

Quarterly Digest on Forced Displacement

First Issue

July 2020

Foreword from the JDC

The World Bank – UNHCR Joint Data Center on Forced Displacement (JDC) has been disseminating monthly Forced Displacement Literature Review updates since October 2019. This is the inaugural issue of the second knowledge product series published by JDC: a *Quarterly Digest*. This *Digest* attempts to fill a gap between the *Review* – which covers the latest research papers or major studies on forced displacement – and formal surveys which take stock of the (academic) literature and try to achieve a comprehensive coverage of published work.

For this first issue, we have chosen to explore some of the long-term impacts of forced displacement. Most of the empirical literature on the impacts of forced displacement on host countries focuses on short- and medium-term impacts.¹ This literature is largely silent on the longer-term impacts of a protracted refugee presence on host countries and communities. In this issue, we seek to understand whether any short-term benefits accruing to host countries dissipate or persist over time, particularly when refugees return to their countries of origin or relocate elsewhere. Additionally, in contexts where large inflows of refugees lead to adverse impacts on host communities in the short-term, whether these problems resolve in the longer-term.

Several recent academic papers featured in this *Digest* shed light on these questions by examining the long-term impact of historical episodes of large-scale forced displacement. The papers largely focus on events in Europe, reflecting the more extensive research on such movements within the academic community. However, while fewer in number, we also feature papers examining historical episodes of forced migration in South Asia, in Africa and to North America. They include the flight of Jews from Nazi Germany and Austria to the United States between 1933 and 1940; forced population transfers following the 1947 Partition of British India; and the flight of one million refugees from Burundi and Rwanda to Tanzania in 1993 and 1994.

The Joint Data Center invited Professor Sascha O. Becker to be the editor of this inaugural edition of the *Quarterly Digest*. He has also authored the introductory chapter below. We are very grateful for his generous and insightful contribution.

Björn Gillsäter

Head of the Joint Data Center on Forced Displacement

¹ For example, see literature reviews undertaken by Ruiz and Vargas-Silva (2013), Verme and Schuettler (2019), and Becker and Ferrara (2019).

PART I

Long-Term Consequences of Forced Displacement: Three Salient Themes

By Sascha O. Becker, Monash University and University of Warwick*

Abstract

Three salient themes emerge when reviewing the literature on the long-term consequences of forced displacement. First, forced migrants are in many cases high-skilled minorities that bring benefits in terms of education, productivity and innovation to the areas that receive them. Second, agglomeration forces, together with infrastructure investments, can make the most out of even massive flows of forced migrants. Third, uprootedness, the experience of being forced to migrate, can have lasting effects on forced migrants and their descendants by changing preferences towards education as a portable asset.

Introduction

As a result of this author's interest in economic history, several of the studies covered in this *Digest* are about more distant episodes of forced displacement. Some go back to the aftermath of WWII, the 1930s and forced displacement of Jewish scientists from Nazi Germany, and even further back in history, to the expulsion of Protestant

* Becker is also affiliated with CAGE; CEPR, CESifo, IZA, ROA, and SoDa Labs; sascha.becker@monash.edu. The author thanks Zara Sarzin and Domenico Tabasso for fruitful discussions, Björn Gillsäter and Caroline Sergeant for helpful comments, and Andreas Ferrara (Becker and Ferrara, 2019) and Irena Grosfeld (Pauline Grosjean, Nico Voigtlaender and Katia Zhuravskaya (Becker et al. 2020) for exciting collaborations.

Keywords: Forced Displacement, Education, Agglomeration, Uprootedness

JEL classification: F22, R23, J24, R12

Cite as: Becker, Sascha O. (2020) "Long-Term Consequences of Forced Displacement: Three Salient Themes", in Becker, S.O. (ed.); World Bank; UNHCR; JDC. *Quarterly Digest on Forced Displacement*. Washington, D.C.: World Bank Group. <https://doi.org/10.47053/jdc.010720/ar.01>

Huguenots from Catholic France in the 17th century, who were welcomed in Prussia. The beauty of drawing on episodes of economic history is that we can study the long-run impacts of forced migration.² Looking at the immediate effects of forced migration often highlights the challenges faced by refugees and host populations alike, as they try to accommodate to the arrival of oftentimes very large groups of forced migrants.³ A look at longer-term outcomes allows us to go beyond these short-run challenges, and in many cases, some highlighted here, a silver lining arises both for the descendants of forced migrants, as well as for the host populations.

Productivity and innovation

The first set of papers in this *JDC Quarterly Digest* will focus on the long-run impacts of refugees on host countries in terms of productivity and innovation. A quite diverse set of papers shows interesting similarities. Religious minorities have often been subject to persecution. Hornung (2014) studies the expulsion of ca. 43,000 Huguenots, a Protestant minority in Catholic France, in 1685, of whom almost half settled in Brandenburg-Prussia. Expelled Huguenots were educated and particularly versed in the textiles sector. These skilled workers not only brought knowledge or technology with them. They partially offset the population lost due to war, plague, and famine during the Thirty Years' War. Hornung (2014) shows positive productivity effects more than hundred years after the arrival of the Huguenots, using Prussian firm-level data from 1802. From a modern perspective, this might seem like a special case wherein the population of forced migrants was more skilled than the local population. However, it is not uncommon for minorities to have specific, often complementary, skills. Another example which, interestingly, also highlights effects in the textiles sector, is Murard and Sakalli (2019). After the Greco-Turkish war of 1919–1922, 1.2 million Greek Orthodox were forcibly resettled from Turkey to Greece, increasing the host population by more than 20% within a few months. Sixty years after the event, localities with a greater share of Greek refugees in 1923 display a higher level of prosperity and industrialization. These long-run benefits of refugees appear to be driven by the

² The literature uses the terms “forced displacement” and “forced migration” interchangeably; “forced resettlement” is typically used when state actors resettle people. Forced displacement may affect a select few, such as in the case of natural disasters affecting a limited geographic area, or millions (“massive population flows”), such as in the case of the population exchanges after the end of WWII, described below.

³ See Schuettler and Caron (2020) for a recent survey of the struggle faced by refugees and internally displaced persons struggle to integrate the labor market.

transfer of technological knowledge in textile and the provision of new agricultural know-how, which fostered growth through higher diversity in complementary skills.

Similarly, expelled Jewish scientists from Nazi Germany advanced innovation and patenting in the United States. Moser et al. (2014) show that the expulsion and persecution of scientists in Nazi-Germany led to emigration of these high-skilled workers to the U.S. Using inventor-level data, the authors show that these forced migrants spurred inventions and patents in chemistry. They did so by attracting scientists to their field rather than increasing productivity of incumbent inventors.

Finally, the Partition of India in 1947 triggered massive population exchanges between India and Pakistan. Focusing on the agricultural sector, Bharadwaj and Mirza (2019) demonstrate that areas in India that received more refugees have (1) higher average yields, (2) are more likely to take up high yielding varieties of seeds, and (3) are more likely to use agricultural technologies. The authors show that these effects are not explained by selective movement into districts with a higher potential for agricultural development. Instead, refugee literacy and land reforms in areas with refugees are two of the many potential mechanisms that could be driving these effects. Quite realistically, the increase in yields and use of agricultural technology coincide with the timing of the Green Revolution in India.

All of these papers – across three different continents and several different centuries – share one commonality: expelled minorities often bring with them important skills that can benefit the receiving populations in terms of productivity and innovation. Note that in this set of papers, effects are driven by the fact that those forced to migrate are more literate and/or equipped with specific skills and as a result, quite naturally, there is a positive effect in the receiving area.

Yet, this also seems to be true for return migration when refugees from less developed countries are temporarily displaced to a more developed country, where they acquire skills that benefit their home country upon return. This fascinating complementary perspective comes from Bahar et al. (2019) who look at the effect of repatriation of refugees who had fled from Yugoslavia to Germany as a result of the Balkan Wars. At the end of the war in the mid-1990s, these refugees lost their special “protected status” in Germany and returned to the successor states of the defunct Yugoslavia. The authors provide causal evidence on the role that migrants play in explaining

productivity shifts (as measured by export performance) in their home countries after their return. In fact, return migrants provide for export links, i.e. industries benefit from the experience refugees gained while away in Germany. Together, these papers document the oftentimes beneficial economic effects to host economies, of welcoming refugees, or of welcoming return migrants.⁴

Agglomeration effects and infrastructure investments

The second set of papers look at agglomeration effects – cost savings arising from economies of scale and network effects – and infrastructure investments. Here, as in the first set of papers, the focus is on long-term effects in receiving countries. Maystadt and Duranton (2019) focus on the long-run effects of hosting temporary refugee inflows from Burundi (1993) and Rwanda (1994) on the Tanzanian economy, more than 10 years after most refugees left. While earlier research on the same episode had looked at short-run effects, no paper had addressed more persistent effects. Maystadt and Duranton (2019) make the important point that positive effects of refugee inflows might build up over time and that agglomeration forces and infrastructure investments are key. It links well with Peters (2019) who studies the long-run effects of the arrival in West Germany of about 8 million ethnic Germans expelled from their domiciles in Eastern Europe. Refugees were not free to choose their destination in West Germany, but instead many were assigned to rural, low population density localities where housing was relatively abundant. Economic theories predict a positive relationship between population size and local productivity. Peters (2019) shows that the initial allocation of refugees was very persistent. Larger refugee numbers are associated with stronger manufacturing employment growth in the 1950s and 60s, and raised local productivity, but not immediately. The takeaway is that even massive population flows, which pose a challenge to accommodate in the short run, e.g. in terms of housing and infrastructure, *can* have positive economic effects, and that those may only materialize after some time.

⁴ It is important to note that many examples in published work bring out the benefits to receiving countries of forced migration, especially if those displaced are high-skilled or bring complementary skills. Migration in its various forms, forced or voluntary, does however also come with challenges. Recent literature highlights the political consequences of a pushback among natives against immigration (see Becker and Ferrara, 2019, for examples). It is also relevant to note the debate about the wage and employment effects of low-skilled migrants competing with equally low-skilled natives. This debate is well exemplified by the discussion around the Mariel boatlift, the arrival of Cuban immigrants, many political refugees, in the US, in 1980. It was originally analysed by Card (1990). See Borjas (2017), Borjas and Monras (2017), Clemens and Hunt (2019), and Peri and Yasenov (2019).

Uprootedness and education

The third section sheds light on an under-appreciated aspect of forced displacement: that its nature is different from voluntary migration. Forced migrants who are uprooted from their homelands often have to move in a sudden way and have to leave most of their physical belongings behind, and undergo a truly life-changing experience. Academic economists have long entertained the idea that being uprooted by force or expropriated increases the subjective value of investing in portable assets, in particular in education (e.g. Brenner and Kiefer 1981). Stigler and Becker (1977) attribute this idea to Reuben Kessel, but give no specific reference. Despite its prominence, the proposed relationship between forced migration and preferences for investment in education is a difficult hypothesis to test. Forced migrants typically differ from locals along many socioeconomic and cultural characteristics, such as ethnicity, language, and religion. Furthermore, labour market competition with locals can also affect the educational choices of forced migrants. For instance, farmers among forced migrants may not have access to land, and they and their descendants may need to invest in skills outside agriculture simply because they have no other choice.⁵

In a recent paper (Becker, Grosfeld, Grosjean, Voigtländer, and Zhuravskaya, 2020), the authors exploit a unique historical setting that allows them to study this ‘uprootedness’ hypothesis. The historical experiment they study is key to bypassing the typical confounding factors mentioned above. In the aftermath of WWII, as Europe’s borders were redrawn, and as Germany ceded territory to Poland, Poland had to cede its own Eastern territories (Kresy) to the Soviet Union. As a result, about 2 million Polish expellees from Kresy were primarily resettled to the newly acquired ‘Western Territories’, which were taken over from Germany (and from which Germans themselves were forcibly expelled). A smaller proportion of former inhabitants of Kresy were also moved to the territories of Central Poland. It is important to note that Poles in Kresy were less educated than Poles in Central Poland before WWII. Yet, their descendants are more educated than other Poles. Thus, here a less-educated group

⁵ This logic, together with the change in investment preferences towards education, can explain the results of two fascinating studies. Nakamura et al. (2020) document the positive effect of forced migration on education of families displaced by the eruption of a volcano off the coast of Iceland in 1973. Bauer et al. (2013) study the economic integration of Germans expelled from formerly German territories into West Germany. They find that migrant children tend to acquire more education than their native peers.

overtakes the rest of the country, driven by a shift of their preferences away from material possessions toward investment in education. Thus, while the experience of forced displacement in itself may leave deep scars, the increased education of the descendants of forced migrants and the resulting benefits in terms of higher earnings gives a silver lining to forced migration.

In sum, this *JDC Quarterly Digest* highlights three themes: a) migration of forced migrants who bring skills that exceed or complement those of the receiving population quite naturally benefits the receiving nations in various dimensions; b) agglomeration forces together with infrastructure investments can make the most out of even massive flows of forced migrants; c) forced migration is different from voluntary migration as it is life-changing, and one important finding is that it may trigger a stronger preference for education among descendants of forced migrants.

PART II

Summaries of Select Articles*

1. Long-Term Impact of Refugees on Innovation and Technological Progress

Immigration and the Diffusion of Technology: The Huguenot Diaspora in Prussia

Erik Hornung

American Economic Review, Volume 104, Issue 1 (2014), Pages 84–122

<http://dx.doi.org/10.1257/aer.104.1.84>

This paper **examines the long-term impact of the forced migration of French Protestants (Huguenots) from France to Brandenburg-Prussia in 1685**. The author estimates the impact of the Huguenots refugees on the productivity of textile manufactories in Prussia more than a century later.

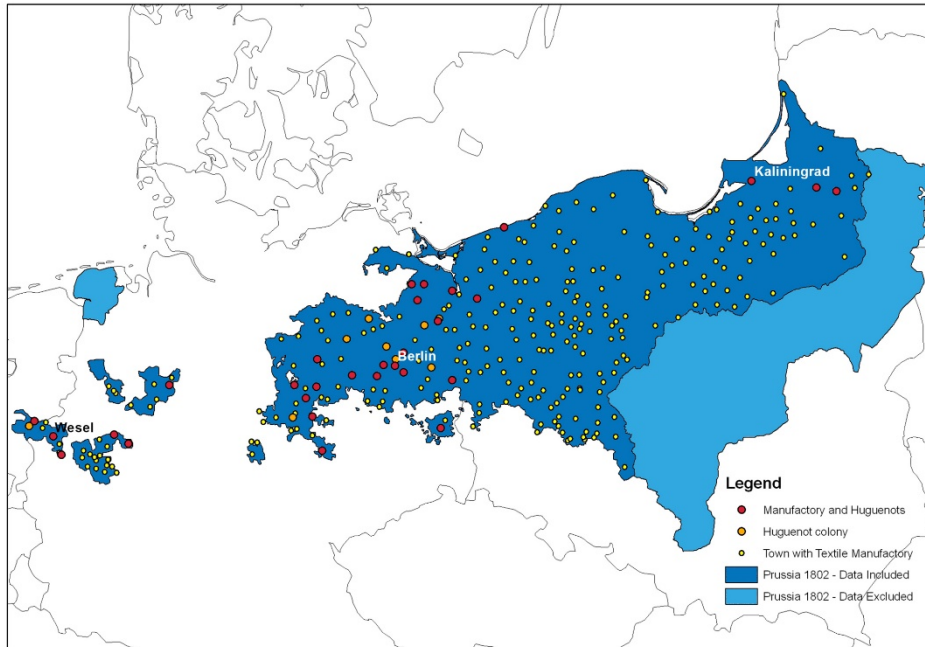
In 1685, approximately 200,000 French Protestants (Huguenots) fled religious persecution in France and settled in neighboring Protestant countries. Approximately 16,000 to 20,000 Huguenots fled to Brandenburg-Prussia, with a population of 1.5 million at the time, and were settled in Prussian towns that had suffered large population losses during the Thirty Years' War (1618–1648), as shown in the map below. The Huguenots were, on average, more skilled than the native population; they tended to be well educated and had been employed in skilled occupations in France, in particular in the textile sector. Moreover, from 1686 unskilled Huguenot workers were refused entry into Brandenburg-Prussia. Skilled Huguenot immigrants found

* The findings, interpretations and conclusions expressed in the summaries of the literature review are entirely those of their authors and do not necessarily represent the views of the Joint Data Center, UNHCR, the World Bank, the Executive Directors of the World Bank or the governments they represent. The boundaries, colors, denominations, and other information shown on any map in this work do not imply any judgment on the part of the World Bank, UNHCR and the JDC concerning the legal status of any territory or the endorsement or acceptance of such boundaries.

The Joint Data Center does not necessarily own each component of the content contained within the work. The JDC therefore does not warrant that the use of any third-party-owned individual component or part contained in the work will not infringe on the rights of those third parties. The risk of claims resulting from such infringement rests solely with you. Examples of components can include, but are not limited to, tables, figures, or images.

work in Prussian textile manufactories that had been depleted of workers due to war and disease.

FIGURE 1: TOWNS WITH TEXTILE MANUFACTORIES IN PRUSSIA, 1802 ⁶



To address the potential endogeneity of immigrants choosing to settle in towns with better economic conditions, the author employs an instrumental variables (IV) approach: using the population losses during the Thirty Years' War (arguably exogenous to a town's economic conditions) as an instrument. The analysis is based on Huguenot immigration lists from 1700 (disaggregated by town) and Prussian firm-level data from 1802 detailing input and output for all 750 textile manufactories operating at the time.

The empirical analysis demonstrates that **textile manufactories in towns hosting a higher share of Huguenot refugees in 1700 achieved higher levels of output and employed more technology in 1802**. Despite the possibility of knowledge diffusion to towns that did not receive Huguenot refugees, the impact of knowledge transfers is

⁶ Notes: The map shows the Prussian territory that was included in the survey in 1802. Areas in light blue are excluded from our analysis. Towns with at least one textile manufactory are marked with a yellow dot. Urban Huguenot colonies that were founded after 1685 are marked with an orange dot.

Reprinted from Hornung, Erik. 2014. "Immigration and the Diffusion of Technology: The Huguenot Diaspora in Prussia." *American Economic Review*, 104 (1): 84-122. [Copyright American Economic Association; reproduced with permission of the *American Economic Review*].

still observable in the original host towns more than 100 years later. The effect is limited to textile manufacturing, the industry that was the main field of occupation among Huguenot refugees.

The author argues that any productivity gain from immigration during this historical period is most likely due to direct interpersonal transfers of knowledge and technology to the local population as well as intergenerational transfers of knowledge, given that indirect communication (e.g. written and electronic media) was negligible in this era.

The author concludes that **the immigration of highly-skilled Huguenots led to technological diffusion and knowledge transfer between Huguenots and the host population, which led to long-term productivity increases in the textile sector**. The findings demonstrate the potential long-run benefits of immigration, which overcome any short-run frictions within 100 years.

German Jewish Émigrés and US Invention

Petra Moser, Alessandra Voena, and Fabian Waldinger
American Economic Review, Volume 104, Issue 10 (2014), Pages 3222–3255
<http://dx.doi.org/10.1257/aer.104.10.3222>

This paper **presents empirical analysis of the long-term impact of highly educated Jewish scientists who had fled Nazi Germany on scientific innovation in the United States (US)**.

In 1933 the Nazis introduced legislation requiring all non-Aryans to be removed from the civil service, leading to the summary dismissal of Jewish academics. After the annexation of Austria in 1938, dismissals were extended to Austrian universities. Approximately 2,400 German Jewish academics were among the roughly 133,000 German Jewish émigrés who, by 1944, had fled Nazi Germany and had sought refuge in the United States.

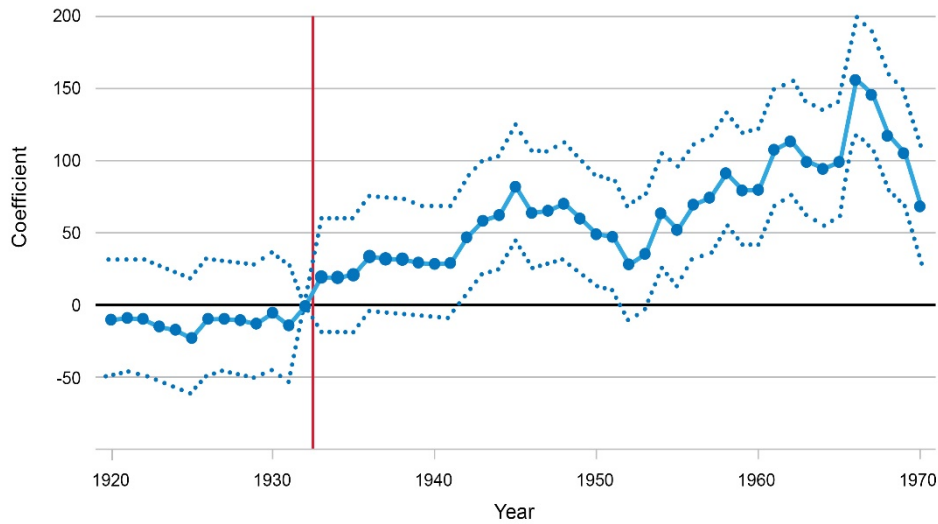
The analysis is based on datasets covering: (a) aggregate changes in US patents between 1920 and 1970 across research fields, which were differentially affected by the arrival of German Jewish chemists; and (b) changes in patenting for individual US inventors across research fields. The authors employ a difference-in-difference methodology, comparing changes in US patenting by US inventors in research fields

of German Jewish émigrés with changes in US patenting by US inventors in fields of other (non émigré) German chemists. This approach controls for a potential increase in US invention in fields where German chemists (who dominated chemical research in the early twentieth century) were active inventors. They also control for variation in patenting at the level of research fields and years (e.g. due to scientific breakthroughs, variation in the speed of invention across the life cycle of a technology, and potential declines in innovation due to competing firms agreeing to pool their patents) as well as patenting class and year fixed effects.

Ordinary least squares (OLS) estimates imply that **German Jewish chemists who sought refuge in the US led to an increase in US patenting by US inventors of at least 31 percent per annum after 1933**. In technology classes that include at least one patent by a German Jewish émigré, US inventors produced at least *75 additional* patents per year after 1933, compared with an average of 241 patents per class and year in technology classes with patents by other German chemists.

To investigate the timing of the increase in US invention, the authors estimate the difference-in-differences coefficient separately for each year, allowing it to be different from zero before 1933. Estimates of annual coefficients indicate that the observed increase in patenting cannot be explained by differential pre-trends. Annual coefficients are close to zero before 1933 and increase to the highest level in the 1950s and early 1960s. These results indicate that unobservable factors that preceded the arrival of the émigrés are unlikely to have been the driving force behind the increase in US patenting.

FIGURE 2: YEAR-SPECIFIC OLS ESTIMATES US PATENTS PER YEAR IN RESEARCH FIELDS OF ÉMIGRÉS ⁷



To examine whether OLS regressions reliably estimate the émigrés' effects, the authors also apply an instrumental variables (IV) approach, using the pre-1933 fields of dismissed German Jewish chemists (determined before the Nazi rise to power) as an instrument for the fields of émigrés to the US. This controls for the possibility that émigrés selected to work in research fields in which US inventors would become more productive, or, more likely based on historical evidence, that selection into research fields was negatively affected by anti-Semitism in the US, which restricted access to the most promising fields.

Consistent with historical accounts of negative selection, **instrumental variables estimates imply a 71 percent increase in patenting, which implies that OLS results underestimate, rather than overestimate, the true effects of émigrés on US invention.** Compared with a mean of 241 patents per class and year between 1920 and 1970 in research fields of other German chemists, US inventors produce

⁷Notes: Coefficients β_t and 95 percent confidence interval in the regression $Patents\ by\ US\ inventors_{c,t} = \alpha_0 + \sum_{t=1920}^{1970} \beta_t \text{émigré class}_c \cdot year_t + \gamma'X_{c,t} + \delta_t + f_c + \varepsilon_{c,t}$ where the dependent variable measures US patents issued to US inventors per class and year, and the variable émigré class_c equals 1 for research fields of émigrés. The variable $year_t$ represents an indicator variable for each year between 1920 and 1970, and 1932 is the excluded category. The control group consists of research fields of other German chemists, defined at the level of 106 USPTO classes which include at least one patent between 1920 and 1970 by another German chemist but include no patents by émigrés. Patents by émigré chemists are excluded from the counts of US inventors. Standard errors are clustered at the level of research fields.

Reprinted from Moser, Petra, Alessandra Voena, and Fabian Waldinger. 2014. "German Jewish Émigrés and US Invention." *American Economic Review*, 104 (10): 3222-55. [Copyright American Economic Association; reproduced with permission of the *American Economic Review*].

170 *additional* patents per class and year in research fields of German Jewish émigrés.

The paper identifies three potential mechanisms for these results:

1. The arrival of German Jewish émigrés increased US invention by attracting a new group of domestic US inventors to the fields of émigrés, rather than by increasing the productivity of incumbent US scientists;
2. The émigrés' effects on US innovation may have been amplified by networks of co-inventors who became active patentees in the fields of émigrés especially after 1940, and continued patenting through the 1950s; and
3. Co-inventors of co-inventors of the émigrés also increased inventive activity in émigré fields after 1933, and remained substantially more productive throughout the 1950s and 1960s.

These patterns suggest that a natural delay in the transmission of knowledge from German Jewish chemists to US inventors influenced the timing of the increase in US invention.

Additionally, comparisons with patent data for a younger group of less prominent German Jewish scientists indicate that the fields of émigré professors may be a good proxy for the fields of a broader flow of German Jewish émigrés, which caused the observed increase in US invention.

The authors conclude that **German Jewish émigré professors helped to increase US invention in the long run, by training a new group of younger US scientists, who then continued to train other scientists.**

Displacement and Development: Long Term Impacts of the Partition of India

Prashant Bharadwaj and Rinchan Ali Mirza
Explorations in Economic History, Volume 73 (2019)
<https://doi.org/10.1016/j.eeh.2019.05.001>

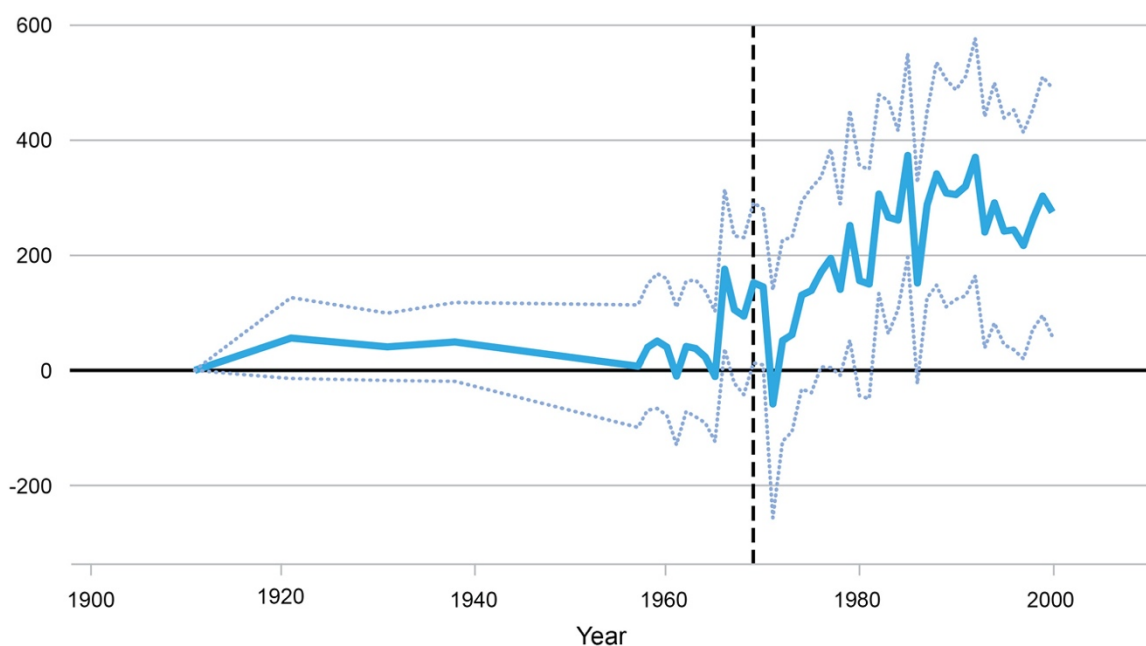
This paper **examines the impact of refugee flows, following the 1947 Partition of British India, on long-term agricultural development in receiving districts in India.**

The authors employ a difference-in-differences approach for a subset of districts for which consistent agricultural data are available for the pre- and post-Partition periods. Data on refugee presence are drawn from the 1951 census, while data on agricultural yields (from 1957 to 2009) are drawn from the Indian Agriculture and Climate Dataset (IACD) and the Village Dynamics in South Asia Dataset (VDSA). Pre-Partition agricultural data from the Agricultural Statistics Reports of British India (for four years between 1910 and 1940) are used to evaluate whether refugees might have moved to places pre-disposed to agricultural growth. The authors control for agricultural characteristics of the district (soil types), altitude, latitude and longitude, state fixed effects, calendar year fixed effects, and state-time trends (pre- and post-Partition).

Several interesting findings emerge from the analysis:

- 1. Districts with a larger refugee presence in 1951 had significantly higher agricultural yields in the decades following India's independence.** Compared to districts with a lower refugee presence in 1951, districts with a larger refugee presence saw average annual wheat yields increase by 9.4 percent between 1957 and 2009. There is a particularly large and statistically significant effect during the decade of 1977–1987—the height of the Green Revolution period in India—in the high refugee districts. The figure below, which plots the year and refugee interaction coefficients on the y-axis, illustrates this finding: refugee presence in 1951 appears to be uncorrelated with trends in wheat yields before partition and for several years after the partition. However, after the start of the green revolution there is a clear ‘take off’ in high refugee areas;

FIGURE 3: HIGH REFUGEE PRESENCE AND WHEAT YIELDS⁸



High Refugee Dummy and Wheat Yields

The relationship between refugee presence and agricultural yields are only present for crops that were affected by the Green Revolution;

2. **Districts with a larger refugee presence in 1951 were more likely to take up new agricultural technologies in the 60 years following Partition.** Refugee presence at the district level is correlated with the adoption of high yielding varieties (HYV) of seeds, as well as the use of fertilizers and tractors;
3. **The increase in agricultural yields and adoption of agricultural technology coincide with the beginning of the Green Revolution in India in the 1960s.**
4. **There does not appear to be a systematic correlation between factors that predict refugee flows and factors that may predict the take up of the Green Revolution.** There is no correlation between pre-Partition canal irrigation and

⁸ Notes: Each point on the graph is the interaction coefficient from a regression where year dummies are interacted with a dummy for high refugee presence at the district level. The regression controls for the main effects, state fixed effects and state specific quadratic trends along with controls for soil types, latitude, longitude and altitude at the district level. This regression is based on a sub sample of districts for whom comparable agricultural data was available starting in 1911 as described in the text. The vertical line in the figure is at 1969.

Reprinted from *Explorations in Economic History*, Volume 73, Prashant Bharadwaj and Rinchan Ali Mirza, Displacement and Development: Long Term Impacts of the Partition of India, 101273, [Copyright (2019), with permission of Elsevier].

aquifer depth (endowments associated with the Green Revolution, which transformed Indian agriculture in the 1960s) and refugee presence. Additionally, there is no correlation between refugee migration and the presence of other infrastructure variables such as banks, post offices, length of roads, and hospitals by 1961 (before the Green Revolution). This mitigates the concern that, even if migrants did not choose districts based on agricultural yields, migrants may have chosen districts based on some other characteristic that was important for the spread of the Green Revolution (like roads, banks, or schooling);

5. **Controlling for the British taxation system on agricultural lands, which has been shown to affect agricultural yields and the take up of the Green Revolution, does not affect the main estimates.**

Refugee presence in 1951 appears to be uncorrelated with trends in yields for wheat prior to Partition, and even for many years after the Partition. However, there is a clear “take off” in districts with a larger refugee presence immediately after the start of the Green Revolution in India. The authors argue that **refugee presence enabled the adoption of new agricultural technologies once the Green Revolution made it possible to do so.**

The authors explore the possible mechanisms driving these results and present some preliminary evidence that refugee literacy played an important role in the take up of high yielding varieties of seeds; Indian districts that received refugees at Partition experienced a net increase in their literacy rates.⁹ There is also some suggestive qualitative evidence that the higher literacy of the refugees had already led them to engage in superior farming practices even before Partition. This mechanism is consistent with the broader literature demonstrating a positive relationship between education and agricultural development, based on the underlying hypothesis that better education enables farmers to understand, evaluate and respond to new developments, making them more likely to adopt new ideas and technologies.

⁹ This builds on the work of Bharadwaj et al. (2015), which showed that Indian districts that received refugees at partition experienced a net increase in literacy rates.

Other potential mechanisms for the authors' findings include: the involvement of Hindu refugees in money lending, which may have supported the take-up of new technologies; and land consolidation occurred in areas that had more refugees, which may have been more likely to see investments in technology during the green revolution.

Mass Refugee Inflow and Long-run Prosperity: Lessons from the Greek Population Resettlement

Elie Murard and Seyhun Orcan Sakalli

This paper was presented at the Research Conference on Forced Displacement 2020, co-organized by the Joint Data Center on Forced Displacement, the Population Studies and Training Center at Brown University and the Evidence for Policy Design (EPOD) and Middle East Initiative (MEI) at Harvard University.

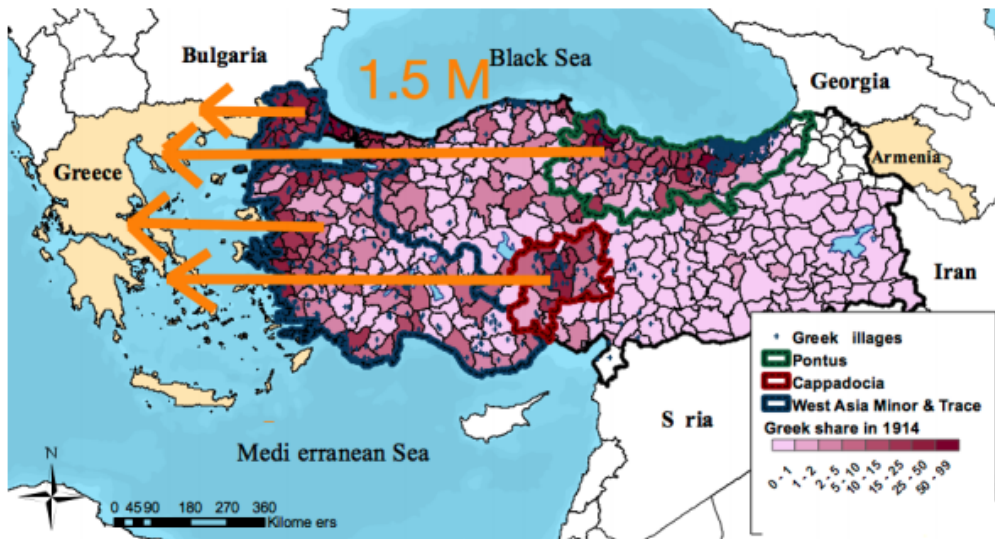
New Version of the working paper available here: https://www.cream-migration.org/publ/uploads/CDP_05_20.pdf.

Earlier version available at: <https://www.iza.org/publications/dp/11613/mass-refugee-inflow-and-long-run-prosperity-lessons-from-the-greek-population-resettlement>

This paper **examines the long-term impact of the 1923 forced resettlement of 1.2 million Greek-Orthodox citizens of Turkey to Greece in the aftermath of the Greco-Turkish war**. The mass resettlement of refugees increased the host population in Greece by more than 20 percent within a few months. Refugees who resettled in rural areas were provided with arable land parcels, farm inputs and cattle. The analysis is based on a geocoded dataset that combines historical data on refugee settlement with contemporary socio-economic outcomes at a disaggregated administrative level. The authors employ several empirical strategies that rely on different margins of spatial and temporal variation in the refugee inflow.

FIGURE 4: THE POPULATION EXCHANGE OF GREEK ORTHODOXES AND MUSLIMS TURKS¹⁰

(a) Greek-Orthodoxes in Ottoman Turkey in 1914



(b) Muslim Turks and Bulgars in Greece in 1920



Key findings include:

¹⁰ Data in map (a) come from the 1924 Ottoman population data. The darker the red color, the higher the number of Greek Orthodox relative to the 1914 population. Data in map (b) come from the 1928 census of the Kingdom of Greece. The darker the green color, the higher the number of Turks and Bulgars left between 1920 and 1928 over the 1920 population.

Reprinted from Elie Murard and Seyhun Orcan Sakalli. 2018. "Mass Refugee Inflow and Long-run Prosperity: Lessons from the Greek population Resettlement", with permission of the authors.

1. **In places of resettlement, refugees contributed to higher industrialization and structural transformation away from agriculture.**
2. **Places of refugees' resettlement display higher levels of prosperity in 1991 relative to other localities without refugees:** conditional on geographical and pre-resettlement characteristics, the former have higher night light luminosity, dwelling with better amenities (e.g. electricity), a larger manufacturing sector and higher average earnings.
3. **Resettlement produced smaller economic gains in places where the local population was predominantly refugees, as well as in municipalities where refugees were segregated into separate villages.** There is a hump-shaped relationship between the share of refugees and long-run prosperity, with prosperity first increasing and then declining when refugees make up more than 40 percent of the local population. The economic gains of the resettlement were also lower in places where refugees were clustered in separate enclaves and where their skills were less easily transferable. This result highlights the crucial role of social interactions and knowledge sharing, which were facilitated by the fact that refugees and natives often spoke the same language and shared the same religion.
4. **No evidence of negative spillover effects in nearby localities,** suggesting that the results are not driven by the reallocation of economic activity into places of resettlement, but rather by the creation of new activity.
5. **Long-run benefits in rural localities of northern Greece appear driven by the transfer of new specific knowledge in textiles and the provision of new agricultural know-how by mostly farmer refugees.** Resettlement led to the expansion of the textile sector and manufacturing especially in places with a greater suitability for the cultivation of textile crops (e.g. cotton), where refugees' knowledge could be more effectively transferred and employed. The resettlement produced smaller economic gains in localities where the interactions between refugees and natives were less likely, either because the local population was predominantly refugee and thus less diverse in terms of skills—hence the hump-shaped relationship between the refugees' share and long-run prosperity—or because of a higher segregation of refugees into separate villages within the same municipality. There was no empirical evidence for alternative mechanisms such as agglomeration economies, investments in public infrastructure or the economic integration of second-generation refugees.

The authors conclude that **by providing complementary (not necessarily superior) knowledge, refugees can generate significant benefits in the long run, even when they do not bring higher human capital, and provided that sufficient investments are made in their resettlement.** The author suggests that resettlement policies should avoid clustering refugees in separate enclaves while targeting locations where newcomers' skills are the most easily transferable.

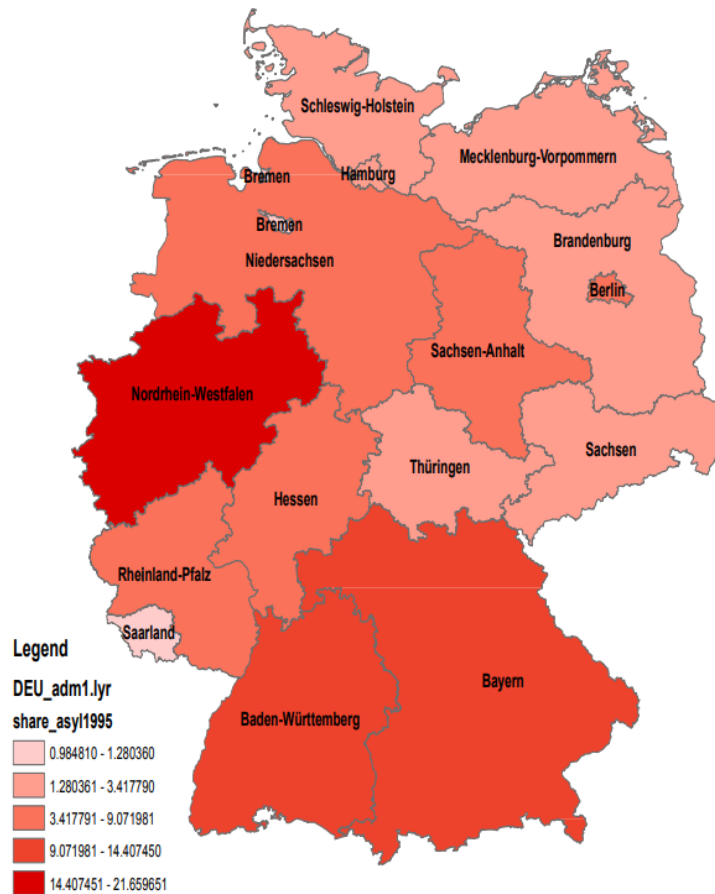
Migration and Post-Conflict Reconstruction: The Effect of Returning Refugees on Export Performance in the Former Yugoslavia

Dany Bahar, Cem Özgüzel, Andreas Hauptmann, Hillel Rapoport
IZA Discussion Paper Series, No. 12412 (2019)

<https://www.iza.org/publications/dp/12412/migration-and-post-conflict-reconstruction-the-effect-of-returning-refugees-on-export-performance-in-the-former-yugoslavia>

During the first half of the 1990s, Germany received roughly 700,000 refugees fleeing ethnic conflict in the former Yugoslavia. By 2000, the majority of refugees had returned to their home country or territories of the former Yugoslavia. The authors exploit this natural experiment, and the exogenous exposure to German industrial know-how and technology it created, to **investigate the role of returning refugees in explaining the export performance of their home countries.**

FIGURE 5: DISTRIBUTION RULE OF ASYLUM SEEKERS IN GERMANY 1995¹¹



The analysis is based on confidential German social security data capturing the number of Yugoslavian migrants working in a particular industry, disaggregated by product type, who arrived in Germany during the Balkan refugee crisis and returned home after the war; together with standard disaggregated international trade data. The authors employ a difference-in-differences methodology to estimate changes in export values from Yugoslavian countries to the rest of the world caused by return migration of workers who were employed in those same sectors in Germany. To address possible endogeneity due to self-selection of workers into certain industries with high potential in their home countries, the authors employ an instrumental variable approach (instrumenting the actual number of returning workers per industry with their

¹¹ Notes: The figure maps different German states with their shade representing the share of all asylum seekers in Germany they were mandated to receive by law in 1995, based on their population and tax revenues. Reprinted from Bahar, D., Özgüzel, C., Hauptmann, A., & Rapoport, H. 2019. "Migration and Post-conflict Reconstruction: The Effect of Returning Refugees on Export Performance in the Former Yugoslavia." *IZA Discussion Paper Series, No. 12412*, with permission of the authors.

expected number given a spatial dispersal policy that exogenously allocated asylum seekers across the different regions of Germany upon arrival).

Key findings include:

1. **Yugoslavian exports performed significantly better during the post-war period in industries that returnees had worked in while in asylum in Germany.** On average, products with a one percent increase in return migration experienced an increase in exports to the rest of the world of 0.08 to 0.24 percent between the pre and post-war periods. The estimated elasticity keeps increasing as time passes after refugees have returned.
2. Results cannot be explained by existing previous trends in exports or by convergence between the industry structure of the former Yugoslavia in the 2000s and that of Germany in the 1990s.
3. Robustness tests rule out plausible alternative explanations, such as investment linked to migration or a decrease in information costs linked to international trade due to migrant networks.
4. Results are driven by knowledge-intensive industries, and by workers with high educational attainment that are in occupations intensive in analytical and cognitive tasks or with managerial characteristics.
5. Results are stronger when looking at workers who, while abroad, experienced fast wage growth, and were employed by the top paying firms within each industry.

The authors find evidence consistent with the idea that **migrant workers exposed to industries in Germany bring back knowhow, knowledge and technologies back home that translates into higher productivity in those same industries, which in turn is reflected in export performance.** Certain types of workers and occupations are more suited for diffusing productivity-inducing knowhow across borders and such knowledge transfers matter more in certain industries than in others. The authors conclude that **returning refugees, after having been integrated in their host economies' labor markets, can play a significant role in the post-conflict reconstruction of their home countries upon their return.**

2. Agglomeration Effects and Infrastructure Investments

The Development Push of Refugees: Evidence from Tanzania

Jean-Francois Maystadt and Gilles Duranton

Journal of Economic Geography, Volume 19, Issue 2 (2019), Pages 299–334

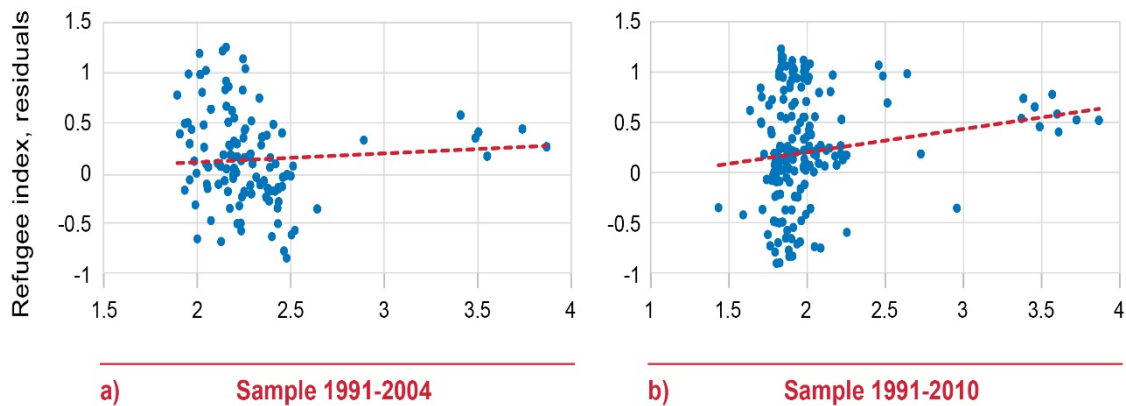
<https://doi.org/10.1093/jeg/lby020>

Maystadt and Duranton (2018) **assess the long-term impact of temporary refugee inflows from Burundi and Rwanda on the welfare of the host population in Tanzania**. About one million refugees fled Burundi in 1993 and Rwanda in 1994 and sought refuge in the Kagera region of Tanzania. Rwandan refugees were repatriated in 1996, and most Burundian refugees had either returned to their country of origin or relocated to a neighboring region by 2004.

The authors exploit time and spatial variations in the way Tanzanian households were affected by refugee inflows over time. The analysis is based on Tanzanian household panel data from the Kagera Health and Development Survey (KHDS), covering the period 1991 to 2010.

The analysis reveals **a sizeable increase in welfare for villages more exposed to refugees, which persisted long after refugees were repatriated or relocated elsewhere**. The refugee presence significantly increased real consumption per adult equivalent between 1991 and 2004 and even more strongly between 1991 and 2010 (see the illustration below), even though most refugees left between 1996 and 2000. The presence of refugees had a positive and persistent impact on the host economy, which did not fade over time.

FIGURE 6: CHANGE IN REAL CONSUMPTION AND THE PRESENCE OF REFUGEES¹²



The most important channel of transmission for persistent changes in welfare is the sizable decrease in transport costs and prices of goods attributed to large-scale investment in road infrastructure. Large-scale investments in road infrastructure to service refugee camps had a positive and significant impact on road accessibility. The consequent decrease in transport costs is strongly associated with the persistent welfare improvement in high-refugee areas. The welfare-improving impact of road accessibility in high-refugee areas is corroborated by the decreasing effect on the prices of goods. The authors did not find any evidence that changes in the provision of local public goods, agglomeration economies, or enhanced trade with neighboring countries explain the persistent increase in real consumption in high-refugee areas compared with other areas.

This paper also contributes to the broader literature on the long-run effects of shocks and the identification of multiple equilibria. The authors conclude that, in the case of the Kagera region, **the temporary population shock induced a permanent shift in the equilibrium through subsequent infrastructure investments rather than a switch to a new equilibrium in a multiple-equilibrium setting.** In simple terms, the large changes that occurred following the influx of refugees and that persisted after their departure can be explained to a great extent by new roads built to serve the refugee camps, which reduced transport costs.

¹² Reprinted from Jean-François Maystadt, Gilles Duranton, The Development Push of Refugees: Evidence from Tanzania, *Journal of Economic Geography*, Volume 19, Issue 2, March 2019, Pages 299–334, with permission of the Oxford University Press.

Market Size and Spatial Growth – Evidence from Germany’s Post-War Population Expulsions

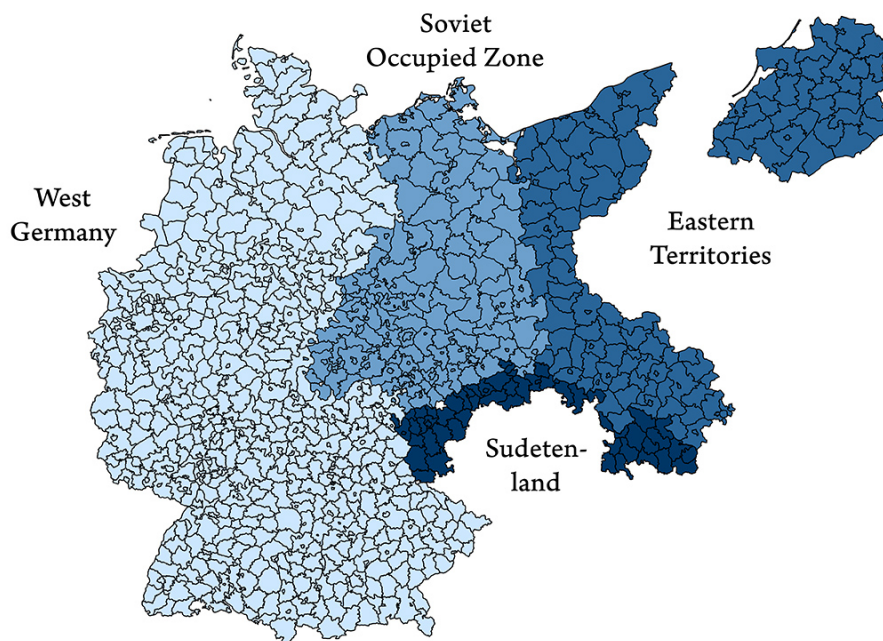
Michael Peters

Preliminary, December 2019

https://mipeters.weebly.com/uploads/1/4/6/5/14651240/refugees_2019.pdf

This paper **examines the long-term impact of forced transfers of Ethnic Germans from East German Territories to West Germany in the aftermath of the Second World War**. Between 1945 and 1948, almost eight million ethnic Germans were forcibly resettled in West Germany, increasing the population in receiving areas by more than 20 percent. Refugees were assigned to rural, low population density localities where housing was relatively abundant.

FIGURE 7: THE GERMAN REICH IN 1939¹³



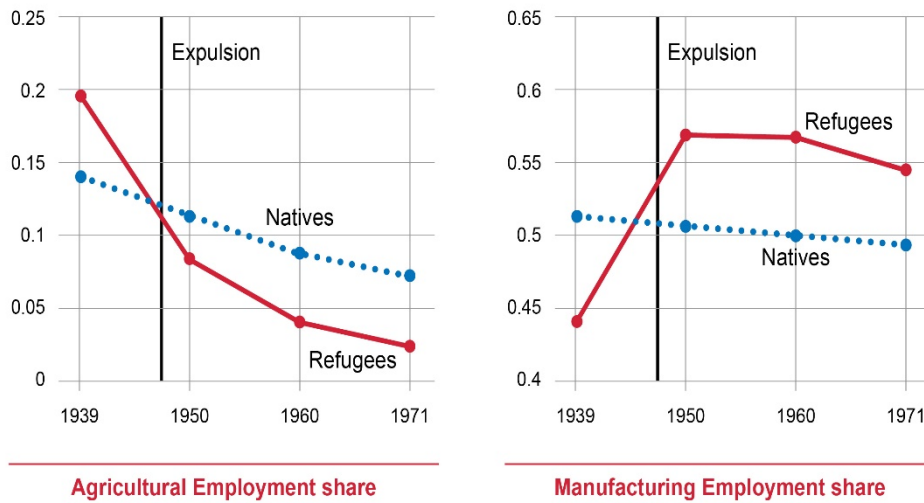
¹³ Notes: The figure shows the German Reich in the boundaries of 1939. The very light-blue part in the west is the area of to-be West Germany. The medium-blue parts in the east are the Eastern Territories of the German Reich. The dark-blue area in the south-east is the Sudetenland, which used to be part of Czechoslovakia and was annexed by Germany in 1938. The light-blue part in the middle is the area of the Soviet Occupied Zone, i.e. the to-be GDR. Reprinted from Peters, Michael. 2019. "Market Size and Spatial Growth—Evidence from Germany’s Post-War Population Expulsions", with permission of the author.

The author exploits the cross-sectional variation in refugee inflows to estimate the relationship between changes in population size and income per capita in the short- and the long-run. The analysis is based on a novel panel dataset for 500 West German counties between 1930 and 1970 constructed from a variety of original historical sources. The author also employs an instrumental variable approach, instrumenting the distance to pre-war population centers in Eastern Europe.

The data reveals that **the initial allocation of refugees was very persistent and constituted an important source of long-run regional population growth**. By 1961, i.e. 10 to 15 years after the initial settlement, populations of counties that received more refugees were still substantially larger and the share of refugees was still higher. Quantitatively, an increase in the share of refugees by 10 percentage points lead to an increase in population size by 1961 of 13 percent.

The author demonstrates **a positive relationship between the allocation of refugees and manufacturing employment growth in the 1950s and 60s**. The expansion of the local manufacturing sector was helped by inflows of refugees, who often ended up as manufacturing workers. The illustration below shows the agricultural employment share (left panel) and the manufacturing employment share (right panel) for the cohort of workers born between 1915 and 1919, with the vertical line indicating the time of the expulsion. Among refugees, 20 percent of the twenty-year olds in 1939 used to work in the agricultural sector, but only 8 percent did so after resettlement in West Germany. At the same time, the percentage of refugees in this cohort who were employed in manufacturing increased from 44 percent to 57 percent after resettlement.

FIGURE 8: THE LIFE-CYCLE OF THE 1915-1919 COHORT ¹⁴



The analysis also shows that the inflow of refugees raised local productivity, with productivity gains accruing slowly over time: while the effect of refugee inflows on income per capita in 1950 is statistically indistinguishable from zero, it is positive and large in the late 50s and early 60s.

The author proposes a model of spatial growth to explain these findings, highlighting a distinction between the short-run and long-run elasticity of productivity with respect to population size. He estimates that long-run scale elasticity is about eight times as large as short-run scale elasticity. At the aggregate level, the settlement of refugees increased income per capita by about 25 percent after 25 years, compared to the short-run effect, which lowered income per capita by 5 percent.

¹⁴ Notes: The figure shows the agricultural employment share (left panel) and the manufacturing share (right panel) for the cohort of workers born between 1915 and 1919 by refugee status. The experience of refugees (natives) is depicted in solid (dashed) lines. The expulsion, taking place in 1947, is drawn as the vertical line. Reprinted from Peters, Michael. 2019. "Market Size and Spatial Growth—Evidence from Germany's Post-War Population Expulsions", with permission of the author.

3. Impact on Refugee Preferences

Forced Migration and Human Capital: Evidence from Post-WWII Population Transfers

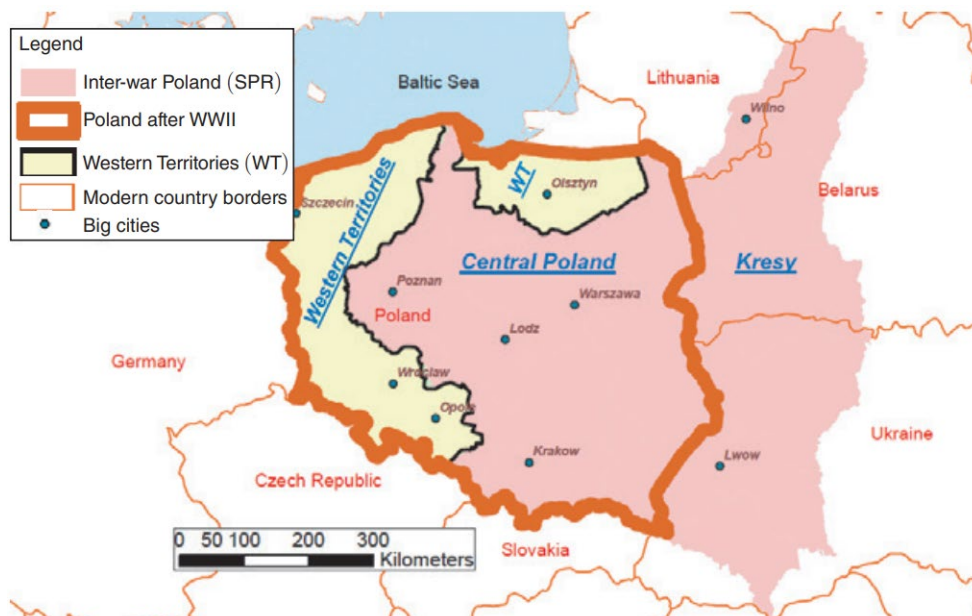
Sascha O. Becker, Irena Grosfeld, Pauline Grosjean, Nico Voigtländer, Ekaterina Zhuravskaya

American Economic Review, Volume 110, Issue 5 (2020), Pages 1430-63

<https://www.aeaweb.org/articles?id=10.1257/aer.20181518>

This paper examines the long-run effects of forced migration on investment in education, by studying the forced transfers of millions of Poles in the aftermath of WWII when Polish frontiers were moved westward. The former Eastern Polish territories (Kresy) became part of the Soviet Union, while the former German areas (the Western Territories) became Polish. Ethnic Germans living in the Western Territories were forced to relocate, while Poles in Kresy were forced to resettle in the Western Territories.

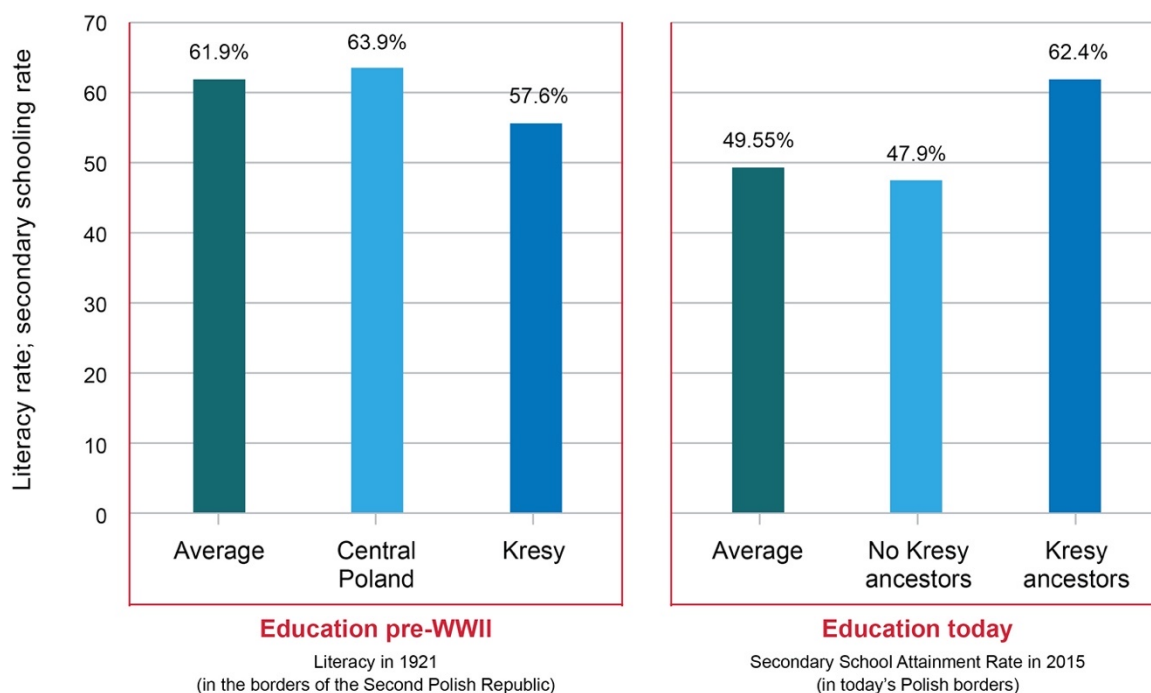
FIGURE 9. POLAND BEFORE AND AFTER WWII¹⁵



¹⁵ Notes: The map illustrates the redrawing of Poland's borders after WWII. The former eastern Polish territories (Kresy) became part of the USSR, while the former German areas in the west and north (Western Territories) became part of Poland. Poles from Kresy were forced to leave: the vast majority were resettled to the emptied Western Territories. Sources: Map generated by the authors from MPIDR and CGG (2011) and GADM (2008). Reprinted from Becker, Sascha O., Irena Grosfeld, Pauline Grosjean, Nico Voigtländer, and Ekaterina Zhuravskaya. 2020. "Forced Migration and Human Capital: Evidence from Post-WWII Population Transfers." *American Economic Review*, 110 (5): 1430-63. [Copyright American Economic Association; reproduced with permission of the *American Economic Review*].

The authors combine historical censuses with newly collected survey data to compare Poles with ancestors from Kresy (11 percent of respondents) to all other Poles. **While there were no pre-WWII differences in education, the authors find that Poles with a family history of forced migration are significantly more educated today.** Descendants of forced migrants have on average one extra year of schooling, driven by a higher propensity to finish secondary or higher education. This contrasts with the situation before WWII, when Poland included the Kresy territories Poles in Kresy had lower literacy rates. The following illustration from the paper shows the reversal in educational attainment of Poles from Kresy compared with Poles from Central Poland before and after WWII.

FIGURE 10: HISTORICAL AND CONTEMPORANEOUS PATTERNS IN EDUCATION¹⁶



¹⁶ Notes: This figure shows the reversal in educational attainment for forced migrants and their descendants. Kresy residents, who were forced to migrate, had lower literacy before WWII than residents of Central Poland, while today descendants of the Kresy migrants have higher educational attainment. The data are from the 1921 Polish census and the 2015 Diagnoza survey. For 1921, the figure displays literacy rates of Roman Catholics (i.e., ethnic Poles) in the Second Polish Republic, which consisted of Kresy and Central Poland. For contemporary Poland, the figure shows the average secondary-school attainment rate, for people without Kresy ancestors (25,122 respondents), and for people with Kresy ancestors (3,221 respondents). We use the share of people with a secondary degree because it is comparable to the 1921 literacy rates in terms of its nationwide average. Reprinted from Becker, Sascha O., Irena Grosfeld, Pauline Grosjean, Nico Voigtländer, and Ekaterina Zhuravskaya. 2020. "Forced Migration and Human Capital: Evidence from Post-WWII Population Transfers." *American Economic Review*, 110 (5): 1430-63. [Copyright American Economic Association; reproduced with permission of the *American Economic Review*].

Those forced migrants who had likely finished school by the time they were expelled from Kresy (i.e. the cohort born before 1930) do not differ from other Poles in terms of their education. For younger cohorts, there is a significant education advantage for Kresy descendants, even for those born two generations after their ancestors had been expelled.

Excluding other possible mechanisms, the authors suggest that **forced migration led to a shift in preferences, away from material possessions and towards investment in transferable human capital; the effects persist over three generations.** They support this interpretation by survey evidence, showing that descendants of forced migrants value material goods less, while having a stronger aspiration for education of their children. They also possess fewer physical assets, relative to the number of physical assets they can afford.

Annex A: Overview of articles

Bahar, Dany, Özgüzel, Cem, Hauptmann, Andreas, and Rapoport, Hillel (2019) **Migration and Post-Conflict Reconstruction: The Effect of Returning Refugees on Export Performance in the Former Yugoslavia**, *IZA Discussion Papers* 12412.

Bauer, Thomas K., Braun, Sebastian, and Kvasnicka, Michael (2013) **The Economic Integration of Forced Migrants: Evidence for Post-War Germany**, *Economic Journal* 123(571): 998-1024.

Becker, Sascha O., and Ferrara, Andreas (2019) **Consequences of Forced Migration: A Survey of Recent Findings**, *Labour Economics* 59: 1–16.

Becker, Sascha O., Grosfeld, Irena, Grosjean, Pauline, Voigtländer, Nico, and Zhuravskaya, Ekaterina (2020) **Forced Migration and Human Capital: Evidence from Post-WWII Population Transfers**, *American Economic Review* 110(5): 1430-1463.

Bharadwaj, Prashant, Khwaja, Asim I., and Mian, Atif (2015) **Population Exchange and its Impact on Literacy, Occupation and Gender – Evidence from the Partition of India**, *International Migration* 53(4): 90-106.

Bharadwaj, Prashant, and Mirza, Rinchan Ali (2015) **Displacement and development: Long term impacts of population transfer in India**, *Explorations in Economic History* 73: 101273

Brenner, Reuven, and Kiefer, Nicholas M. (1981) **The Economics of the Diaspora: Discrimination and Occupational Structure**, *Economic Development and Cultural Change* 29(3): 517–534.

Borjas, George J. (2017) **The Wage Impact of the Marielitos: A Reappraisal**, *Industrial and Labor Relations Review* 70(5): 1077–1110.

Borjas, George J., and Monras, Joan (2017) **The Labour Market Consequences of Refugee Supply Shocks**, *Economic Policy* 32(91): 361–413.

Card, David (1990) **The Impact of the Mariel Boatlift on the Miami Labor Market**, *Industrial and Labor Relations Review* 43(2): 245–257.

Clemens, Michael, and Hunt, Jennifer, 2019. **The Labor Market Effects of Refugee Waves: Reconciling Conflicting Results**, *Industrial and Labor Relations Review* 72(4): 818–857.

Hornung, Erik (2014) **Immigration and the Diffusion of Technology: The Huguenot Diaspora in Prussia**, *American Economic Review* 104(1): 84-122.

Maystadt, Jean-François and Duranton, Gilles (2019) **The development push of refugees: evidence from Tanzania**, *Journal of Economic Geography* 19 (2): 299–334.

Moser, Petra, Voena, Alessandra, and Waldinger, Fabian (2014) **German Jewish Émigrés and US Invention**, *American Economic Review* 104(10): 3222-3255.

Murard, Eli and Sakalli, Seyhun Orcan (2018) **Mass Refugee Inflow and Long-Run Prosperity: Lessons from the Greek Population Resettlement**, *IZA Working Paper No. 11613*.

Nakamura, Emi, Sigurdsson, Jósef, and Steinsson, Jón (2020) **The Gift of Moving: Intergenerational Consequences of a Mobility Shock**, R&R at *Review of Economic Studies*.

Peri, Giovanni, and Yasenov, Vasil (2019) **The Labor Market Effects of a Refugee Wave: Synthetic Control Method Meets the Mariel Boatlift**, *Journal of Human Resources* 54(2): 267-309.

Peters, Michael (2019) **Market Size and Spatial Growth - Evidence from Germany's Post-War Population Expulsions**, *R&R Econometrica*.

Ruiz, Isabel and Vargas-Silva, Carlos (2013) **The Economics of Forced Migration**, *Journal of Development Studies* 49(6): 772-784.

Schuettler, Kirsten, and Caron, Laura (2020) **Jobs Interventions for Refugees and Internally Displaced Persons**, World Bank, Washington, DC. License: Creative Commons Attribution CC BY 3.0 IGO.

Stigler, George J., and Becker, Gary S. (1977) **De Gustibus Non Est Disputandum**, *American Economic Review* 67 (2): 76–90.

Verme, Paolo and Schuettler, Kirsten (2019) **The Impact of Forced Displacement on Host Communities: A Review of the Empirical Literature in Economics**, *Households in Conflict Network Working Paper* 302.

Annex B: Consent

Some of the images have been slightly modified for the purpose of this publication, with permissions from the authors and publishers. Some images have been reproduced with proper reference to the original content. The Joint Data Center on Forced Displacement does not necessarily own each component of the content contained within the work. The JDC therefore does not warrant that the use of any third-party-owned individual component or part contained in the work will not infringe on the rights of those third parties. The risk of claims resulting from such infringement rests solely with you. If you wish to re-use a component of the work, it is your responsibility to determine whether permission is needed for that re-use and to obtain permission from the copyright owner. Examples of components can include, but are not limited to, tables, figures, or images.