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The Cost of Remoteness Revisited

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ABSTRACT

THE COST OF REMOTENESS REVISITED*

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Redding and Sturm (2008) use the German division as a natural experiment to study the importance of market access for regional development. They show empirically that cities close to the East-West German border experienced a significant decline in population growth due to division. I argue that their results are driven by the internal migration of refugees in the 1950s rather than the loss of market access. In fact, the treatment effect estimated by Redding and Sturm (2008) disappears completely once the refugee share in 1950 and boundary changes of sample cities are taken into account.

Keywords: Market Access, Regional Growth, Internal Migration
JEL classification: F15, N94, R12, R23

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1 Introduction

In a very influential article, Redding and Sturm (2008) use the German division after World War II (WWII) as a natural experiment to show the importance of market access for regional development. The authors find that following division 20 West German cities located within 75 kilometers to the East-West German border (treatment cities) experienced a considerable decline in annual population growth relative to other West German cities (control cities). They attribute this growth difference to the decline in market access caused by the division. The key assumption in Redding and Sturm (2008) is that distance to the East-West German border, which determines treatment and control status, affects population growth only through its effect on lost market access. By exploiting the German division as a natural experiment, Redding and Sturm (2008) argue to provide causal evidence on the importance of market access for regional development.[1] Other papers that also exploit the European division after WWII as a source of exogenous variation in market access, confirm the influence of market access on regional development (Redding et al. (2011), Brülhart et al. (2012), and Ahlfeldt et al. (2015)).

Redding and Sturm (2008), however, neglect the war related migration of refugees in the 1950s, which provides an alternative explanation for their findings. I provide empirical evidence that the estimated treatment effect in the 1950s is due to the contemporaneous shock in the internal migration of refugees, rather than the decline in market access. The internal migration pattern was induced by German refugees that had fled to regions close to the later East-West German border in the aftermath of WWII and moved to more western regions in the 1950s. Thus, the distance to the East-West German border also affected the population share of refugees in 1950. Moreover, population growth in the 1950s and population share of refugees in 1950 are strongly negatively correlated. Hence, there is a contemporaneous shock which differs between treatment and control group. Since Redding and Sturm (2008) only control for the population share of refugees in 1961, when many WWII refugees had already changed their initial residence, they neglect the internal migration in the 1950s.

[1] Redding and Sturm (2008) argue that the East-West German border was drawn for military purposes only. Thus, treatment and control status were assigned randomly and did not depend on any prewar characteristics of the cities that might affect population growth. Moreover, the authors argue that alternative explanations for regional growth differences, like changes in natural endowments or different institutions, can be ruled out in their setting.

It is important to notice that I do not control directly for the internal migration of refugees. This internal migration might itself be driven by the loss in market access, and adding internal migration might thus create a bad control problem. Instead, I control for the population share of refugees in 1950, which was predetermined at the time of division.

I show that the treatment effect estimated by Redding and Sturm (2008) is nearly halved when I add the population share of refugees in 1950 to control for the internal migration pattern. Moreover, I correct the annual city-level population growth rates by accounting for all boundary changes between 1950 and 1988. I show that the treatment effect disappears completely when these boundary changes are taken into account.

2 Refugees in West Germany

In 1944, when the defeat of Nazi Germany was just a matter of time, the German authorities ordered the evacuation of ethnic Germans that were living in the eastern territories of the German Reich.[2] However, the rapid advances of the Soviet troops and the fear of acts of revenge led to an unorganized mass flight of German population to the west. After the unconditional surrender of Nazi Germany on May 8, 1945, the eastern territories of the German Reich were ceded to Poland and Russia (see Figure 1). However, even after the unconditional surrender the forceful displacement of ethnic Germans, especially from Polish and Czechoslovakian territories, continued. These *wild* expulsions were followed by organized and compulsory transfers that were sanctioned by the Potsdam Agreement in August 1945.

According to the 1950 census, there were about 8 million expellees (*Heimatvertriebene*) mainly from the eastern territories and further 1.5 million *immigrants* (*Zugewanderte*) from the Soviet occupation zone living in West Germany. These refugees (=expellees + *immigrants*) made up a fifth of the West German population in 1950 (Statistisches Bundesamt, 1955). The 9.5 million refugees, however, were not equally distributed over West Germany. Most refugees fled to the nearest western territories not threatened by the Red Army. Moreover, the organized transports according to the Potsdam Agreement brought refugees to reception points in the east of each receiving occupation zone (Douglas, 2012). Finally, the

[2] See Schulze (2011) for an overview on the expulsion and immigration of ethnic Germans during and after WWII. For further details see Bethlehem (1982), Connor (2007), Douglas (2012), and Ziemer (1973).

French zone in the south west of Germany refused to admit any refugees. Overall, therefore, refugees were concentrated close to the later East-West German border (Wild, 1979).

Several attempts of the authorities to rebalance the regional distribution of refugees between 1947 and 1949 failed. Refugees that tried to relocate on their own were hindered by several restrictions imposed by the Allied Occupation Forces (Müller and Simon, 1959). Although the restrictions were relaxed by 1949, the unorganized movement of refugees remained at a minor scale until 1950 (Müller and Simon, 1959; Ziemer, 1973). Thus, the unequal distribution of refugees was highly persistent and could be observed even 5 years after the war.

For 107 sample cities I have information on the population share of expellees in 1946.[3] Expellees are defined as all ethnic Germans who on September 1, 1939 lived in the former German territories east of the Oder-Neisse line, the Saarland or abroad but only if their mother tongue was German. The correlation coefficient between the expellee share in 1946 and 1950 for these 107 sample cities is 0.97. The correlation coefficient between the expellee share in 1946 and the population share of refugees in 1950, which includes Germans that lived in the Soviet occupation zone or Berlin on September 1, 1939, is 0.94.[4]

Free movement was fully restored finally on May 23, 1949 when the Federal Republic of Germany was founded. In 1949, however, the housing stock of the cities was not rebuilt and the influx of population into the cities, thus, picked up slowly (Wild, 1979). Mainly male refugees of working age moved to the industrial centers of West Germany, i.e., cities in the Rhine-Ruhr area, the Rhine-Main area, and Baden-Wuerttemberg, looking for a job and better living conditions (Connor, 2007). These workers wanted to get their families to join them as soon as they could get appropriate accommodations (Pfeil, 1959).

Additionally, the government began to organize population transfers from the three federal states with the highest shares of refugees (Schleswig-Holstein, Lower Saxony, and Bavaria) to the other, more western, federal states at the end of 1949. A second program followed in 1951 and a third in 1953. All together, these programs resettled 750,000 refugees. By the end of June 1958 about 918,000 refugees had been relocated by official programs (Müller and Simon, 1959). The total

[3]The data are provided in Statistisches Amt des Vereinigten Wirtschaftsgebietes (1950), Statistisches Landesamt Nordrhein-Westfalen (1949), and Statistisches Landesamt Rheinland-Pfalz (1949).

[4]The data on expellees, refugees and native population in each sample city according to the 1950 census are reported in the Statistical Yearbook of German Cities (*Statistisches Jahrbuch Deutscher Gemeinden*) published by the Deutscher Städtetag (1952, 1953) and Statistisches Landesamt Hamburg (1952).

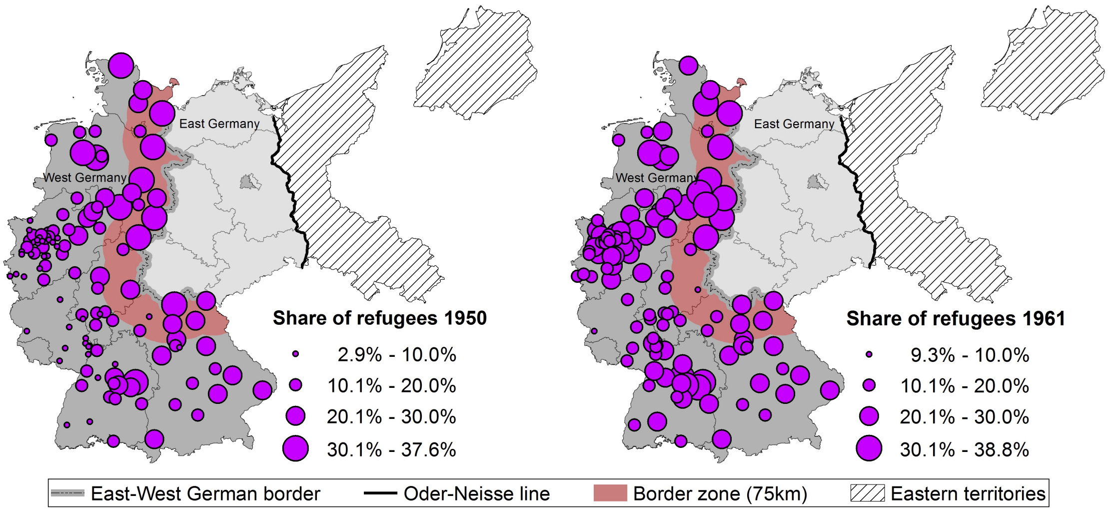

Figure 1: The German Reich in its 1937 borders and the distribution of refugees in sample cities in 1950 and 1961.
Sources: Redding and Sturm (2008), MPIDR and CGG (2011), and Deutscher Städtetag (1952, 1953), own calculations. Author's design.

amount of internal migration was considerably larger, since additional refugees moved on their own.

Figure 1 depicts the share of refugees in total population in 1950 and 1961 for all 119 West German sample cities. The data on the population share of refugees in 1961 are from Redding and Sturm (2008). Moreover, Figure 1 displays East Germany (the former Soviet occupation zone), the Oder-Neisse line, which was set as the new eastern border of Germany, and the eastern territories of the German Reich that became part of Poland and Russia after WWII. The left part of Figure 1 shows the population share of refugees in 1950. It ranges from 2.9 percent in Pirmasens, a city far in the west and in the French occupation zone, to 37.6 percent in Lübeck, located at the East-West German border. The cities lying within 75 kilometers of the East-West German border had on average higher shares of refugees (25 percent) than more western cities (14 percent) in 1950. The right part of Figure 1 shows the population share of refugees in 1961.

The internal migration of refugees changed the structure of city population in the 1950s substantially. First, refugees left the rural areas they had initially arrived at and migrated to cities (Lendl, 1959). Consequently, the overall population share of refugees in the sample cities increased from 16 percent in 1950 to 22 percent in 1961.[5] Second, their movement to the west reduced differences in the shares

[5]Between 1950 and 1961 another 3 million refugees from East Germany reached West Germany and located predominantly in cities (Statistisches Bundesamt, 1967). Thus, these new refugees increased the average population share of refugees additionally.

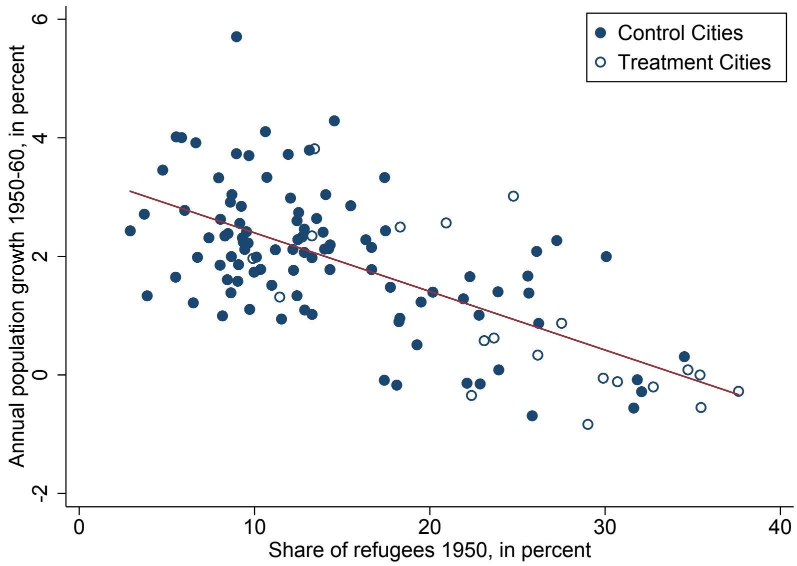

Figure 2: Annual population growth 1950-60 and refugee share in 1950.
Sources: Deutscher Städtetag (1952, 1953) and Redding and Sturm (2008), own calculations.

of refugees between treatment and control cities, i.e., between cities within 75 kilometers to the East-West German border and other West German cities. In 1961, the treatment cities had an average refugee share of 26 percent while control cities had reached 21 percent. Due to the relocation of the refugees, the difference between treatment and control cities in the population share of refugees more than halved between 1950 and 1961 from 11 to 5 percentage points. Figure 1 illustrates these changes.

Figure 2 illustrates the negative correlation of annual population growth of the sample cities in the 1950s with the population share of refugees in 1950. The 20 treatment cities are highlighted by circles to show their clustering at the south-east, i.e., having high shares of refugees and low population growth in the 1950s. The unconditional OLS regression line in Figure 2 suggests that an increase of the 1950 refugee share of one percentage point is associated with a decrease in the annual population growth between 1950 and 1960 by 0.1 percentage points. However, this result also holds when I restrict the regression to control cities only. Thus, the negative association of population growth in the 1950s and the population share of refugees is not driven by the treatment status. This simple regression provides some preliminary evidence that at least a part of the growth differences between treatment and control cities may be driven by the relocation of refugees.

3 Estimations and Discussion

For the empirical analysis I have recourse to the data set provided by Redding and Sturm (2008) and add data on population and refugees in 1950 provided by Deutscher Städtetag (1952, 1953).[6] Refugees are defined as all ethnic Germans who on September 1, 1939 lived in the former German territories east of the Oder-Neisse line, the Soviet occupation zone, Berlin or the Saarland. In addition, ethnic Germans from abroad with German as their mother tongue are defined as refugees.

The estimation strategy follows Redding and Sturm (2008) and uses a differences-in-differences model to estimate the treatment effect, i.e., the effect of division on the annual population growth of 20 West German cities within 75 kilometers to the East-West German border compared to 99 more western German cities. The underlying argument is that cities close to the border (treatment cities) lost substantial part of their market access while more western cities (control cities) were less affected. This estimation strategy is prone to contemporaneous shocks that affect treatment and control cities at a different scale. Thus, it is important to control for the inflow of refugees during and after WWII into West German cities. Redding and Sturm (2008) control for the population share of refugees in 1961. On the one hand, this measure allows the authors to include the 3 million refugees which arrived from East Germany between 1950 and 1961. On the other hand, it neglects the migration pattern in the 1950s, because regional distribution of refugees was widely rebalanced in 1961. Thus, I include the population share of refugees in 1950 as a control variable to account for this contemporaneous shock on city population. To be more precise, I do not control for the internal migration flows directly, since these flows might be affected by the changes in market access, but for the refugee share in 1950. An important feature of this control variable is that it was predetermined at the time of division, because most refugees arrived until 1946 and were hindered to relocate in the aftermath of WWII.[7]

[6] To relate the refugee share in 1950 to the same observational units as in Redding and Sturm (2008), I aggregate the cities according to the online appendix of Redding and Sturm (2008) if necessary, i.e., if boundary changes took place in 1950 or later. Moreover, I compare the total population in 1950 of own aggregations with the population in the original data set. The mean absolute difference is about 25, with a maximum of 49 inhabitants, and can be explained by rounding differences, since the values in the original data set are rounded to the nearest full hundreds. The data for Hamburg are from Statistisches Landesamt Hamburg (1952), because erroneously only female refugees were reported in Deutscher Städtetag (1953).

[7] However, some refugees might have endogenously chosen their initial residence or relocated according to city characteristics. I assess this potential endogeneity problem in the Appendix. The robustness checks indicate that endogenous location choice of refugees should be a minor problem, if at all.

3.1 Controlling for Internal Migration in the 1950s

In a first step I reproduce the estimation results reported in Table 5 in Redding and Sturm (2008, p. 1790) and additionally conduct the same estimation but with the 1950 population share of refugees as a control. The underlying estimation equation is as follows:

$$\begin{aligned} Popgrowth_{ct} = \alpha + \beta Border_c + \gamma \left(Border_c \times Division_t\right) \\ + \delta_t \left(Refugees_{ic} \times d_t\right) + d_t + \varepsilon_{ct}, \end{aligned} \quad (1)$$

where $Popgrowth_{ct}$ is the annualized population growth rate in city c for the periods t = 1919-1925, 1925-1933, 1933-1939, 1950-1960, 1960-1970, 1970-1980, and 1980-1988. $Border_c$ is a binary dummy variable that is one for all cities lying within 75 kilometers to the East-West German border and zero otherwise, $Division_t$ is a dummy that is one for the postwar periods 1950-1960, 1960-1970, 1970-1980, and 1980-1988, α is the intercept, d_t is a full set of time fixed effects, and ε_{ct} is an error term, clustered at the city level. Finally, the share of $Refugees_{ic}$ in total population in year i = 1950, 1961 of each city c is interacted with period dummies to capture the effect of refugees relocation on population growth in each period.

Table 1 presents the results in the first two columns. Column 1 contains the original results of Redding and Sturm (2008) with the refugee share in 1961 as a control. The estimated treatment effect γ is -0.678 and is statistically significant at the 1 percent level. This estimate is virtually unchanged compared to their baseline model result that does not control for refugees (-0.746, s.e. 0.182). Consequently, the authors conclude that the overall treatment effect cannot be explained by refugees.

Column 2 shows the results of the same estimation but includes the 1950 population share of refugees. Now the estimated treatment effect is almost halved (-0.387) and not statistically significant at any standard level. Moreover, the explanatory power of the econometric model increases markedly (R-squared increases from 0.243 in column 1 to 0.281 in column 2). Interaction terms imply that an 1 percentage point increase of the refugee share in 1950 reduces annual population growth in the 1950s by 0.089 percentage points. In 1950, the population share of refugees in treatment cities was on average 11 percentage points above control cities. The average annual population growth rate in the 1950s is 0.88 percent for treatment and 2.00 percent for control cities. Thus, the internal migration of refugees in the 1950s explains a substantial part of the different development of treatment and control cities ($0.089 \times 11 = 0.979$).

In the 1970s, however, the interaction term between the refugee share and the time dummy is 0.046 and significant at the 5 percent level. This result indicates that cities with a high population share of refugees in 1950 grew faster in the 1970s. Vonyó (2012) shows that West German cities suffered from labor shortages right after the war, so these cities may have had a larger reserve of labor force during the *Wirtschaftswunder* and entered a higher growth path in the long run.

A rather surprising result is the positive correlation between refugee share and population growth in the period 1933-1939. A possible explanation is the location of refugees in former army buildings. Between 1933 and 1939, Germany rearmed and increased the number of soldiers substantially to prepare for the war. These soldiers were counted as part of the population in the censuses 1933 and 1939 and thus increased the population of cities with a military base. After the war, refugees occupied vacant army buildings, since housing was scarce. Hence, there is a possible link between population growth in the 1930s and refugees inflow after WWII. I provide empirical evidence for this link in the Appendix.

Finally, I analyse the dynamics of growth adjustment. In their *Basic Results* in Table 2, Redding and Sturm (2008, p. 1780) present the treatment effect for each postwar period separately. Column 3 of Table 1 shows their results. The authors find the magnitude of the treatment effect to "decline monotonically over time" (Redding and Sturm, 2008, p. 1781). They interpret this finding as a gradual adjustment of the city's population to the new long run equilibrium after the market access shock. Does the internal migration that took place in the 1950s alter this finding?

For the estimation, I replace the term ($Border_c \times Division_t$) in equation (1) by ($Border_c \times Division_t \times d_t$). Hence, the border dummy is interacted with each postwar period separately. I present the results in column 4. According to these results, the division had no immediate impact on treatment cities. Hence, the relocation of refugees can fully explain the large growth differences between treatment and control group in the 1950s and 1960s.[8] The only statistically significant estimate for treatment cities is found for the 1970s with -1.122. This growth difference between treatment and control cities in the 1970s drives the total effect in column 2.

[8]When I estimate the same equation but with the population share of refugees in 1961, the model still estimates a significant treatment effect in all postwar periods because the internal migration in the 1950s is ignored. The estimation results are not reported to save space but can be received upon request.

Table 1: Population Growth – Controlling for Internal Migration

	Population growth			
	(1)	(2)	(3)	(4)
$Border_c \times Division_t$	-0.678***	-0.387		
	(0.211)	(0.261)		
$Border_c \times$ 1950-60			-1.249***	0.019
			(0.348)	(0.351)
$Border_c \times$ 1960-70			-0.699**	-0.259
			(0.283)	(0.315)
$Border_c \times$ 1970-80			-0.640**	-1.122**
			(0.355)	(0.472)
$Border_c \times$ 1980-88			-0.397**	-0.187
			(0.147)	(0.198)
$Refugees_{ic} \times$ 1919-25	0.004	0.000		0.000
	(0.020)	(0.020)		(0.020)
$Refugees_{ic} \times$ 1925-33	-0.014	-0.018		-0.018
	(0.014)	(0.014)		(0.014)
$Refugees_{ic} \times$ 1933-39	0.068***	0.072***		0.072***
	(0.022)	(0.017)		(0.017)
$Refugees_{ic} \times$ 1950-60	-0.052***	-0.089***		-0.098***
	(0.014)	(0.010)		(0.011)
$Refugees_{ic} \times$ 1960-70	-0.002	-0.019		-0.022*
	(0.016)	(0.012)		(0.012)
$Refugees_{ic} \times$ 1970-80	0.065***	0.046**		0.062***
	(0.024)	(0.018)		(0.020)
$Refugees_{ic} \times$ 1980-88	0.013*	0.003		-0.001
	(0.007)	(0.006)		(0.005)
$Border_c$	0.029	-0.067	0.129	-0.067
	(0.167)	(0.213)	(0.139)	(0.213)
Year FE	Yes	Yes	Yes	Yes
i	1961	1950	–	1950
Observations	833	833	833	833
R-squared	0.243	0.281	0.214	0.286

Notes: The dependent variable is the annualized population growth rate of each West German city c in percent. The growth periods t are 1919-1925, 1925-1933, 1933-1939, 1950-1960, 1960-1970, 1970-1980, and 1980-1988. The $Border_c$ dummy is one for all cities c within 75 km to the East-West German border and zero else. $Division_t$ is a dummy which is one for each postwar period and zero else. $Refugees_{ic}$ is the population share of refugees in each city in year i, with i = 1950, 1961. Thus, column 1 reports the original results of Redding and Sturm (2008) including the population share of refugees in 1961 as a control variable. In column 2, however, the refugee share in 1961 is replaced by the population share of refugees in 1950. Column 3 shows the results of a model with the *Border* dummy interacted with each postwar period separately but without further control variables. Column 4 adds the population share of refugees in 1950 to the model of column 3. Standard errors in parentheses are adjusted for clustering on cities.
*** = Significant at the 1 percent level.
** = Significant at the 5 percent level.
* = Significant at the 10 percent level.

3.2 Adjusting for Boundary Changes

The theoretical NEG literature does not provide an explanation for a delayed impact of a market access shock on population growth. Therefore, the strong and significant growth difference for the 1970s is surprising. However, sample cities experienced numerous boundary changes especially in the 1970s. In particular control cities in Baden-Wuerttemberg and North Rhine-Westphalia were affected by these boundary changes. Although Redding and Sturm (2008, Technical Appendix, p. 8) "aggregate any settlement with a population greater than 10,000 in 1919 that merges with one of [their] cities for all years in the sample", they do not adjust the population growth rate for smaller boundary changes. Thus, the estimated treatment effect for the 1970s might be a statistical artefact of these smaller boundary changes, where municipalities with less than 10,000 inhabitants in 1919 are incorporated into sample cities. Therefore, I correct the annual population growth rate for all population changes that were induced by boundary changes between 1950 and 1988.

Data on boundary changes are provided in Statistisches Bundesamt (1958, 1963, 1972, 1983, 1989). These sources report the population of each sample city for the latest census both with and without boundary changes. Thus, I can adjust the annual population growth rate in each postwar growth period for boundary changes. Between 1950 and 1988 there are 155 growth periods with smaller boundary changes in the sample cities, 93 of them in the 1970s. Table B.1 in the Appendix gives an exhaustive overview of all boundary changes.

In Table 2 I estimate the baseline differences-in-differences model of Redding and Sturm (2008) with and without adjusting for boundary changes and conduct the same estimations as in the previous section but with the adjusted population growth rate as dependent variable. Column 1 of Table 2 shows the original baseline differences-in-differences results of Redding and Sturm (2008), without adjusting for smaller boundary changes. The estimated treatment effect is -0.746. Controlling for all boundary changes in column 2 almost doubles the R-squared and reduces the estimated treatment effect to -0.631.

Columns 3 to 6 present the same results as in Table 1 but for the adjusted population growth rate as dependent variable. There are three main differences in the estimation results. First, the explanatory power measured by the R-squared increases in all four specifications compared to the results in Table 1. Second, the absolute treatment effect in column 3 (column 4) decreases to -0.483 (-0.145) compared to -0.678 (-0.387) in column 1 (column 2) of Table 1. Finally, the

Table 2: Population Growth – Adjusting for Boundary Changes

	Population growth					
	(1)	(2)	(3)	(4)	(5)	(6)
$Border_c \times Division_t$	-0.746***	-0.623***	-0.483**	-0.145		
	(0.182)	(0.170)	(0.192)	(0.217)		
$Border_c \times$ 1950-60					-1.244***	0.058
					(0.348)	(0.342)
$Border_c \times$ 1960-70					-0.572***	-0.206
					(0.188)	(0.227)
$Border_c \times$ 1970-80					-0.278	-0.246
					(0.192)	(0.253)
$Border_c \times$ 1980-88					-0.397***	-0.186
					(0.147)	(0.199)
$Refugees_{ic} \times$ 1919-25			0.004	0.000		0.000
			(0.020)	(0.020)		(0.020)
$Refugees_{ic} \times$ 1925-33			-0.014	-0.018		-0.018
			(0.014)	(0.014)		(0.014)
$Refugees_{ic} \times$ 1933-39			0.068***	0.072***		0.072***
			(0.022)	(0.017)		(0.017)
$Refugees_{ic} \times$ 1950-60			-0.059***	-0.096***		-0.101***
			(0.014)	(0.009)		(0.011)
$Refugees_{ic} \times$ 1960-70			-0.000	-0.017**		-0.016*
			(0.010)	(0.008)		(0.008)
$Refugees_{ic} \times$ 1970-80			0.019**	0.013*		0.015**
			(0.008)	(0.007)		(0.007)
$Refugees_{ic} \times$ 1980-88			0.010	-0.002		-0.001
			(0.007)	(0.006)		(0.005)
$Border_c$	0.129	0.129	0.029	-0.067	0.129	-0.067
	(0.139)	(0.139)	(0.167)	(0.213)	(0.139)	(0.213)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
i	–	–	1961	1950	–	1950
Boundary changes	No	Yes	Yes	Yes	Yes	Yes
Observations	833	833	833	833	833	833
R-squared	0.211	0.379	0.406	0.455	0.385	0.455

Notes: In column 1 the dependent variable is the annualized population growth rate of each West German city c in percent. In columns 2 to 6, the annualized population growth rate is adjusted for boundary changes between 1950 and 1988. Growth periods t are 1919-1925, 1925-1933, 1933-1939, 1950-1960, 1960-1970, 1970-1980, and 1980-1988. The $Border_c$ dummy is one for all cities c within 75 km to the East-West German border and zero else. $Division_t$ is a dummy which is one for each postwar period and zero else. $Refugees_{ic}$ is the population share of refugees in each city in year i, with i = 1950, 1961. Thus, column 1 reports the baseline differences-in-differences results of Redding and Sturm (2008). Column 2 shows the same results but with the adjusted annualized population growth rate as dependent variable. Column 3 includes the population share of refugees in 1961 as a control variable. In column 4, however, the refugee share in 1961 is replaced by the population share of refugees in 1950. Column 5 shows the results of a model with the *Border* dummy interacted with each postwar period separately but without further control variables. Column 6 adds the population share of refugees in 1950 to the model of column 5. Standard errors in parentheses are adjusted for clustering on cities.
*** = Significant at the 1 percent level.
** = Significant at the 5 percent level.
* = Significant at the 10 percent level.

interaction term of the treatment dummy with 1970-1980 in columns 5 and 6 is lower in absolute terms. When I take the boundary changes into account the estimated growth difference between treatment and control cities for the 1970s decreases from -1.122 (s.e. 0.472) to -0.246 (s.e. 0.253) in column 6 of Table 2.

These results indicate that the boundary changes increase the measurement error in the dependent variable and bias the treatment effect upwards. Furthermore, boundary changes in the 1970s can explain the large growth differences between treatment and control cities in this period. Most importantly, controlling for the refugee share in 1950 and adjusting for boundary changes reduces the baseline treatment effect from -0.746 in column 1 to -0.145 in column 4. Thus, there is no statistically significant growth difference between treatment and control cities once the internal migration of refugees and smaller boundary changes are taken into account.

4 Conclusion

The empirical results provide strong evidence that the treatment effect estimated by Redding and Sturm (2008) primarily captures a contemporaneous shock in refugee share, which caused internal migration of refugees in the 1950s, rather than a shock in market access. There is no statistically significant treatment effect when I take this contemporaneous shock into account. Moreover, when I adjust the population growth rate for smaller boundary changes the difference between treatment and control cities disappears completely.

Appendix

A Robustness Checks

Although refugees could hardly choose their preferred destination and were hindered to relocate in the aftermath of WWII, an endogenous location choice of some refugees and relocations can not be ruled out completely. Some refugees might have chosen specific destination cities according to (unobserved) characteristics that in turn affect city growth. Therefore, the previous estimates that include the population share of refugees in 1950 as a control variable might suffer from an endogeneity bias.

In the immediate aftermath of WWII refugees preferred cities with appropriate supply of food and housing. Therefore, they were looking for smaller, more rural cities with less destruction. Moreover, these were cities with relatively small industrial sectors and unfavorable growth perspectives. After this initial phase, refugees tried to move to more urban centers with larger labor markets and better growth perspectives. Whether the previous results are upward or downward biased depends on the influence of these two factors on the distribution of refugees in 1950.

To assess the potential endogeneity problem, I replace the population share of refugees in 1950 with the population share of expellees in 1950 in section A.1 and employ an instrumental variable (IV) approach in section A.2. Both approaches provide evidence that the potential endogeneity bias should be a minor problem, if at all. In section A.3, I show that the rearmament of Germany between 1933 and 1939 can fully explain the correlation between prewar population growth and refugee share in the aftermath of WWII. Finally, I allow the instrumental variable of section A.2 to compete directly against the distance to the East-West German border in section A.4. This regression provides suggestive evidence, that the growth differences between treatment and control cities are driven by the internal migration of refugees rather than the loss of market access.

A.1 Population Share of Expellees

The first approach to take the potential endogeneity bias into account is to restrict the following analysis to expellees. Expellees are defined as ethnic Germans from the former eastern territories of the German Reich and from abroad, but only if their mother tongue was German. Hence, *immigrants* from the Soviet occupation zone or Berlin are excluded because they were less often forcefully displaced and could more often decide on their emigration to West Germany. Therefore, the initial location choice of *immigrants* is more likely driven by destination characteristics that foster postwar growth.

I conduct the same estimations as in sections 3.1 and 3.2, but replace the population share of refugees in 1950 by the population share of expellees in 1950. The results are presented in Table A.1. In columns 1 and 2, the dependent variable is the annualized population growth rate, while in columns 3 and 4, the growth rate is adjusted for boundary changes that took place between 1950 and 1988.

The main findings are not affected by focusing on expellees rather than refugees more specifically. The baseline treatment effect reduces from -0.746 to -0.413 (s.e. 0.236) in column 1 and to -0.212 (s.e. 0.197) in column 3. These estimates are very similar to previous results. In columns 2 and 4, I interact the treatment dummy with each post treatment period separately. The results do not differ much from the corresponding results in Tables 1 and 2. There is no statistically significant treatment effect in the postwar periods, except for the 1970s in column 2. This effect, however, can be explained by boundary changes. Furthermore, in the 1950s, the interaction term between the expellee share and the time dummy is lower compared to previous estimations. This finding is in line with the self selection of East German *immigrants* into cities with favorable growth perspectives.

A.2 IV Regression

However, also expellees might have chosen their destination according to unobserved city characteristics. To control for the endogenous location decision of expellees, I follow Braun and Kvasnicka (2014) and use an instrumental variable (IV) approach. During the phase of flight and expulsion expellees fled mainly to the nearest West German region not threatened by the Red Army, i.e., regions close to their old homelands. The IV approach relies on this fact and instruments the population share of expellees in a given sample city by the weighted sum of distances to the origin regions of expellees. The weight is defined as the population of the origin region divided by the total population of all origin regions. Hence, the instrument captures the variation in the population share of expellees driven by the geographical distance to the old homelands. The instrument Z_c is defined as:

$$Z_c = \sum_s \left(Distance_{cs} \times \frac{Population_{39s}}{\sum_s Population_{39s}} \right), \tag{A.1}$$

Table A.1: Robustness – Population Share of Expellees in 1950

	Population growth			
	Not Adjusted		Adjusted	
	(1)	(2)	(3)	(4)
$\text{Border}_c \times \text{Division}_t$	-0.413*		-0.212	
	(0.236)		(0.197)	
$\text{Border}_c \times$ 1950-60		-0.176		-0.138
		(0.319)		(0.307)
$\text{Border}_c \times$ 1960-70		-0.306		-0.260
		(0.318)		(0.216)
$\text{Border}_c \times$ 1970-80		-0.924**		-0.204
		(0.434)		(0.238)
$\text{Border}_c \times$ 1980-88		-0.247		-0.247
		(0.188)		(0.188)
$\text{Expellees}_{50c} \times$ 1919-25	0.007	0.007	0.007	0.007
	(0.024)	(0.024)	(0.024)	(0.024)
$\text{Expellees}_{50c} \times$ 1925-33	-0.024	-0.024	-0.024	-0.024
	(0.016)	(0.016)	(0.016)	(0.016)
$\text{Expellees}_{50c} \times$ 1933-39	0.083***	0.083***	0.083***	0.083***
	(0.020)	(0.020)	(0.020)	(0.020)
$\text{Expellees}_{50c} \times$ 1950-60	-0.111***	-0.116***	-0.119***	-0.120***
	(0.012)	(0.014)	(0.011)	(0.013)
$\text{Expellees}_{50c} \times$ 1960-70	-0.026**	-0.029**	-0.019**	-0.018*
	(0.013)	(0.013)	(0.009)	(0.009)
$\text{Expellees}_{50c} \times$ 1970-80	0.047**	0.058**	0.013	0.012
	(0.021)	(0.023)	(0.008)	(0.008)
$\text{Expellees}_{50c} \times$ 1980-88	0.006	0.003	0.002	0.003
	(0.006)	(0.006)	(0.006)	(0.006)
Border_c	-0.041	-0.041	-0.041	-0.041
	(0.194)	(0.194)	(0.194)	(0.194)
Year FE	Yes	Yes	Yes	Yes
Observations	833	833	833	833
R-squared	0.281	0.284	0.458	0.458

Notes: The dependent variable is the annualized population growth rate of each West German city c in percent. In columns 3 and 4, the annualized population growth rate is adjusted for boundary changes between 1950 and 1988. Growth periods t are 1919-1925, 1925-1933, 1933-1939, 1950-1960, 1960-1970, 1970-1980, and 1980-1988. The $Border_c$ dummy is one for all cities c within 75 km to the East-West German border and zero else. $Division_t$ is a dummy which is one for each postwar period and zero else. $Expellees_{50c}$ is the population share of expellees in each city in 1950. In columns 1 and 3 the population share of expellees in 1950 is included as a control variable. In columns 2 and 4, however, the *Border* dummy is interacted with each postwar period separately. Thus, columns 1 and 2 correspond to columns 2 and 4 in Table 1. Columns 3 and 4 correspond to columns 4 and 6 in Table 2. Standard errors in parentheses are adjusted for clustering on cities.
*** = Significant at the 1 percent level.
** = Significant at the 5 percent level.
* = Significant at the 10 percent level.

where $Distance_{cs}$ is the great circle distance between the administrative capital of a origin region of expellees s and a sample city c, and $Population_{39s}$ is the population of a origin region in 1939.[9]

The identifying assumption of the IV regression is $Cov(Z_c, \varepsilon_{ct}) = 0$. This assumption requires two things. First, conditional on covariates, there is no unobserved factor that drives Z_c and population growth. Second, the instrument affects the population growth only through its effect on the expellee share.

Due to the structure of the model and because the endogenous regressor as well as the excluded instrument Z_c are time invariant, it is possible to reduce the first stage regression to a single cross section. The estimation equation for the first stage regression is as follows:

$$Expellees_{50c} = \alpha' + \beta' Z_c + \gamma' Border_c + \varepsilon'_c, \tag{A.2}$$

where $Expellees_{50c}$ is the population share of expellees in each sample city c in 1950, Z_c is the instrumental variable defined in equation (A.1), $Border_c$ is a binary dummy variable that is one for all cities located within 75 kilometers to the East-West German border and zero otherwise, and ε'_c is a heteroscedasticity robust error term.

Table A.2 shows the results of the first stage regression. The instrument is statistically significant and the partial F-Statistic of the excluded instrument is above the standard threshold of 10, indicating no weak instrument problem. Moreover, a large fraction of the variance in the expellee share is explained by the first stage (R-squared = 0.45) and the treatment status has no statistically significant influence on the population share of expellees (γ' = -1.158, s.e. 1.894).

Table A.2: IV Regression – First stage

	Z_c	Border$_c$	Observations	R-squared	F-Statistic, excl. instr.
Expellees$_{50c}$	-0.058***	-1.158	119	0.453	82.41
	(0.006)	(1.894)			

Notes: The dependent variable is the population share of expellees in each West German city c in 1950. Z_c is the instrumental variable defined in equation (A.1). The $Border_c$ dummy is one for all cities c within 75 km to the East-West German border and zero else. Heteroscedasticity robust errors in parentheses.
*** = Significant at the 1 percent level.
** = Significant at the 5 percent level.
* = Significant at the 10 percent level.

[9]The origin regions are the districts Königsberg, Gumbinnen and Allenstein in East Prussia, Breslau, Liegnitz and Oppeln in Silesia, Stettin and Köslin in Pommerania, Frankfurt, Danzig, Memel Territory, and the Sudetenland.

For the IV estimation I use the same differences-in-differences model as before, but instrument the population share of expellees in 1950 with the population weighted distance to origin regions of expellees Z_c. I employ the feasible efficient two step generalized method of moments estimator with errors clustered at the city level implemented by STATA command ivreg2 (Baum et al., 2007). Table A.3 presents the estimation results. In columns 1 and 2, the dependent variable is the annualized population growth rate, while in columns 3 and 4 the growth rate is adjusted for boundary changes. The results in Table A.3 thus correspond to the results in Table A.1.

In all four specifications the treatment effect is not statistically significant and very close to the results in Tables 1 and 2. The estimation coefficient on the interaction of the instrumented expellee share and the 1950s is lower than in Table A.1. This difference indicates an endogenous relocation of expellees towards cities with better growth perspectives, the difference, however, is not statistically significant.

A.3 Rearmament of Germany

In Table A.3, there is a significant correlation between the instrumented population share of expellees and prewar growth. A possible explanation for this correlation is the location of expellees in former army buildings. Between 1933 and 1939 Nazis Germany increased the number of military personnel substantially to prepare for the war. These soldiers were counted as part of the population in the censuses 1933 and 1939 and thus increased the population of cities with a military base. After the war, refugees occupied vacant army buildings, since housing was scarce.

To test whether the correlation between prewar growth and the expellee inflow is driven by the rearmament of Germany or not, I add the public sector employment share in 1939 as a control variable. In the occupational census in 1939, the military personnel was counted as part of the public sector. Therefore, the employment share of the public sector in total employment provides information on the size of the military personnel. More precisely, I use the variable $Public1939$ in the data set of Redding and Sturm (2008), which comprises not the whole public sector but a single occupational group. This occupational group includes only public administration, justice, and military personnel. Thus, large groups in the public sector like teachers or medical workers are excluded. The variable is a good proxy for military personnel, if the personnel in administration and justice is almost proportional to the size of total employment in each city and therefore

Table A.3: Robustness – IV Regression Using Distance to Origin of Refugees

	Population growth			
	Not Adjusted		Adjusted	
	(1)	(2)	(3)	(4)
$Border_c \times Division_t$	-0.343		-0.168	
	(0.275)		(0.226)	
$Border_c$ × 1950-60		-0.009		0.007
		(0.331)		(0.329)
$Border_c$ × 1960-70		-0.194		-0.270
		(0.362)		(0.249)
$Border_c$ × 1970-80		-1.008*		-0.248
		(0.558)		(0.259)
$Border_c$ × 1980-88		-0.161		-0.161
		(0.241)		(0.241)
$Expellees'_{50c}$ × 1919-25	-0.010	-0.010	-0.010	-0.010
	(0.027)	(0.027)	(0.027)	(0.027)
$Expellees'_{50c}$ × 1925-33	-0.051**	-0.051**	-0.051**	-0.051**
	(0.020)	(0.020)	(0.020)	(0.020)
$Expellees'_{50c}$ × 1933-39	0.110***	0.110***	0.110***	0.110***
	(0.028)	(0.028)	(0.028)	(0.028)
$Expellees'_{50c}$ × 1950-60	-0.125***	-0.143***	-0.135***	-0.145***
	(0.020)	(0.022)	(0.019)	(0.022)
$Expellees'_{50c}$ × 1960-70	-0.041	-0.049	-0.028*	-0.022
	(0.026)	(0.030)	(0.017)	(0.019)
$Expellees'_{50c}$ × 1970-80	0.028	0.064	0.008	0.013
	(0.034)	(0.045)	(0.012)	(0.013)
$Expellees'_{50c}$ × 1980-88	-0.004	-0.014	-0.013	-0.014
	(0.015)	(0.013)	(0.012)	(0.013)
$Border_c$	0.001	0.001	0.001	0.001
	(0.199)	(0.199)	(0.199)	(0.199)
Year FE	Yes	Yes	Yes	Yes
Observations	833	833	833	833
R-squared	0.273	0.275	0.449	0.449

Notes: The dependent variable is the annualized population growth rate of each West German city c in percent. In columns 3 and 4, the annualized population growth rate is adjusted for boundary changes between 1950 and 1988. Growth periods t are 1919-1925, 1925-1933, 1933-1939, 1950-1960, 1960-1970, 1970-1980, and 1980-1988. The $Border_c$ dummy is one for all cities c within 75 km to the East-West German border and zero else. $Division_t$ is a dummy which is one for each postwar period and zero else. $Expellees'_{50c}$ are the fitted values of the first stage regression for the population share of expellees in each city in 1950. Standard errors in parentheses are adjusted for clustering on cities.
*** = Significant at the 1 percent level.
** = Significant at the 5 percent level.
* = Significant at the 10 percent level.

the variation in the public sector employment share is mostly driven by the size of the military personnel.

The public sector employment share in 1939 ranges from 0.9 to 14.7 percent with a median of 4.9 percent. Among the 10 cities with the largest public sector employment share are three large harbours of the German Navy and the other 7 cities had a military base as well (Stahl, 1954). Among the 10 cities with the lowest share, however, there are 5 cities that have not even a single duty station. The correlation coefficient between the public sector employment share and the expellee share in 1950 is 0.49. Unfortunately there are no data on public sector employment available for two control cities (Bergisch-Gladbach and Villingen-Schwenningen). However, all previous results are robust to the exclusion of these two cities.

For the first stage regression I include the public sector employment share of 1939 in equation (A.2). Table A.4 shows the results of the first stage regression. The estimator of the population weighted distance (-0.049, s.e. 0.007) is slightly below the estimator in Table A.2 but still statistically significant. The partial F-Statistic for the instrument is 45 and indicates no weak instrument problem. The estimator for the public sector employment share (0.534, s.e. 0.193) is statistically significant and has the expected positive sign. The estimator indicates, that cities with a higher public sector employment share in 1939 have a higher population share of expellees in 1950, which is in line with the location of expellees in former army buildings. The treatment status has no statistically significant influence on the population share of expellees (γ' = -0.718, s.e. 1.825).

Table A.4: IV Regression – First stage – Public Sector Employment Share

	Z_c	Public1939$_c$	Border$_c$	Observations	R-squared	F-Statistic, excl. instr.
Expellees$_{50c}$	-0.049***	0.534***	-0.718	117	0.488	45.00
	(0.007)	(0.193)	(1.825)			

Notes: The dependent variable is the population share of expellees in each West German city c in 1950. Z_c is the instrumental variable defined in equation (A.1). The $Border_c$ dummy is one for all cities c within 75 km to the East-West German border and zero else. $Public_{39c}$ is the employment share of the public sector in each city in 1939. Heteroscedasticity robust errors in parentheses.
*** = Significant at the 1 percent level.
** = Significant at the 5 percent level.
* = Significant at the 10 percent level.

In the econometric model for the IV regression I interact the public sector employment share with a full set of time dummies. Table A.5 presents the results of the IV regression. In column 1, the dependent variable is the annualized population growth rate, while the growth rate is adjusted for boundary changes in column 2. The treatment dummies are not statistically significant and almost identical to previous estimations. The main difference is the interaction term of the instrumented expellee share and the 1930s time dummy. Compared to previous results, the estimator reduces from 0.110 (s.e. 0.028) in Table A.3 to 0.022 (s.e. 0.035) and is not statistically significant. The interaction of the public sector employment share with the prewar period is 0.315 (s.e. 0.068). This estimator implies that an 1 percentage point increase in the public sector employment share increases the annual population growth between 1933 and 1933 by 0.315 percentage points. The average annual population growth rate in the 1930s is 1.74. These results suggest, that the rearmament of Germany can explain the correlation between the postwar inflow of expellees and prewar growth.

However, the assumption of the staff in administration and justice to be almost proportional to total employment might not hold in case of an administrative center. Therefore, I replace the public sector employment share in 1939 by the population share living in collective accommodation in 1939. The data are from the census in 1939 (Statistisches Reichsamt, 1944). Collective accommodation (*Anstaltshaushaltungen*) includes all forms of households where people live together voluntary and nonvoluntary, e.g. military bases, ships, youth centers, dormitories, nursing homes, and also concentration camps. The advantage of the collective accommodation share is that expellees were accommodated in all of these facilities after the war.

The variation in the collective accommodation share, however, is driven by the variation in the military personnel. Hence, the collective accommodation share and the public sector employment share in 1939 are strongly correlated, with a correlation coefficient of 0.85. The correlation coefficient between the collective accommodation share in 1939 and the population share of expellees in 1950 is 0.50. The results of the first stage regression are in Table A.6 and the IV regression results are in Table A.7. However, when I include the collective accommodation as control variable the results are virtually unchanged.

A.4 Validity of Exclusion Restriction

The small differences between the IV regression results in the Appendix and the results in the main text, provide suggestive evidence that the potential endogeneity bias of the treatment effect should be a minor problem, if at all. However, I cannot directly test the exclusion restriction, i.e., that the instrument affects the population growth only through its effect on the expellee share.

Table A.5: Robustness – IV Regression with Public Sector Employment Share

	Population growth			
	Not Adjusted		Adjusted	
	(1)		(2)	
$\text{Border}_c \times \text{Division}_t$	-0.351	(0.283)	-0.186	(0.236)
$\text{Expellees}'_{50c} \times$ 1919-25	0.020	(0.036)	0.020	(0.036)
$\text{Expellees}'_{50c} \times$ 1925-33	-0.049*	(0.028)	-0.049*	(0.028)
$\text{Expellees}'_{50c} \times$ 1933-39	0.022	(0.035)	0.022	(0.035)
$\text{Expellees}'_{50c} \times$ 1950-60	-0.140***	(0.030)	-0.150***	(0.028)
$\text{Expellees}'_{50c} \times$ 1960-70	-0.056**	(0.028)	-0.033	(0.020)
$\text{Expellees}'_{50c} \times$ 1970-80	0.004	(0.046)	-0.005	(0.016)
$\text{Expellees}'_{50c} \times$ 1980-88	-0.007	(0.019)	-0.018	(0.016)
$\text{Public1939}_c \times$ 1919-25	-0.108	(0.067)	-0.108	(0.067)
$\text{Public1939}_c \times$ 1925-33	-0.022	(0.049)	-0.022	(0.049)
$\text{Public1939}_c \times$ 1933-39	0.315***	(0.068)	0.315***	(0.068)
$\text{Public1939}_c \times$ 1950-60	0.060	(0.056)	0.063	(0.056)
$\text{Public1939}_c \times$ 1960-70	0.065*	(0.039)	0.034	(0.029)
$\text{Public1939}_c \times$ 1970-80	0.081	(0.079)	0.049*	(0.026)
$\text{Public1939}_c \times$ 1980-88	0.004	(0.025)	0.012	(0.025)
Border_c	0.031	(0.211)	0.031	(0.211)
Year FE	Yes		Yes	
Observations	819		819	
R-squared	0.320		0.508	

Notes: The dependent variable is the annualized population growth rate of each West German city c in percent. In column 2, the annualized population growth rate is adjusted for boundary changes between 1950 and 1988. Growth periods t are 1919-1925, 1925-1933, 1933-1939, 1950-1960, 1960-1970, 1970-1980, and 1980-1988. The $Border_c$ dummy is one for all cities c within 75 km to the East-West German border and zero else. $Division_t$ is a dummy which is one for each postwar period and zero else. $Expellees'_{50c}$ are the fitted values of the first stage regression for the population share of expellees in each city in 1950. $Public1939_c$ is the employment share of the public sector in each city in 1939. Standard errors in parentheses are adjusted for clustering on cities.
*** = Significant at the 1 percent level.
** = Significant at the 5 percent level.
* = Significant at the 10 percent level.

Table A.6: IV Regression – First stage – Collective Accommodation Share

	Z_c	$Collective_{39c}$	Border_c	Observations	R-squared	F-Statistic, excl. instr.
Expellees_{50c}	-0.047***	0.414***	-0.339	119	0.511	40.79
	(0.007)	(0.116)	(1.843)			

Notes: The dependent variable is the population share of expellees in each West German city c in 1950. Z_c is the instrumental variable defined in equation (A.1). The $Border_c$ dummy is one for all cities c within 75 km to the East-West German border and zero else. $Collective_{39c}$ is the population share living in collective accommodation in 1939. Heteroscedasticity robust errors in parentheses.
*** = Significant at the 1 percent level.
** = Significant at the 5 percent level.
* = Significant at the 10 percent level.

Table A.7: Robustness – IV Regression with Collective Accommodation Share

	Population growth			
	Not Adjusted		Adjusted	
	(1)		(2)	
$\text{Border}_c \times \text{Division}_t$	-0.313	(0.289)	-0.171	(0.242)
$\text{Expellees}'_{50c} \times$ 1919-25	0.013	(0.034)	0.013	(0.034)
$\text{Expellees}'_{50c} \times$ 1925-33	-0.058**	(0.028)	-0.058**	(0.028)
$\text{Expellees}'_{50c} \times$ 1933-39	0.036	(0.033)	0.036	(0.033)
$\text{Expellees}'_{50c} \times$ 1950-60	-0.150***	(0.030)	-0.157***	(0.028)
$\text{Expellees}'_{50c} \times$ 1960-70	-0.075**	(0.030)	-0.045**	(0.022)
$\text{Expellees}'_{50c} \times$ 1970-80	-0.021	(0.046)	-0.015	(0.017)
$\text{Expellees}'_{50c} \times$ 1980-88	-0.016	(0.019)	-0.025	(0.016)
$\text{Collective}_{39c} \times$ 1919-25	-0.064*	(0.037)	-0.064*	(0.037)
$\text{Collective}_{39c} \times$ 1925-33	0.009	(0.032)	0.009	(0.032)
$\text{Collective}_{39c} \times$ 1933-39	0.178***	(0.040)	0.178***	(0.040)
$\text{Collective}_{39c} \times$ 1950-60	0.049	(0.034)	0.047	(0.033)
$\text{Collective}_{39c} \times$ 1960-70	0.073***	(0.026)	0.036*	(0.021)
$\text{Collective}_{39c} \times$ 1970-80	0.110**	(0.049)	0.051***	(0.017)
$\text{Collective}_{39c} \times$ 1980-88	0.017	(0.015)	0.022	(0.015)
Border_c	0.060	(0.214)	0.060	(0.214)
Year FE	Yes		Yes	
Observations	833		833	
R-squared	0.320		0.500	

Notes: The dependent variable is the annualized population growth rate of each West German city c in percent. In column 2, the annualized population growth rate is adjusted for boundary changes between 1950 and 1988. Growth periods t are 1919-1925, 1925-1933, 1933-1939, 1950-1960, 1960-1970, 1970-1980, and 1980-1988. The $Border_c$ dummy is one for all cities c within 75 km to the East-West German border and zero else. $Division_t$ is a dummy which is one for each postwar period and zero else. $Expellees'_{50c}$ are the fitted values of the first stage regression for the population share of expellees in each city in 1950. $Collective_{39c}$ is the population share living in collective accommodation in 1939. Standard errors in parentheses are adjusted for clustering on cities.
*** = Significant at the 1 percent level.
** = Significant at the 5 percent level.
* = Significant at the 10 percent level.

The main potential problem is the correlation between the distance to the East-West German border and the population weighted distance to the origin region of expellees Z_c (correlation coefficient = 0.87). Hence, the instrument might captures a part of the growth effect due to the loss in market access. Therefore, I allow the instrument to compete directly against the distance to the East-West German border. While the instrument captures more of the variation in the expellee share the latter captures lost market access, especially when I assume that the treatment effect is of limited range, for example 75 kilometers. The correlation between the population share of expellees in 1950 and the distance to the East-West German border is -0.50, whereas the correlation with the population weighted distance is -0.67.

The estimation equation is as follows:

$$Popgrowth_{ct} = \alpha^{\dagger} + \beta_t^{\dagger} \left(BorderDistance_c \times d_t \right) + \gamma_t^{\dagger} \left(Z_c \times d_t \right) + \varepsilon_c^{\dagger}, \qquad \text{(A.3)}$$

where $Popgrowth_{ct}$ is the annualized population growth rate in city c in time period t. Z_c is the population weighted distance to the origin regions of expellees and $BorderDistance_c$ is the distance to the East-West German border in kilometers. The variable d_t represents a full set of time fixed effects and $\varepsilon_c^{\dagger}$ is an error term, clustered at the city level.

Table A.8 presents the estimation results. In column 2, the population growth rate is adjusted for boundary changes between 1950 and 1988. However, the results in columns 1 and 2 are virtually identical. The estimator of $\gamma_{1950-60}^{\dagger}$ is 0.012 and significant at the one percent level. Thus, cities further away from the sending districts experienced a larger population growth in the 1950s. This finding is in line with the internal migration of refugees to the west. However, the estimator of $\beta_{1950-60}^{\dagger}$ is -0.005 (s.e. 0.002) and indicates a negative association between distance to the East-West German border and the population growth in the 1950s. The estimator of $\beta_{1950-60}^{\dagger}$ contradicts the supposed negative effect of the market access shock on cities close to the East-West German border. The horse race produces a clear winner and provides suggestive evidence that the treatment effect estimated by Redding and Sturm (2008) is driven by the relocation of refugees after WWII, rather than the loss of market access.

Table A.8: Robustness – Horse Race

	Population growth			
	Not Adjusted		Adjusted	
	(1)		(2)	
Border $\text{Distance}_c \times$ 1919-25	0.005	(0.004)	0.005	(0.004)
Border $\text{Distance}_c \times$ 1925-33	-0.002	(0.002)	-0.002	(0.002)
Border $\text{Distance}_c \times$ 1933-39	-0.005	(0.004)	-0.005	(0.004)
Border $\text{Distance}_c \times$ 1950-60	-0.005**	(0.002)	-0.005**	(0.002)
Border $\text{Distance}_c \times$ 1960-70	-0.000	(0.002)	0.002	(0.002)
Border $\text{Distance}_c \times$ 1970-80	0.006	(0.005)	0.001	(0.001)
Border $\text{Distance}_c \times$ 1980-88	0.002	(0.001)	0.002	(0.001)
$Z_c \times$ 1919-25	-0.003	(0.003)	-0.003	(0.003)
$Z_c \times$ 1925-33	0.004**	(0.002)	0.004**	(0.002)
$Z_c \times$ 1933-39	-0.003	(0.003)	-0.003	(0.003)
$Z_c \times$ 1950-60	0.012***	(0.002)	0.012***	(0.002)
$Z_c \times$ 1960-70	0.003	(0.002)	0.000	(0.002)
$Z_c \times$ 1970-80	-0.005	(0.004)	-0.001	(0.001)
$Z_c \times$ 1980-88	-0.000	(0.001)	-0.000	(0.001)
Year FE	Yes		Yes	
Observations	833		833	
R-squared	0.263		0.440	

Notes: The dependent variable is the annualized population growth rate of each West German city c in percent. In column 2, the annualized population growth rate is adjusted for boundary changes between 1950 and 1988. Growth periods t are 1919-1925, 1925-1933, 1933-1939, 1950-1960, 1960-1970, 1970-1980, and 1980-1988. The $BorderDistance_c$ is the distance of each city c to the East-West German border in kilometers. Z_c is the population weighted distance to the origin regions of expellees. Standard errors in parentheses are adjusted for clustering on cities.
*** = Significant at the 1 percent level.
** = Significant at the 5 percent level.
* = Significant at the 10 percent level.

B Boundary Changes 1950-1988

Table B.1: Boundary Changes Between 1950 and 1988

City	Year	Total	Absorbed (parts of) (+) / Exclusion to (-)
Aachen	1958	339	Belgium (+339)
	1972	57011	Eilendorf (+13171), Walheim (+7717), Laurensberg (+9749), Brand (+10714), Broichweiden (+17), Haaren (+8162), Kornelimünster (+2645), Richterich (+4707), Stolberg (+124), Würselen (+5)
Amberg	1972	6755	Ammersricht (+1923), Gailoh (+1386), Karmensölden (+1049), Raigering (+1104), Kümmersbruck (+186), Traßlberg (+1107)
Ansbach	1950	721	Bernhardswinden (+237), unincorporated areas (+484)
	1960	49	Neuses (+49)
	1961	109	Hennenbach (+106), Schalkenhausen (+3)
	1962	11	unincorporated areas (+11)
	1963	10	Hennenbach (+10)
	1970	2667	Eyb (+2667)
	1972	7088	Bernhardswinden (+610), Brodswinden (+630), Elpersdorf (+1121), Hennenbach (+2208), Neuses (+957), Schalkhausen (+1214), Claffheim (+348)
Aschaffenburg	1975	1430	Gailbach (+1430)
	1978	3215	Obernau (+3186), Großostheim (+29)
Augsburg	1951	-6	Stadtbergen (-6)
	1960	7	Haunstetten (+7)
	1972	42134	Göggingen (+15980), Haunstetten (+21810), Inningen (+4344)
	1978	523	Stätzling (+523)
	1979	11	Gersthofen (+11)
Bad Kreuznach	1969	4166	Winzenheim (+1196), Bosenheim (+954), Ippesheim (+265), Planing (+1751)
Baden-Baden	1972	8202	Ebersteinburg (+1078), Neuweiher (+2121), Steinbach (+3273), Varnhalt (+1730)
	1974	2814	Haueneberstein (+2814)
	1975	2992	Sandweier (+2992)
Bamberg	1952	6	unincorporated areas (+6)
	1956	35	unincorporated areas (+35)
	1960	42	unincorporated areas (+42)
	1963	91	Memmelsdorf (+91)
	1970	258	Hallstadt (+258)
	1972	6868	Bug (+766), Gaustadt (+5507), Wildensorg (+432), Gundelsheim (+119), Strullendorf (+44)
	1980	4	Bischberg (+4)
Bayreuth	1961	6	unincorporated areas (+6)
	1972	2610	Oberkonnersreuth (+541), Laineck (+2050), Thiergarten (+19)
	1976	1933	Aichig (+660), Oberpreuschwitz (+641), Seulbitz (+232), Thiergarten (+400)
	1978	133	Wolfsbach (+133)
Bergisch-Gladbach	1975	3154	Odenthal (+3154)
	1978	-15	Overath (-15)
Bielefeld	1961	875	Babenhausen (+108), Brake (+767)

Continued on next page

Table B.1 – continued from previous page

City	Year	Total	Absorbed (parts of) (+) / Exclusion to (-)
	1973	145423	Altenhagen (+4072), Babenhausen (+2392), Brackwede (+39856), Brake (+6738), Brönninghausen (+940), Gadderbaum (+8498), Großdornberg (+2216), Heepen (+9351), Hillegossen (+4323), Niederdornberg-Deppendorf (+1232), Oldentrup (+2800), Jöllenbeck (+9319), Kirchdornberg (+1023), Lämershagen-Gräfinghagen (+1085), Milse (+3111), Sennestadt (+20187), Theesen (+2227), Ubbedissen (+3453), Vilsendorf (+2013), Hoberge-Uerentrup (+2413), Senne I (+17140), Häger (+47), Schröttinghausen (+871), Steinhagen (+116)
	1977	5	Leopoldshöhe (+5)
	1982	-105	Spenge (-97), Werther (-8)
Bocholt	1975	15754	Barlo (+1540), Biemenhorst (+2588), Hemden (+904), Holtwick (+961), Liedern (+950), Lowick (+1943), Mussum (+2624), Spork (+904), Stenern (+1705), Suderwick (+1353), Dingden (+282)
Bonn	1969	61905	Buschdorf (+657), Duisdorf(+10215), Ippendorf (+3515), Lengsdorf (+3990), Lessenich (+1522), Röttingen (+2192), Beuel (+31550), Oberkassel (5593), Holzlar (+2282), Stieldorf (+389)
Bottrop	1976	15285	Kirchhellen (15285)
Braunschweig	1959	1001	Querum (+1001)
	1971	86	Querum (+86)
	1974	47639	Harxbüttel (+373), Geitelde (+870), Leiferde (+1587), Stiddien (+288), Bevenrode (+723), Bienrode (+2366), Broitzem (+3594), Dibbesdorf (+961), Hondelage (+1888), Lamme (+1524), Mascherode (+2505), Rautheim (+3936), Rüningen (+4276), Schapen (+1639), Stöckheim (+4519), Thune (+1051), Timerlah (+1540), Völkenrode (+1071), Volkmarode (+3071), Waggum (+2902), Watenbüttel (+1838), Wenden (+5075), Buchhorst (+33), Klein Schöppenstedt (+9)
Celle	1961	208	Vorwerk (+208)
	1963	205	Altencelle (+205)
	1968	289	Westercelle (-22), Boye (+311)
	1973	16863	Altencelle (+2788), Altenhagen (+900), Borstel (+308), Garßen (+2217), Groß Hehlen (+2241), Hustedt (+650), Lachtehausen (+540), Scheuen (+1402), Westercelle (+5817)
Coburg	1972	5414	Lützelbuch (+517), Seidmannsdorf (+492), Rögen (+184), Beiersdorf (+938), Creidlitz (+1721), Scheuerfeld (+1562)
	1976	312	Neu u. Neershof (+297), Dörfles-Esbach (+15)
	1977	624	Bertelsdorf (+624)
Darmstadt	1958	-63	Wixhausen (-63)
	1977	2227	Wixhausen (+4185), Griesheim (-1958)
Datteln	1975	2547	Ahsen (+1169), Horneburg (+1378)
Delmenhorst	1974	2453	Hasbergen (+2453)
Dinslaken	1975	1820	Voerde (+826), Walsum (+994)
	1977	26	Voerde (+26)
Dortmund	1975	7498	Holzen (+4429), Lichtendorf (+2438), Westhofen (+634), Hagen (-3)
Düren	1972	34237	Arnoldsweiler (+3046), Birgel (+1412), Birkesdorf (+8308), Derichsweiler (+2181), Echtz-Konzendorf (+1373), Gürzenich (+4828), Mariaweiler-Hoven (+3625), Merken (+2724), D'horn (+20), Kreuzau (+25), Lendersdorf (+4696), Merzenich (+23), Niederau (+1976)
	1978	3	Merzenich (+3)
Düsseldorf	1975	48808	Hubbelrath (+972), Angermund (+3906), Wittlaer (+5199), Erkrath (+6714), Hasselbeck-Schwarzbach (+1260), Hilden (+35), Monheim (+30716)
	1979	-3	Ratingen (-3)
Duisburg	1975	19816	Budberg (+216), Moers (+31), Rheinkamp (+4418), Rumeln-Kaldenhausen (+14493), Dinslaken (+760)

Continued on next page

Table B.1 – continued from previous page

City	Year	Total	Absorbed (parts of) (+) / Exclusion to (-)
Emden	1961	-9	Wybelsum (-9)
	1972	4102	Petkum (+952), Widdelswehr (+969), Logumer Vorwerk (+297), Twixlum (+688), Wybelsum (+1196)
	1980	10	Krummhörn (+10)
Erlangen	1950	679	unincorporated areas (+679)
	1957	-13	Bubenreuth (-13)
	1960	15	Eltersdorf (+15)
	1967	402	Kosbach (+402)
	1972	10854	Großdechsendorf (+1950), Eltersdorf (+2544), Frauenaurach (+3285), Hüttendorf (+269), Kriegenbrunn (+566), Tennenlohe (+2240)
	1974	-5	Nürnberg (-5)
	1977	4	Fürth (+4)
Eschweiler	1972	15223	Dürwiß (+5282), Laurenzberg (+167), Lohn (+1189), Weisweiler (+5627), Gressenich (+10), Kinzweiler (+2948)
Essen	1967	-153	Gelsenkirchen (-153)
	1970	6087	Altendorf (+6087)
	1975	16803	Kettwig (+16803)
Esslingen a.N.	1973	10748	Berkheim (+6697), Zell am Neckar (+4051)
Flensburg	1970	1251	Adelby (+1251)
	1971	-17	Harrislee (-17)
	1972	14	Harrislee (+14)
	1974	1703	Adelby (+1703)
Frankenthal (Pfalz)	1969	1783	Eppstein (+1783)
	1974	-30	Bobenheim-Roxheim (-30)
Frankfurt a.M.	1972	14985	Harheim (+3043), Nieder-Erlenbach (+2619), Nieder-Eschbach (+6435), Kalbach (+2851), Oberursel (+45), Friedrichsdorf (-8)
	1974	-45	Oberursel (-45)
	1977	14722	Bergen-Enkheim (+14722)
Freiburg i.Br.	1966	11	Lehen (+11)
	1971	3258	Lehen (+1971), Opfingen (+1287)
	1972	1140	Waltershofen (+1140)
	1973	3421	Tiengen (+1078), Münzingen (+863), Hochdorf (+1480)
	1974	4267	Ebnet (+1793), Kappel (+2474)
	1978	69	Umkirch (+69)
Fürth	1950	53	unincorporated areas (+53)
	1972	10552	Sack (+1782), Stadeln (+6128), Vach (+2424), Boxdorf (+218)
	1977	-4	Erlangen (-4)
Fulda	1972	14726	Bernhards (+339), Besges (+70), Bronnzel (+1240), Dietershan (+492), Edelzell (+1035), Gläserzell (+1108), Haimbach (+1087), Harmerz (+871), Istergiesel (+276), Johannesberg (+388), Kämmerzell (+667), Kohlhaus (+893), Lehnerz (+1660), Lüdermünd (+208), Maberzell (+1501), Malkes (+106), Mittelrode (+208), Niederrode (+113), Niesig (+864), Oberrode (+363), Rodges (+48), Sickels (+552), Zell (+128), Zirkenbach (+509)
Gelsenkirchen	1967	183	Essen (+183)
	1981	-28	Gladbeck (-28)
Giessen	1953	-3	Heuchelheim (-3)
	1971	2969	Allendorf (+1497), Födgen (+1472)
Gladbeck	1981	28	Gelsenkirchen (+28)
Göppingen	1953	31	Schlat (+31)
	1956	1451	Bartenbach (+1451)
	1957	793	Bezgenriet (+793)
	1971	1444	Hohenstaufen (+1444)

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Table B.1 – continued from previous page

City	Year	Total	Absorbed (parts of) (+) / Exclusion to (-)
	1972	398	Maitis (+398)
	1973	74	Schwäbisch-Gmünd (+74)
	1975	6954	Faurndau (+6954)
Göttingen	1960	4	Grone (+4)
	1963	927	Herberhausen (+927)
	1964	22242	Geismar (+8552), Grone (+5401), Nikolausberg (+606), Weende (+7883)
	1971	6	Bovenden (+6)
	1973	6025	Deppoldshausen (+18), Elliehausen (+1510), Esebeck (+437), Groß Ellershausen (+1109), Hetjershausen (+859), Holtensen (+1131), Knutbühren (+126), Roringen (+835)
Goslar	1972	12538	Hahnenklee-Bockswiese (+1262), Hahndorf (+1167), Jerstedt (+1510), Oker (+8599)
	1974	-5	Bad Harzburg (-5)
Gütersloh	1970	17509	Avenwedde (+8528), Friedrichsdorf (+896), Spexard (+3851), Ebbesloh (+203), Hollen (+646), Nienhorst (+565), Isselhorst (+2440), Ummeln (+46), Nordrheda-Ems (+101), Verl (+230), Varensell (+3)
	1973	281	Senne I (+281)
	1979	6	Rheda-Wiedenbrück (+6)
Hagen	1970	156	Dahl (+91), Ennepetal (+65)
	1975	35291	Berchum (+1553), Hohenlimburg (+26755), Garenfeld (+939), Breckerfeld (+5930), Waldbauer (+114)
Hamburg	1969	81	Cuxhaven (+81)
Hameln	1973	15596	Afferde (+3810), Groß Hilligsfeld (+781), Hastenbeck (+1047), Haverbeck (+669), Holtensen (+1211), Klein Berkel (+4064), Klein Hilligsfeld (+193), Tündern (+1944), Unsen (+526), Wehrbergen (+445), Welliehausen (+231)
Hamm	1968	10920	Berge (+3686), Westtünnen (+2344), Wiescherhöfen (+4974), Pelkum (-84)
	1975	84949	Heessen (+17700), Bockum-Hövel (+25143), Pelkum (+25172), Uentrop (+11497), Rhynern (+5437)
Hanau	1968	16	Großauheim (+16)
	1969	9	Dörnigheim (+2), Mittelbuchen (+7)
	1971	1860	Mittelbuchen (+1860)
	1974	32589	Großauheim (+15884), Kleinauheim (+6978), Steinheim (+9727)
Hannover	1967	165	Wettbergen (+165)
	1968	200	Wettbergen (+200)
	1974	51707	Laatzen (+251), Langenhagen (+3237), Isernhagen (+2653), Ahlem (+9727), Anderten (+5728), Misburg (+19859), Vinnhorst (+5662), Wettbergen (+3822), Wülferode (+863), Warmbüchen (-95)
	1980	11	Hemmingen (+11)
	1981	-121	Laatzen (-121)
Heidelberg	1975	8674	Ziegelhausen (+8674)
	1976	-41	Neckargemünd (-41)
Heilbronn	1962	-9	Flein (-9)
	1965	6	Frankenbach (+6)
	1970	1094	Klingenberg (+1094)
	1972	2636	Kirchhausen (+2636)
	1974	9429	Biberach (+2545), Frankenbach (+4714), Horkheim (+2170)
Herford	1969	10509	Diebrock (+1533), Eickum (+1389), Elverdissen (+2796), Falkendiek (+799), Laar (+615), Schwarzenmoor (+1321), Stedefreund (+756), Herringhausen (+1300)
Hildesheim	1961	20	Itzum (+20)
	1965	47	Achtum (+47)
	1971	2327	Ochtersum (+2327)
	1973	5	Himmelsthür (+5)

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Table B.1 – continued from previous page

City	Year	Total	Absorbed (parts of) (+) / Exclusion to (-)
	1974	12174	Achtum-Uppen (+1127), Bavenstedt (+784), Einum (+826), Himmelsthür (+6398), Itzum (+674), Marienburg (+209), Marienrode (+183), Sorsum (+1973)
Hof	1960	175	Leimitz (+175)
	1972	1221	Unterkotzau (+757), Martinsreuth (+196), Wölbattendorf (+268)
	1975	2	Tauperlitz (+2)
	1977	707	Leimitz (+707)
	1978	484	Wölbattendorf (+318), Haidt (+166)
Ingolstadt	1962	5904	Unsernherrn (+5904)
	1968	34	Mailing (+34)
	1969	330	Friedrichshofen (+330)
	1972	15293	Brunnenreuth (+1320), Dünzlau (+219), Etting (+1593), Gerolfing (+1497), Hagau (+255), Irgertsheim (+483), Mailing (+3443), Mühlhausen (+116), Oberhaunstadt (+4020), Pettenhofen (+254), Zuchering (+2093)
	1974	-24	Weichering (-24)
Iserlohn	1956	1100	Oestrich (+1100)
	1971	51	Letmathe (+51)
	1975	37450	Hennen (+6764), Kesbern (+481), Letmathe (+26405), Hemer (+678), Sümmern (+3122)
Kaiserslautern	1969	13050	Dansenberg (+1008), Erlenbach (+1610), Erfenbach (+2730), Hohenecken (+2553), Mölschbach (+883), Morlautern (+2155), Siegelbach (+2111)
	1974	49	Kindsbach (+43), Mehlingen (+6)
Karlsruhe	1958	45	Neureut (+45)
	1972	3323	Hohenwettersbach (+1415), Stupferich (+1908)
	1973	1762	Wolfartsweiher (+1762)
	1974	6694	Grötzingen (+6694)
	1975	16428	Wettersbach (4426), Neureut (+12002)
Kempten	1972	11753	Sankt Lorenz (+2055), Sankt Mang (+9698)
Kiel	1958	1633	Suchsdorf (+1633)
	1959	1220	Schilksee (+1220)
	1963	606	Melsdorf (+530), Oppendorf (+76)
	1965	94	Kronshagen (+94)
	1966	88	Russee (+88)
	1970	6219	Meimersdorf (+907), Moorsee (+918), Rönne (+300), Wellsee (+1573), Russee (+2521)
	1984	-7	Altenholz (-7)
Koblenz	1960	30	Kesselheim (+30)
	1969	2212	Kapellen-Stolzenfels (+636), Kesselheim (+1576)
	1970	18069	Arenberg-Immendorf (+3999), Arzheim (+2344), Bubenheim (+832), Güls (+5121), Lay (+1578), Rübenach (+3957), Rhens (+238)
Köln	1975	98064	Rodenkirchen (+41755), Brauweiler (+3233), Frechen (+170), Hürth (+45), Lövenich (+20575), Pulheim (+30), Sinnersdorf (+6475), Wesseling (+25913), Bornheim (+21) , Dormagen (-135), Leverkusen (-18)
	1976	-27016	Wesseling (-27016)
Konstanz	1971	1794	Litzelstetten (+1794)
	1975	3525	Dingelsdorf (+1061), Dettingen (+2464)
Krefeld	1970	861	Willich (+859), Vorst (+2)
	1975	13021	Kapellen (+313), Rumeln-Kaldenhausen (+102), Kempen (+12606)
	1976	82	Kempten (+82)
Landshut	1961	547	unincorporated areas (+404) and Schönbrunn (+143)
	1963	8	Ergolding (+8)
	1972	3988	Müchnerau (+679), Schönbrunn (+2881), Hohenegglkofen (+241), Kumhausen (+187)

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Table B.1 – continued from previous page

City	Year	Total	Absorbed (parts of) (+) / Exclusion to (-)
	1974	1982	Frauenberg (+1478), Altdorf (+424), Ergolding (+80)
	1981	-11	Bruckberg (-11)
Ludwigsburg	1956	87	Aldingen (+87)
	1974	5513	Neckarweihingen (+5513)
	1975	3185	Poppenweiler (+3185)
Ludwigshafen a.R.	1974	2267	Ruchheim (+2267)
Lübeck	1969	25	Ratekau (+25)
	1970	970	Ratekau (+20), Stockelsdorf (+950)
Lüdenscheid	1969	-3775	Lüdenscheid-Land (-3775)
Lüneburg	1963	719	Oedeme (+719)
	1974	4652	Häcklingen (+748), Ochtmissen (+828), Oedeme (+1375), Rettmer (+633), Reppenstedt (+272), Wendisch Evern (+73), Adendorf (+723)
Mainz	1957	361	Hechtsheim (+361)
	1969	17532	Drais (+921), Ebersheim (+1359), Finthen (+4933), Hechtsheim (+5752), Laubenheim (+3366), Marienborn (+1201)
	1971	5	Ober-Olm (+5)
Marburg	1974	18490	Bauerbach (+673), Cappel (+6309), Cyriaxweimar (+282), Dilschhausen (+126), Einhausen (+592), Ginseldorf (+385), Gisselberg (+495), Haddamshausen (+310), Hermershausen (+241), Marbach (+3411), Schröck (+1266), Wehrda (+3656), Wehrshausen (+746), Lahntal (-2)
Minden	1973	28530	Aminghausen (+398), Bölhorst (+865), Dankersen (+3636), Dützen (+2969), Haddenhausen (+1471), Häverstädt (+2142), Hahlen (+3646), Kutenhausen (+1501), Leteln (+2804), Meißen (+3032), Päpinghausen (+407), Stemmer (+1288), Todtenhausen (+2980), Barkhausen (+746), Hartum (+133), Holzhausen II (+512)
Mönchengladbach	1975	12670	Wickrath (+12508), Jüchen (+11), Wegberg (+151)
Moers	1975	47746	Kapellen (+11266), Budberg (+11), Rheinkamp (+36500), Homberg (-31)
Mülheim a.d.R.	1975	605	Kettwig (+605)
	1981	-117	Ratingen (-117)
München	1952	-1142	Gröbenzell (-1142)
	1957	15	unincorporated areas (+15)
	1958	7	unincorporated areas (+7)
	1959	39	unincorporated areas (+39)
	1973	9	Oberschleißheim (+9)
Münster	1956	592	Sankt Mauritz (+592)
	1975	53429	Albachten (+2559), Amelsbüren (+4632), Angelmodde (+6342), Handorf (+4608), Hiltrup (+14052), Nienberge (+3055), Sankt Mauritz (+8089), Wolbeck (+4817), Albersloh (+66), Rinkerode (+3), Roxel (+4383), Telgte (+823)
Neumünster	1970	9383	Einfeld (+6214), Gadeland (+2883), Tungendorf (+286)
Neuss	1975	20740	Holzheim (+6831), Norf (+6113), Rosellen (+3419), Kaarst (+1495), Neukirchen (+2882)
Nürnberg	1952	2258	unincorporated areas (+2258)
	1961	-29	Katzwang (-29)
	1972	33641	Großgründlach (+2900), Neunhof (+1162), Brunn (+247), Fischbach (+12033), Katzwang (+6423), Kornburg (+1584), Worzeldorf (+2894), Boxdorf (+2493), Wolkersdorf (+3316), Schwaig (+589)
	1974	5	Erlangen (+5)
	1978	19	Kleinschwarzenlohe (+19)
	1985	6	Oberasbach (+6)
Offenbach a.M.	1955	-11	Heusenstamm (-11)

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Table B.1 – continued from previous page

City	Year	Total	Absorbed (parts of) (+) / Exclusion to (-)
	1968	7	Heusenstamm (+7)
Osnabrück	1970	3197	Holzhausen (+3197)
	1971	16	Nahne (+16)
	1972	21183	Atter (+2704), Darum (+593), Gretesch (+1727), Hellern (+4186), Lüstringen (+3105), Nahne (+2422), Pye (+1786), Voxtrup (+4660)
	1976	-15	Wallenhorst (-15)
Paderborn	1969	3413	Marienloh (+936), Wewer (+2477)
	1975	26040	Benhausen (+1107), Dahl (+1072), Elsen (+6314), Sande (+2288), Schloß Neuhaus (+13606), Hövelhof (+84), Dörenhagen (+11), Neuenbeken (+1547), Ostenland (+11)
Passau	1958	3	Heining (+3)
	1972	18097	Grubweg (+5545), Hacklberg (+4038), Hals (+1586), Heining (+6449), Kirchberg (+479)
Pforzheim	1963	8	Büchenbronn (+8)
	1971	1714	Würm (+1714)
	1972	791	Hohenwart (+791)
	1974	4415	Büchenbronn (+4415)
	1975	9152	Huchenfeldt (+2652), Eutingen (+6500)
	1977	-5	Niefern-öschelbronn (-5)
Pirmasens	1956	964	Lemberg (+964)
	1958	-26	Simten (-26)
	1969	5890	Erlenbrunn (+1451), Fehrbach (+1290), Hensberg (+234), Winzeln (+1542), Simten (+1719), Rodalben (-346)
	1972	2081	Gersbach (+1309), Windsberg (+772)
	1974	2	Rodalben (+2)
Regensburg	1971	12	Oberisling (+12)
	1972	307	Burgweinting (+307)
	1977	2727	Burgweinting (+1274), Harting (+535), Oberisling (+918)
	1978	431	Barbing (+431)
Remscheid	1975	1491	Hückeswagen (+1170), Wermelskirchen (+321)
Reutlingen	1969	5	Pfullingen (+5)
	1971	5144	Bronnweiler (+802), Gönningen (+2833), Oferdingen (+1159), Reicheneck (+350)
	1972	3365	Altenburg (+1071), Degerschlacht (+1138), Sickenhausen (+1156)
	1974	1887	Rommelsbach (+1887)
	1975	2482	Mittelstadt (+2482)
Schwäbisch Gmünd	1959	3063	Bettringen (+3063)
	1968	17	Straßdorf (+12), Herlikofen (+5)
	1969	3520	Herlikokofen (+3520)
	1971	5998	Bargau (+2357), Degenfeld (+411), Weiler in den Bergen (+931), Lindach (+2299)
	1972	5273	Großdeinbach (+2191), Straßdorf (+3082)
	1973	-257	Göppingen (-74), Mutlangen (-183)
	1974	-40	Lorch (-40)
	1975	1359	Rechberg (+1364), Waldstetten (-5)
Schweinfurt	1961	-13	Niederwerrn (-13)
	1978	56	Grafenrheinfeld (+56)
Siegen	1966	7461	Breitenbach (+97), Bürbach (+936), Kaan-Marienborn (+3492), Seelbach (+1117), Trupach (+1671), Volnsberg (+148)
	1969	224	Feuersbach (+224)
	1975	61907	Eiserfeld (+22346), Hüttental (+39561)
Soest	1969	4892	several villages (+4892)

Continued on next page

Table B.1 – continued from previous page

City	Year	Total	Absorbed (parts of) (+) / Exclusion to (-)
	1980	11	Bad Sassendorf (+11)
Solingen	1975	2259	Burg a.d. Wupper (+2055), Wermelskirchen (+197), Witzhelden (+7)
Straubing	1972	6219	Hornstorf (+414), Kagers (+687), Alburg (+1984), Ittling (+3134)
	1976	104	Unterzeitldorn (+104)
	1978	-7	Mitterharthausen (+4), Aiterhofen (-11)
Trier	1969	18594	Ehrang-Pfalzel (+11314), Eitelsbach (+253), Filsch (+256), Irsch (+607), Kernscheid (+424), Ruwer (+2254), Tarforst (+439), Zewen-Oberkirch (+3037), Kenn (+10)
	1974	7	Newel (+7)
Tuebingen	1971	10943	Bühl (+1326), Hagelloch (+1315), Hirschau (+2131), Kilchberg (+845), Pfrondorf (+2353), Unterjesingen (+1982), Weilheim (+991)
	1974	376	Bebenhausen (+376)
Ulm	1968	4	Einsingen (+4)
	1971	1768	Jungingen (+1768)
	1972	1239	Unterweiler (+513), Mähringen (+726)
	1974	4679	Eggingen (+823), Donaustetten (+708), Einsingen (+1651), Ermingen (+556), Gögglingen (+941)
	1979	13	Blaustein (+13)
Velbert	1975	37741	Langenberg (+16858), Neviges (+19145), Wülfrath (+1738)
Viersen	1970	38156	Dülken (+20992), Süchteln (15126), Boisheim (+1542), Oedt (+344), Neersen (+49), Lobberich (+103)
Villingen-Schwenningen	1970	489	Mühlhausen (+489)
	1971	1033	Obereschach (+1033)
	1972	2810	Tannheim (+1062), Herzogenweiler (+146), Pfaffenweiler (+1029), Rietheim (+573)
	1974	1178	Marbach (+1178)
	1975	1888	Weigheim (+1039), Weilersbach (+849)
Wesel	1969	5958	Obringhoven (+4525), Flüren (+1433)
	1975	9332	Büderich (+4722), Voerde (+400), Hamminkeln (+1539), Bislich (+2404), Diersfordt (+260), Hünxe (+7)
Wiesbaden	1956	-11	Schlangenbad (-11)
	1977	11742	Auringen (+1196), Breckenheim (+1633), Delkenheim (+3648), Medenbach (+1147), Naurod (+2219), Nordenstadt (+1910), Hofheim am Taunus (+3), Hochheim am Main (-14)
Wilhelmshaven	1951	19	Sengwarden (+19)
	1972	2186	Sengwarden (+2186)
Witten	1970	69	Herdecke (+69)
	1975	15117	Herbede (+15117)
Worms	1969	12914	Abenheim (+2441), Heppenheim a.d. Wiese (+2020), Ibersheim (+480) Pfeddersheim (+4443), Rheindürkheim (+2246), Wies-Oppenheim (+1126, Osthofen (+158)
Würzburg	1971	9	Randersacker (+9)
	1973	-62	Unterdürrbach (-62)
	1974	1040	Rottenbauer (+1040)
	1976	2836	Unterdürrbach (+1832), Oberdürrbach (+1004)
	1978	7592	Lengfeld (+2860), Versbach (+4408), Höchberg (+324)
	1982	-12	Höchberg (-12)
	1983	-4	Veitshöchheim (-4)

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