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The Long-Run Impact of Forced Migration: Evidence from the Killing Fields

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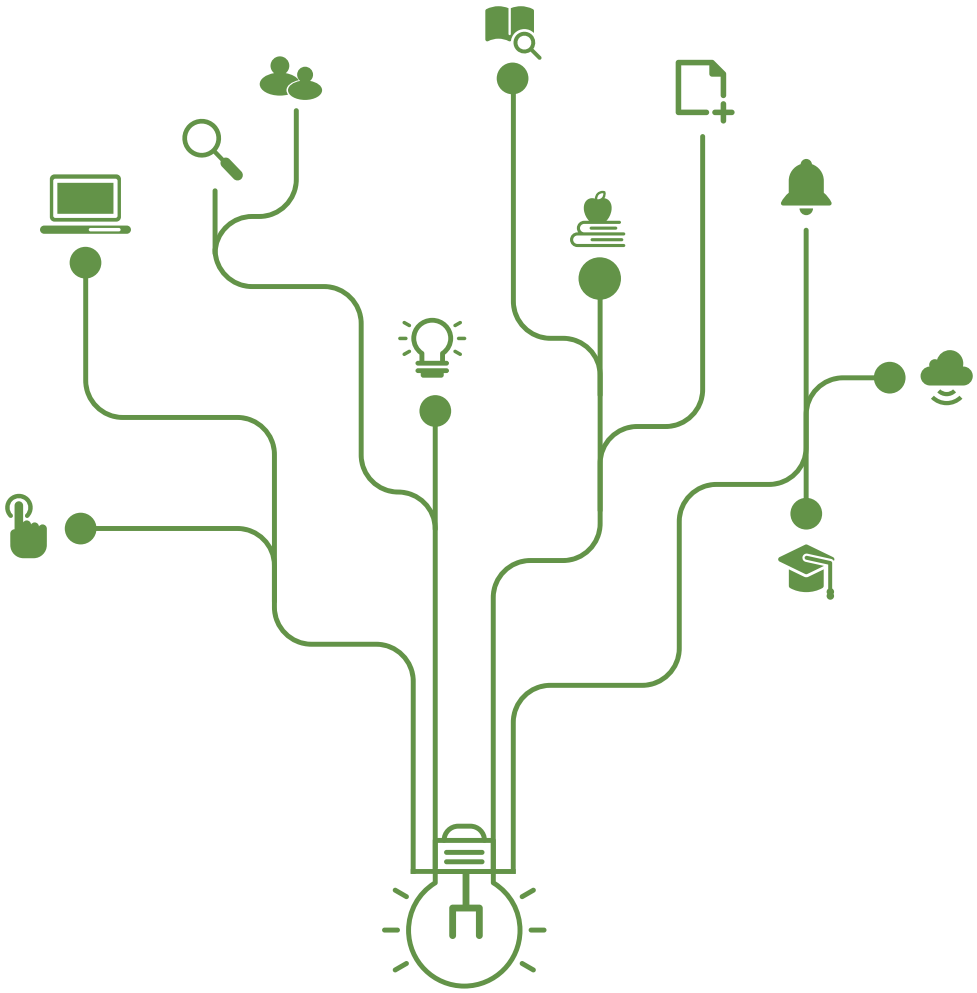

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Chungeun Yoon*

Abstract

This study examines the long-term effects of forced migration on economic and educational outcomes in a low-income country. We explore the Killing Fields in Cambodia, where the Khmer Rouge regime seized power in 1975 and compelled approximately one million people to relocate from urban to rural areas. We find that individuals forced to migrate during the Khmer Rouge regime were likely to eventually transition from the agricultural sector to the service sector. Younger cohorts who experienced forced migration and descendants of migrants who were displaced to the Killing Fields exhibited a decrease in years of schooling compared with those whose families were not forced to migrate. These findings suggest that the repercussions of the Khmer Rouge regime have had persistent impacts on individuals' employment patterns and educational outcomes across generations.

Keywords: Geographic mobility, Structural change, Education, Civil conflict

JEL classification: O15, R23, J61, E24, N45

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A Khmer Rouge slogan targeted at the so-called "new people" from urban areas was, "To keep you is no benefit, to destroy you is no loss."

1 Introduction

Throughout history, mass forced migration has been a feature of fragile or conflict-affected states and developing countries. The impact of forced population displacement is clearly detrimental in the short run. This human catastrophe disperses families and increases the death rate during and following displacement. To mitigate the detrimental impacts of forced migration and promote stable economic growth in developing countries, it is crucial to also identify the long-term economic consequences of forced migration.

One way to examine the effects of forced migration is to study whether a particular historical instance of forced migration has long-term effects on the local economy and the forced migrants. Specifically, what are the long-term effects of forced migration on local labor markets and outcomes for migrants in low-income countries? What are the intergenerational consequences of such migration?

While it is well understood that forced migration causes large losses in the short run, its long-term effects are less clear. It is possible that forced population displacement does not cause negative effects on local economies via labor reallocation or other potential mechanisms. Forced migration could in fact overcome the challenge of the agricultural productivity gap in developing countries if it fundamentally changes the structure of the economy and population. Gollin et al. (2014) find an agricultural productivity gap in low-income countries in which workers who are reallocated from agricultural to non-agricultural occupations increase their wages.

There is considerable evidence of economic impacts of forced migration. However, few empirical studies have found a causal effect of forced migration since decisions to migrate to a certain location can be endogenous despite uncontrollable circumstances such as war or

conflict. Further, self-selection with regard to migration decisions could arise in the case of survivors of war or conflict who must seek out a living. To overcome the challenge of identifying a causal effect, we exploit a historical event in which a regime suddenly pushed urban people to move to rural areas, an exogenous shock to the forced migrants and the local communities.

Our study exploits a unique historical event as a natural experiment: the forced migration of urban people to rural areas under Cambodia's Khmer Rouge regime in 1975. We investigate the causal effect of this forced relocation on the labor market in terms of structural changes and educational outcomes among the descendants of migrants. We use the complete-count Census conducted in 1998 and geographical information on the locations of the Killing Fields, restricting the data to those individuals who were forced to migrate. Differences in migration patterns across regions and years allow us to identify the causal effects of such moves on economic and educational outcomes.

We find that individuals who were compelled by the Khmer Rouge regime to migrate to the Killing Fields were more likely to eventually transition out of the agricultural sector and into the service sector. This finding highlights the role of forced migration in driving significant changes in individuals' employment patterns and the overall structure of the labor market. Younger cohorts who were subjected to forced migration experienced a decrease in years of schooling. The descendants of those who migrated to the Killing Fields also experienced a significant negative impact on educational attainment. This suggests that the repercussions of the Khmer Rouge regime continued to affect educational outcomes across generations. Our study sheds light on the uneven distribution of benefits within families resulting from migration. While previous studies have often emphasized the positive intergenerational effects of migration, our study underscores the need to consider context-specific factors.

The history and politics of the Khmer Rouge and the Killing Fields have been well documented, including by Kiernan (2002, 2003, 2004) and other researchers. Slocomb (2010) produced an economic history of Cambodia and records related to the economy of the Khmer

Rouge regime. Islam et al. (2016, 2017) have explored the long-term effects of the Killing Fields on education, earnings, and health, and Saing and Kazianga (2020) have investigated the long-run impact of U.S. bombings in Cambodia. To the best of our knowledge, no literature has explored the causal effects of forced migration on economic and educational outcomes in Cambodia.

The literature that explores the economic impacts of forced migration has focused on impacts on migrants forced to move due to conflict or war, policies, and natural disasters. In terms of conflict and war, there is substantial evidence of adverse short-run effects of such migration. Kondylis (2010) showed that displaced Bosnians had higher unemployment rates after the war, and Fiala (2015) also found that displaced households lagged behind in Uganda. Studies on the 1994 Rwandan genocide suggest that it caused a substantial decrease in economic growth (Hodler, 2019) and had short- and long-run adverse impacts on outcomes for children hosted in refugee communities (Baez, 2011). Ruiz and Vargas-Silva (2013) have reviewed the economic literature, finding mixed results as to the effects of forced migration on host communities. Though Akbulut-Yuksel (2014) provides evidence of long-term negative consequences on outcomes for Germans who were of school age during World War II, another study found that the bombing of German cities had only a temporary impact on post-war city growth (Brakman et al., 2004). Further, Miguel and Roland (2011) found no long-run impact of U.S. bombings on local poverty rates in Vietnam. Therefore, it is not clear whether forced migration and war generate long-run negative economic consequences on individuals or communities.

Several studies have explored the economic impacts of government-enforced migration. Bharadwaj et al. (2015) have examined the impact of the partition of the Indian subcontinent in 1947, finding large and long-term impacts on one district's educational, occupational, and gender composition. Meng and Zhao (2017) found strong adverse intergenerational effects of China's Cultural Revolution on children's education, while Kinnan et al. (2018) found that it reduced consumption volatility and asset holding. However, little is known about the consequences of mass genocide and the forced relocation of urban populations to rural areas in low-income countries.

The recent literature on the long-term economic consequences of disasters has produced mixed evidence. Deryugina et al. (2018) found that Hurricane Katrina impacted where victims live, but had only small and transitory effects on employment and income, while McIntosh (2008) found an adverse impact on labor market outcomes. In terms of other disasters in U.S. history, Hornbeck and Naidu (2014) found that African-American migration caused by the 1927 Mississippi flood led to local agricultural development. Sudden shocks such as the destruction of houses and buildings can generate positive spillover effects by creating profitable opportunities for reconstruction Hornbeck and Keniston (2017). Furthermore, Nakamura et al. (2022) found that those under the age of 25 (the children) who were forced to relocate due to a volcanic eruption exhibited a significant increase in wages and education, while those over the age of 25 (the parents) were marginally worse off. Our work focusing on the link between forced migration and long-term economic consequences in low-income countries contributes to the recent literature on the roles of sudden shocks such as wars, conflicts, and natural disasters in explaining local economies, structural transformation, and educational outcomes.

The rest of this paper is organized as follows. Section 2 explains the historical background of the Killing Fields and forced migration. Section 3 describes the data we analyzed and presents descriptive statistics. Section 4 outlines our empirical methods, and Section 5 presents the results and discusses their implications. Section 6 concludes the study.

2 Historical Background

The Khmer Rouge regime in Cambodia, under the leadership of Pol Pot, implemented a policy of forced migration starting in 1975. Urban residents were forcibly relocated to rural areas, with the intention of increasing agricultural productivity and transforming the country into an agrarian communist society. This policy resulted in immense human suffering and tragedy (Heuveline, 2001; Kiernan, 2002; Slocomb, 2010). Figure 1 depicts the patterns of forced migration, providing visual evidence of this horrific historical event. A photograph is

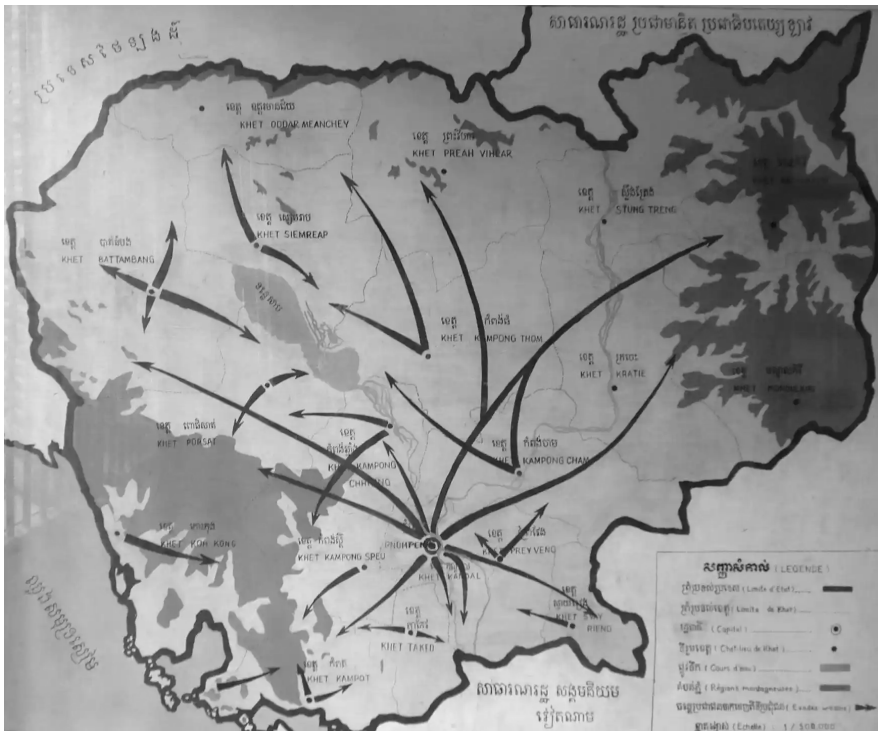
also given to further corroborate the actuality and magnitude of this historical tragedy.

Estimates suggest that half a million to more than a million people were displaced by the Khmer Rouge regime. These individuals, referred to as "new people," were forced to leave their homes and take up farming in rural areas. The conditions they faced were harsh, and many suffered from starvation, overwork, and disease. Tragically, a significant number of "new people" lost their lives due to these extreme conditions or were executed under the brutal regime.

The Khmer Rouge's campaign of forced migration and labor camps, known as the Killing Fields, lasted from 1975 to 1979. According to the Cambodian Genocide Program at Yale University, over 1.3 million victims of execution have been found in approximately 20,000 mass grave sites. The total number of casualties during this period is estimated at around two million out of a 1974 population of approximately eight million.

The policies of the Khmer Rouge regime were based on a radical ideology aimed at eradicating class distinctions and establishing a self-sufficient agrarian society. The regime considered urban life counter-revolutionary and sought to dismantle it, exerting strict control over the population through forced labor, torture, and mass killings. Notably, the regime targeted not only individuals associated with the previous government but also intellectuals, professionals, and religious minorities, viewing them as threats to their vision of a communist society.

The forced migration and atrocities committed during the Khmer Rouge era left an indelible mark on Cambodia's history and the lives of its people. The effects of this traumatic period continue to resonate in Cambodian society and have shaped the collective memory of the nation. Understanding the historical context and the immense human suffering endured during this time is crucial for comprehending the subsequent social, economic, and psychological impacts on the Cambodian people.



(a) Forced migration

(b) Forced migrants

Figure 1: FORCED MIGRATION IN CAMBODIA

Notes: Evacuation map from the Tuol Sleng Genocide Museum (a). Photo from the Documentation Center of Cambodia (b)

3 Data

Our research relied on two key datasets: the complete-count Census conducted in 1998 and geographical information specifically related to the locations of the Killing Fields. The complete-count General Population Census of Cambodia 1998 recorded a population of 11,437,656 individuals. We narrowed down these data to include only the 3,125,733 individuals who migrated under the Khmer Rouge regime. The census collected detailed information from individuals regarding their current place of residence, past places of residence, and the timing of their movements. By examining records of where people lived and when they moved, we identified individuals who were compelled to migrate to the Killing Fields after the Khmer Rouge assumed control of Cambodia in 1975.

To enhance the precision of our analysis, we specifically limited the data to individuals who migrated between 1965 and 1980 and did not subsequently relocate to another place after their migration. This particular timeframe was selected to facilitate the examination of migratory patterns that occurred before and during the Khmer Rouge regime. In cases where individuals relocated multiple times, we observe only their current and previous reported residence. For example, if an individual was forced to migrate to the Killing Fields in 1975 but later returned to their hometown or relocated elsewhere, our data would exclusively reflect their current location and their previous recorded location. This timeframe, therefore, allows us to account for potential interim changes in residence and capture the movements of individuals who were affected by the Khmer Rouge regime.

We obtained data on the locations of 309 mass-grave sites and 158 prisons associated with the Khmer Rouge, commonly referred to as the Killing Fields. This information was sourced from the Cambodian Genocide Program Interactive Geographic Database (CGEO), a project facilitated by Yale University's Genocide Studies Program. Figure 2 illustrates the locations of the Killing Fields within the boundaries of communes in Cambodia. This allows us to determine whether individuals recorded in the census were compelled to migrate to the areas where the Killing Fields are located.

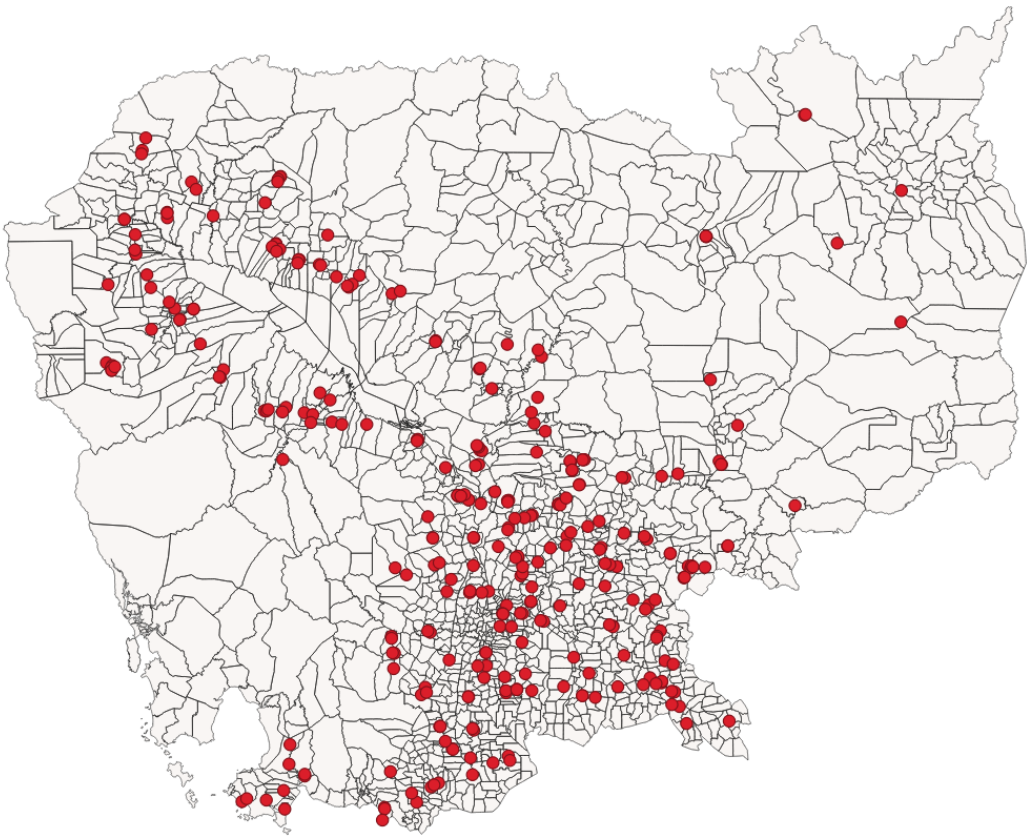
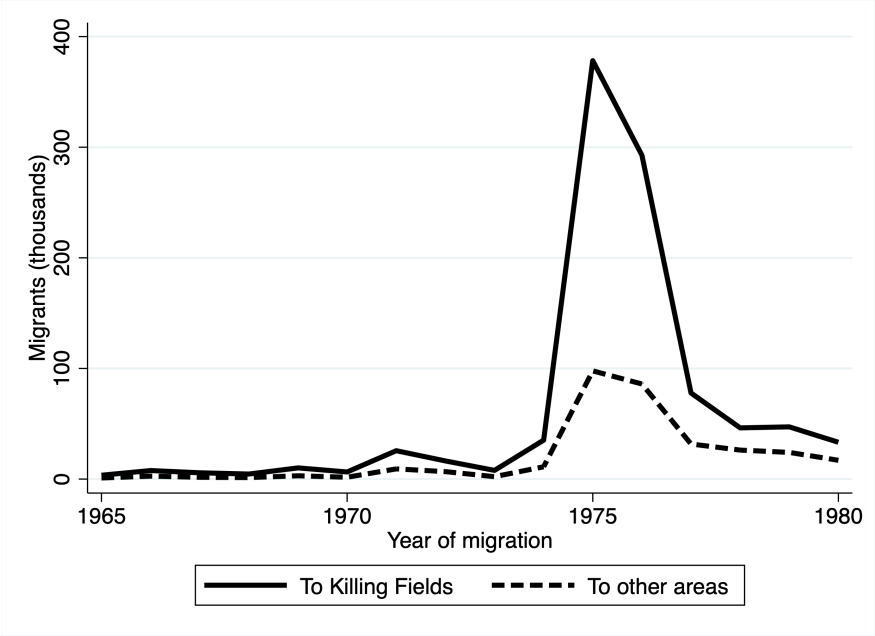
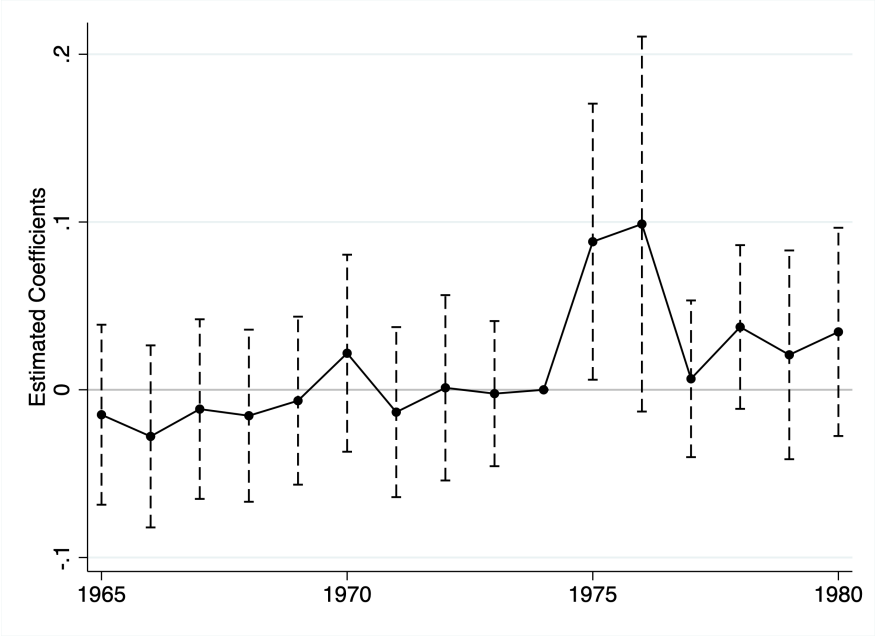


Figure 2: KILLING FIELDS

Notes: The map depicts the boundaries of communes in Cambodia. Each dot on the map represents the locations of the Cambodian genocide sites known as Killing Fields.



(a) Forced migration by areas



(b) Estimated forced migration to the Killing Fields

Figure 3: FORCED MIGRATION OVER THE YEARS

Notes: The first figure illustrates the number of individuals who migrated to the Killing Fields and those who migrated to other regions. The second figure reports the regression analysis results. The coefficients are estimated by regressing the migration to the Killing Fields on the year of migration relative to the base year of 1974, controlling for province fixed effects, gender, age, age-squared, and the year of education.

Figure 3 displays the number of individuals who migrated to the Killing Fields as well as those who migrated to other areas. The figure reveals distinct migration patterns, indicating that individuals were more likely to migrate to areas that later became sites of genocide after the Khmer Rouge regime assumed power in 1975. This observation aligns with anecdotal evidence suggesting that individuals who resided in urban areas were forcibly relocated to rural areas and compelled to engage in agricultural activities during the Khmer Rouge era.

The second figure presents the results of the regression analysis. The coefficients were estimated by regressing the migration to the Killing Fields on the year of migration relative to the base year of 1974. The analysis controlled for province fixed effects, gender, age, age squared, and years of education. The results of the regression analysis provide clear evidence that individuals were most likely to migrate to the Killing Fields between 1975 and 1976, a period that coincides with the Khmer Rouge regime's rise to power. The significance of the coefficients indicates a strong association between the timing of the migration and the regime's takeover.

Table 1 reports summary statistics on the data used in the analysis. The sample is made up of individuals who migrated between 1965 and 1980 and did not relocate again following their migration. The independent variable used in our analysis is migration to the Killing Fields. If a person migrated to an area that later became the site of a genocide, the variable takes a value of one. The dependent variable indicates whether a person was engaged in the agricultural, manufacturing, or service sectors in 1998. For example, the 1998 Census reports that approximately 77 percent of people worked in the agricultural sector. It is important to note that the census does not allow us to track the occupational changes of individuals over time. We solely observe the occupations reported in the 1998 Census.

In the next section, we thoroughly address the data limitations and propose strategies to mitigate potential challenges stemming from the inability to track both occupational changes and migration patterns over time. We have carefully designed our methodology to account for these constraints and to maximize the robustness and validity of our results.

Table 1: SUMMARY STATISTICS

	Mean	SD	Observations
	(1)	(2)	(3)
Migration to the Killing Fields	0.780	0.415	1,042,594
Female	0.566	0.496	1,042,594
Age	41.933	14.546	1,042,594
Ethnicity: Khmer	0.967	0.180	1,042,594
Religion: Buddhism	0.968	0.177	1,042,594
Literacy	0.655	0.475	1,042,594
Never atteneded school	0.343	0.475	1,042,594
Years of education	5.457	3.041	682,089
Employment	0.829	0.376	1,042,594
Agricultural sector	0.771	0.420	871,103
Manufacturing sector	0.024	0.153	871,103
Service sector	0.192	0.394	871,103
Number of districts			180
Number of communes			1,584

Notes: This table presents the summary statistics of individuals who migrated between the years 1965 and 1980. The sample excludes individuals who did not migrate. The data is derived from the complete-count General Population Census of Cambodia 1998.

4 Empirical Strategy

Our objective is to estimate the causal impact of forcible relocation to the Killing Fields on long-term economic outcomes. To achieve this, we leverage the variation in migration patterns across different regions and different years. We first compare the outcomes of migrants who relocated to regions that later became genocide sites with the outcomes of migrants who relocated to other regions. We also compare the outcomes of individuals who migrated before the Khmer Rouge regime seized power in 1975 with the outcomes of those who migrated afterward. If the Killing Fields indeed had a lasting effect on long-term economic outcomes, individuals who migrated in response to the Khmer Rouge regime in 1975 would be more likely to have been exposed to the Killing Fields. The following equation captures the effect of interest.

$$Y_{ijt} = \beta \left(\text{KF}_{ij} \times \text{Post-1975}_{it}\right) + \gamma_j + \tau_t + X_i + \epsilon_{ijt} \tag{1}$$

where Y_{ijt} indicates whether individual i who migrated to district j in year t was engaged in each of the following sectors: agricultural, manufacturing, or service. KF_{ij} is a dummy variable indicating that individual i migrated to district j where Killing Fields were located, and Post-1975_{it} is a dummy variable that switches on in year 1975 or later if individual i migrated in year t. District fixed effects γ_j are included to account for unobserved time-invariant characteristics specific to each district, and year fixed effects τ_t are also incorporated to control for common shocks that affected all individuals in a given year of migration. Individual controls X_i include gender, age, age squared, and years of education. The coefficient of interest β measures the long-term effect of migrating to the Killing Fields in 1975 or later in response to the Khmer Rouge on individuals' occupational choices reported in the 1998 Census. This coefficient captures the relationship between the experience of migrating to the Killing Fields and individuals' subsequent occupational decisions.

The identification strategy is not without potential concerns. It relies on the assumption that the outcomes of individuals who migrated to the Killing Fields and those of individuals

who migrated to other regions would not have changed differently in the absence of the Khmer Rouge regime and the existence of the Killing Fields. Moreover, there may be other unobserved factors or uncontrolled events that happened to coincide with the Killing Fields that could potentially influence individuals' occupational choices.

To address these concerns, we conduct a balance check to assess the comparability of the two groups. Table 2 presents the baseline characteristics of the two groups, focusing on several variables measured prior to the occurrence of the Killing Fields. We find that there is a statistically significant difference in one variable at the 10 percent level: engagement in the service sector. However, it is noteworthy that despite the non-random selection of individuals to the Killing Fields, there is balance in the majority of baseline characteristics across the two groups. Moreover, a joint significance test of all the baseline variables does not yield statistically significant results (p=0.346). To further address concerns related to potential differences across districts and years, we control for these factors, finding balance across the two groups as presented in column 4. Overall, the groups exhibit similar baseline characteristics, suggesting that the outcomes of individuals who migrated to the Killing Fields would have resembled those of individuals who migrated to other regions had the Killing Fields not occurred.

We employ a fully flexible time-varying estimation using an event study specification relative to a base year. The equation is as follows:

$$Y_{ijt} = \sum_{t} \beta_t (\text{KF}_{ij} \times \text{YearDummy}_{it}) + \gamma_j + \tau_t + X_i + \epsilon_{ijt} \tag{2}$$

where all variables are defined as in equation 1. The key distinction is that KFij is interacted with YearDummyit, which is a dummy variable representing a specific year t during which individual i migrated. The estimates β_t illustrate the differences in outcomes between individuals who migrated to the Killing Fields and those who migrated to other regions, relative to a base year of 1974, prior to the Khmer Rouge regime. We would expect these estimates to remain constant in the years leading up to the Khmer Rouge regime, as the

Table 2: BASELINE CHARACTERISTICS BETWEEN MIGRANTS

	To the Killing Fields (1)	To other regions (2)	p-value (no controls) (3)	p-value (controls) (4)
Female	0.480	0.492	0.831	0.467
Age	48.985	48.071	0.250	0.608
Years of education	5.008	4.961	0.941	0.595
Employment	0.870	0.854	0.875	0.854
Agricultural sector	0.860	0.828	0.107	0.638
Manufacturing sector	0.016	0.017	0.835	0.938
Service sector	0.118	0.149	0.072	0.250
p-value (joint F-test)			0.346	0.435
Observations	50,003	15,002	65,005	65,005

Notes: Columns 1 and 2 show the mean values of migrants before the Khmer Rough took power in Cambodia and forced people to migrate in 1975 (years 1965-1974). The p-value reported in column 3 is derived from a regression of each variable on a dummy variable of migrating to the Killing Fields, and the p-value in column 5 is obtained from a regression, controlling for district fixed effects and year of migration fixed effects. The p-value (joint F-test) reports aggregate orthogonality test in a regression of a dummy variable of migrating to the Killing Fields on covariates.

regime had yet to come to power.

To further validate the identifying assumption, we test it by restricting the sample to migrants who relocated from 1965 to 1974, prior to the Killing Fields, and estimating the following model:

$$Y_{ijt} = \beta \left(\text{KF}_{ij} \times \text{Year}_{it}\right) + \gamma_j + \tau_t + X_i + \epsilon_{ijt} \tag{3}$$

where Year_{it} is a linear year trend. The coefficient β measures the difference in time trends between migrants.

Table 3 reports the results; the coefficients have small magnitudes and none are statistically significant, further supporting the parallel pre-trend assumption and strengthening the validity of our identification strategy. The lack of statistical significance of the coefficients supports the assumption that, prior to the occurrence of the Killing Fields, the outcomes of

Table 3: PRETREATMENT TRENDS

Dependent variable	Agricultural sector (1)	Manufacturing sector (2)	Service sector (3)
Migration to KF × year	0.001	0.000	-0.001
	(0.001)	(0.000)	(0.001)
District fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	56,718	56,718	56,718
R-squared	0.122	0.026	0.103

Notes: The sample is restricted to migrants before the Khmer Rough took power in Cambodia and forced people to migrate in 1975 (years 1965-1974). The dependent variable indicates whether a person engages in each of the following sectors: agricultural, manufacturing, and service sectors. Migration to KF is an indicator that takes a value of one if a person migrates to the districts where the Killing Fields are located. The interaction term of migration indicator and year are linear time trends in the Killing Fields and other districts. Standard errors in parentheses are clustered at the district level.
$^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

the two groups followed similar trajectories.

5 Empirical Results

5.1 Labor Market Effects

We explore the long-term economic transformation and structural changes that emerged as a result of the Killing Fields. Individuals who were compelled to migrate to Killing Fields locations had no choice but to engage in agricultural activities during that time. This experience might have had a lasting impact, leading them to continue their involvement in agriculture over the next 20 years. Alternatively, the distressing events individuals endured while engaged in agricultural work in the Killing Fields might have driven them away from the agricultural sector. Moreover, it is crucial to consider that economic development is typically accompanied by structural change, often involving a shift away from agriculture and potentially manufacturing toward the service sector. In this context, one would expect

to observe evidence of such structural changes in the context of the Killing Fields.

Table 4: THE LONG-RUN EFFECT OF FORCED MIGRATION ON THE STRUCTURAL CHANGE IN THE LABOR MARKET

Dependent variable	Agricultural sector (1)	Manufacturing sector (2)	Service sector (3)
Migration to KF × Post-1975	-0.033***	0.002	0.028***
	(0.012)	(0.002)	(0.011)
R-squared	0.148	0.031	0.121
District fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	170,888	170,888	170,888

Notes: The sample consists of individuals who migrated between the years 1965 and 1978. The dependent variable indicates whether a person engages in each of the following sectors: agricultural, manufacturing, and service sectors. Migration to KF is an indicator that takes a value of one if a person migrates to the districts where the Killing Fields are located. Standard errors in parentheses are clustered at the district level.
$^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table 5: FORCED MIGRATION AND THE STRUCTURAL CHANGE WITH ADDITIONAL CONTROLS

Dependent variable	Agricultural sector (1)	Manufacturing sector (2)	Service sector (3)
Migration to KF × Post-1975	-0.022**	0.001	0.017**
	(0.010)	(0.002)	(0.009)
R-squared	0.227	0.033	0.203
District fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Observations	170,888	170,888	170,888

Notes: The table controls for individual characteristics including gender, age, age-squared and the year of education. Standard errors in parentheses are clustered at the district level.
$^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Table 4 presents compelling findings regarding the impact of the Killing Fields on the occupational choices of migrants. We find a significant decrease in the agricultural share among individuals who migrated to the Killing Fields, relative to those who migrated to other regions. On average, individuals affected by the Killing Fields were 3.3 percentage points less

likely to work in the agricultural sector. This translates to a 4.3 percent decrease in the agricultural share given the mean of the variable. In Table 5, we include additional control variables at the individual level: gender, age, age squared, and years of education. The coefficient estimates reveal that the Killing Fields caused a 2.2 percentage point reduction in the agriculture share, corresponding to a 2.9 percent decrease. These results demonstrate a robust relationship between the occurrence of the Killing Fields and a decline in agricultural engagement among migrants, even after accounting for individual characteristics. These findings provide empirical evidence that supports the notion that the Killing Fields contributed to a structural change in occupational choices, specifically a shift away from agriculture.

The manufacturing sector had historically represented a relatively small segment of occupational choices, approximately 2.4 percent at the time of the 1998 Census. Examining the estimated coefficients presented in Tables 4 and **??** , we find that the coefficients are small in magnitude and statistically insignificant. We find no evidence that the Killing Fields drove a structural change toward the manufacturing sector. It appears that the immediate investment surge, capital formation, and subsequent growth in the manufacturing sector were not direct outcomes of this historical event.

Our analysis reveals a significant and noteworthy increase in employment in the service sector among those who migrated to Killing Fields locations. As depicted in Table 4, the share of migrants engaged in the service sector increased by 2.8 percentage points, equivalent to a substantial 14.6 percent increase. When the control variables included in Table 5 are taken into account, the increase in the service sector share is 1.7 percentage points, reflecting an 8.9 percent increase. These findings suggest that the experience of the Killing Fields triggered a notable shift toward the service sector. The service sector effectively absorbed a significant portion of the displaced economic activity from the agricultural sector. It is evident that migrants who experienced the demanding agricultural activities associated with the Killing Fields sought opportunities to transition into alternative sectors. This shift to the service sector demonstrates the transformative impact of the Killing Fields on long-term occupational choices. The traumatic experiences endured during the Killing Fields likely influenced

individuals to seek alternative avenues of employment, resulting in a substantial reallocation of labor toward the service sector. The rise in service sector engagement highlights the dynamic nature of economic transformation and the adaptability of individuals in response to significant historical events.

Table 6: FORCED MIGRATION AND THE STRUCTURAL CHANGE BY GENDER

Dependent variable	Agricultural sector (1)	Manufacturing sector (2)	Service sector (3)
A. Women			
Migration to KF × Post-1975	-0.030**	0.003	0.023**
	(0.013)	(0.003)	(0.011)
R-squared	0.166	0.057	0.136
District fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	81,538	81,538	81,538
B. Men			
Migration to KF × Post-1975	-0.035***	0.001	0.032***
	(0.013)	(0.002)	(0.012)
R-squared	0.149	0.023	0.125
District fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	89,350	89,350	89,350

Notes: The sample is divided into two groups: females and males. Standard errors in parentheses are clustered at the district level.
$^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

To examine the mechanisms behind the structural transformation that coincided with the Killing Fields, we investigate differential effects across gender, age groups, and educational levels. Table 6 provides a breakdown of the effects by gender, using subsamples of women and men. Both coefficients are consistent with those obtained in the main regression analysis, with similar magnitudes. This suggests that the impact of the structural transformation was comparable for both genders.

We also explored the effects by age group, as outlined in Table 7. We divided the sample using the median age from the 1998 Census as a threshold. Individuals aged 45 or younger

Table 7: FORCED MIGRATION AND THE STRUCTURAL CHANGE BY AGE

Dependent variable	Agricultural sector (1)	Manufacturing sector (2)	Service sector (3)
A. Young individuals			
Migration to KF × Post-1975	-0.034**	0.001	0.030**
	(0.014)	(0.003)	(0.013)
R-squared	0.184	0.046	0.148
District fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	90,915	90,915	90,915
B. Old individuals			
Migration to KF × Post-1975	-0.032***	0.004	0.026***
	(0.010)	(0.003)	(0.010)
R-squared	0.105	0.020	0.090
District fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	79,973	79,973	79,973

Notes: The sample is divided into two groups: young individuals, aged 45 or younger (with 45 as the median) in the 1988 Census, and older individuals, aged over 45. Standard errors in parentheses are clustered at the district level.
$^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

in the 1998 Census (equivalent to 22 or younger in 1975) were considered part of the young group. The analysis indicates that there were no significant differences in the effects observed among different age groups. The direction and magnitude of the effects remained similar.

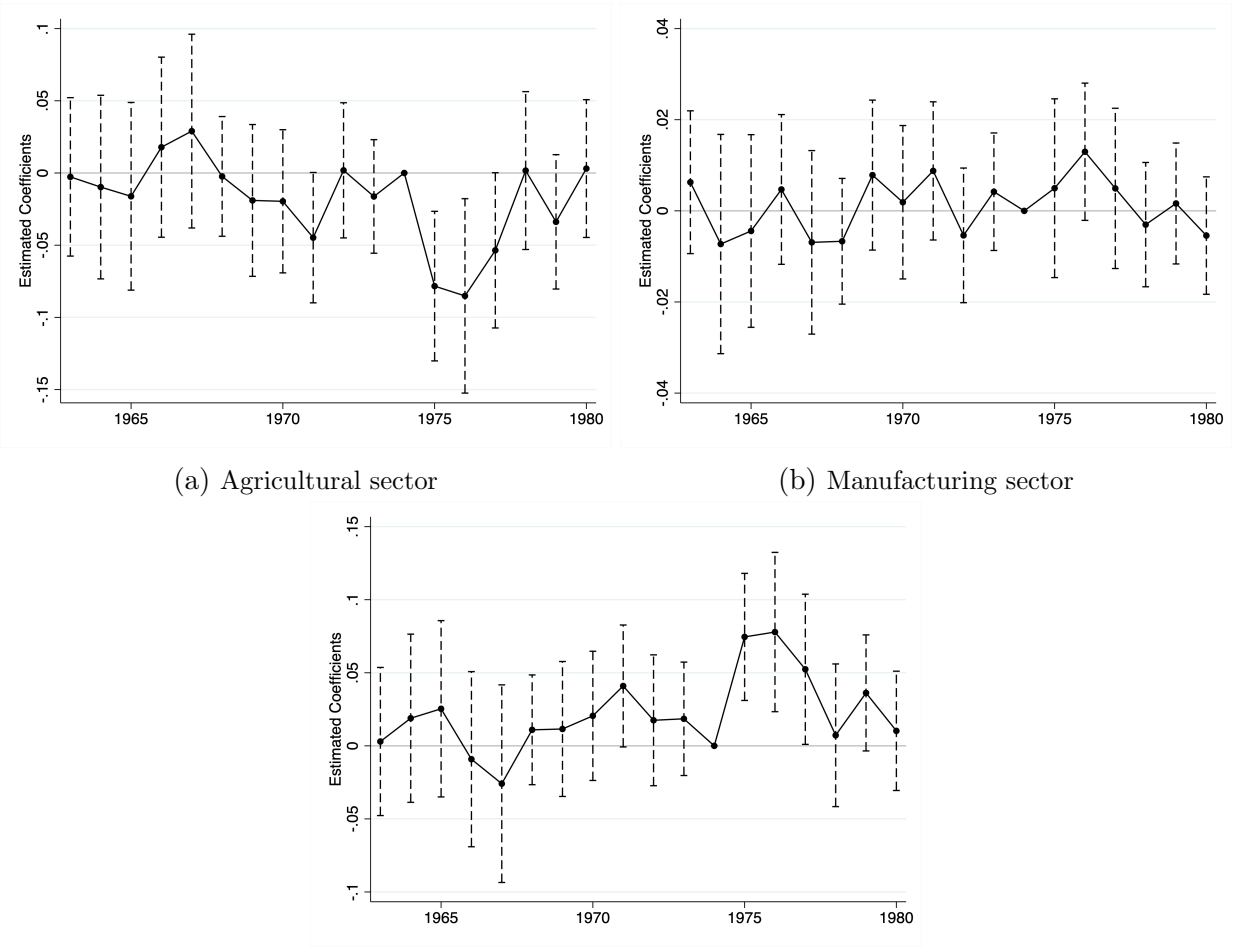
Table 8: FORCED MIGRATION AND THE STRUCTURAL CHANGE BY LEVEL OF EDUCATION

Dependent variable	Agricultural sector (1)	Manufacturing sector (2)	Service sector (3)
A. Individuals with no education			
Migration to KF × Post-1975	-0.012	-0.001	0.007
	(0.008)	(0.002)	(0.007)
R-squared	0.118	0.028	0.101
District fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	60,260	60,260	60,260
B. Individuals with any education level			
Migration to KF × Post-1975	-0.038***	0.002	0.034***
	(0.014)	(0.002)	(0.012)
R-squared	0.157	0.034	0.128
District fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Observations	110,627	110,627	110,627

Notes: The sample is divided into two groups: individuals with no education records and individuals with any level of education. Standard errors in parentheses are clustered at the district level.
$^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

Finally, we investigated the influence of educational attainment on the structural transformation, as presented in Table 8. We found that individuals with no education were unable to leave the agricultural sector, whereas those with any level of education transitioned into the service sector. This finding aligns with previous studies, which have consistently indicated that educational attainment is generally lower in the agricultural sector than in other sectors.

We show the estimates of equation 1 and their corresponding 95% confidence intervals in Figure 4. As depicted in the figure, individuals who migrated to the Killing Fields experi-



(a) Agricultural sector

(b) Manufacturing sector

(c) Service sector

Figure 4: DIFFERENCE-IN-DIFFERENCES IN THE STRUCTURAL CHANGE

Notes: The figures show the regression coefficients and 95% confidence intervals relative to the year 1974. The regression controls for individual characteristics such as gender, age, and level of education. Standard errors in parentheses are clustered at the district level.

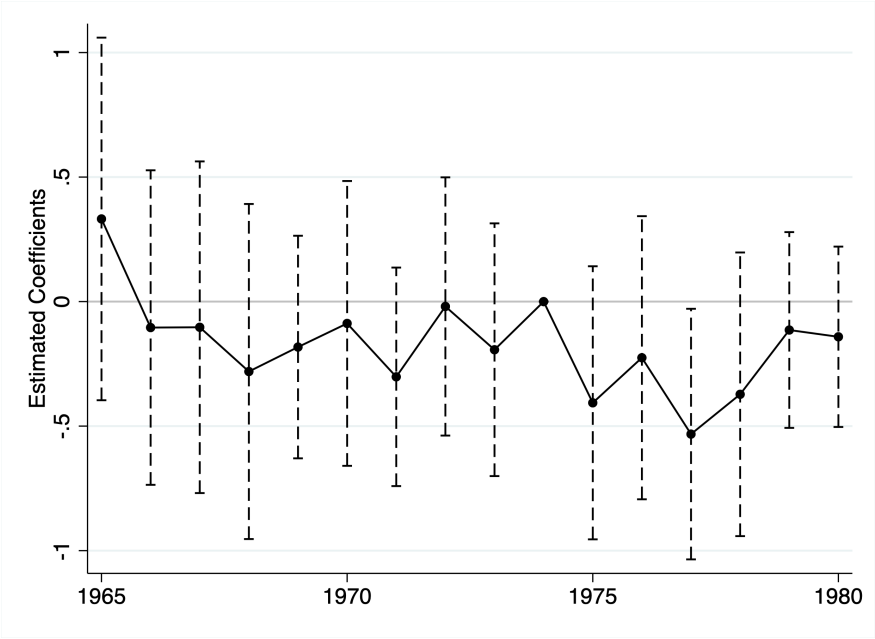
enced a significant shift away from agriculture and toward the service sector. This finding is consistent with the results of the previous regression analysis. The figure highlights the responses of individuals who were forced by the Khmer Rouge to migrate to the Killing Fields in 1975. Moreover, the constancy of the comparison between migrants over the pre-treatment years provides support for the key identifying assumption made in our analysis. This assumption suggests that there were no differential pre-trends among migrants.

5.2 Education Effects

We proceed to investigate the causal effect of migration on educational attainment, shown in Table 9, which provides separate results for children aged 5 to 11 and adolescents aged 12 to 18 at the year of migration. The table reveals a significant negative effect of migration to the Killing Fields among school-age children. The effect is substantial, corresponding to a decrease of 0.27 in years of education, which equates to a 5 percent reduction in educational attainment. In contrast, there was no significant effect on the educational attainment of older cohorts. The estimated effect in this group is small and statistically insignificant. It is worth noting that the lack of significance among older cohorts could be interpreted as a placebo test, providing additional confidence in the validity of the observed effect among school-age children.

These findings are further reinforced by the event study estimates presented in Figure **??**. The figure visually depicts the trend in educational attainment over time for different age groups. It illustrates that younger cohorts, who experienced forced migration to the Killing Fields, witnessed a decline in their years of education. In contrast, older cohorts did not exhibit this decline in education. The evidence from Table 9 and Figure 5 underscores the significant and negative causal effect of migration to the Killing Fields on educational attainment, specifically among school-age children.

We next focus on the causal effects of the Killing Fields on descendants of migrants, which we find to be negative and significant. In Table 10, the descendants of those who were



(a) School age children

(b) Adolescents

Figure 5: DIFFERENCE-IN-DIFFERENCES IN EDUCATION ON MIGRANT CHILDREN

Notes: The figures show the regression coefficients and 95% confidence intervals relative to the year 1974. The age range of school-age children at the year of migration was 5 to 11 years old, while adolescents were individuals aged 12-18 at the year of migration. Standard errors in parentheses are clustered at the district level.

Table 9: FORCED MIGRATION AND EDUCATION ON MIGRANT CHILDREN

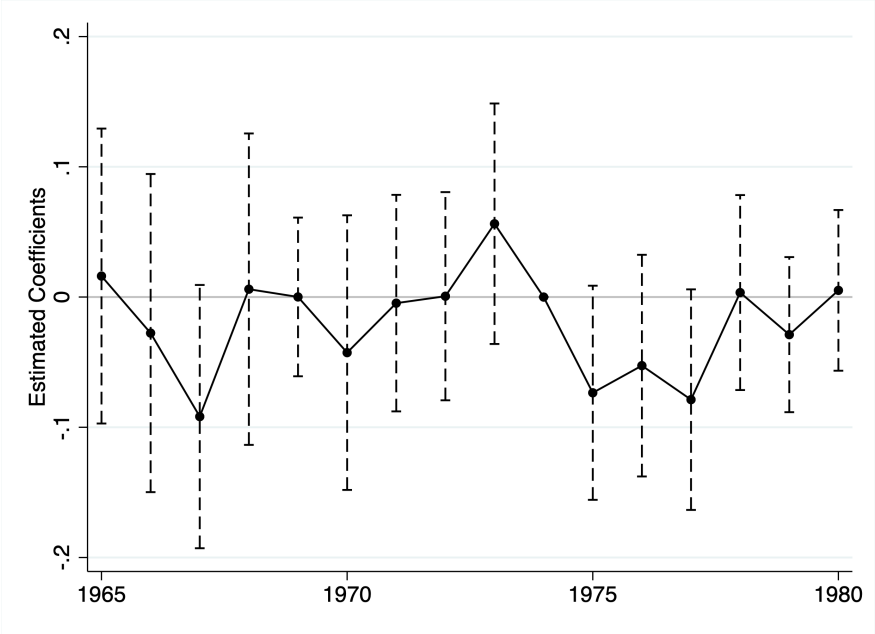
Dependent variable	Year of education			
Sample	School-age children		Adolescence	
	(1)	(2)	(3)	(4)
Migration to KF	-0.265**	-0.265**	-0.139	-0.166
× Post-1975	(0.128)	(0.129)	(0.129)	(0.133)
R-squared	0.150	0.209	0.082	0.115
District fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
Observations	15,894	15,894	14,999	14,999

Notes: The sample is divided into two groups: school-age children aged 5 to 11 during the year of migration, and adolescents aged 12 to 18. Columns 2 and 4 control for individual characteristics including gender, age, and age-squared. Standard errors in parentheses are clustered at the district level.
$^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

compelled by the Khmer Rouge regime to migrate to the Killing Fields achieved, on average, 0.21 fewer years of education, representing a 4 percent decrease. This effect persists even among children born a decade after the events of the Killing Fields, suggesting the enduring nature of these educational consequences. The event study estimates depicted in Figure 6 further support these findings.

To interpret this negative effect, it is crucial to consider the state of the Cambodian educational system under the Khmer Rouge regime. Education suffered severe setbacks. Schools were closed, and educated individuals and teachers faced harsh treatment and even execution. Under the Khmer Rouge regime, approximately 90 percent of teachers were killed. The remaining educational resources during that time were put toward promoting the principles of the Khmer revolution, rather than literacy. As a result, a generation of Cambodian children grew up without the ability to read or write. The literacy rate plummeted to just over 40 percent . The lack of education supply and the low demand for education were significant factors that contributed to the educational challenges faced by the descendants of those who migrated to the Killing Fields. The execution of educated individuals discouraged investments in education among future generations. The combination of a low return on

(a) Children born after the Killing Fields



(b) Children born 10 years after the Killing Fields

Figure 6: DIFFERENCE-IN-DIFFERENCES IN CHILDREN OF MIGRANTS

Notes: The figures show the regression coefficients and 95% confidence intervals relative to the year 1974. Children born after the Killing Fields are non-migrants, but their parents migrated and gave birth between 1976 and 1985. In the 1998 Census, they are aged 13 to 22. Children born 10 years after the Killing Fields are non-migrants, but their parents migrated and gave birth after 1985. In the 1998 Census, they are 12 years old or younger. Standard errors in parentheses are clustered at the district level.

Table 10: FORCED MIGRATION AND EDUCATION ON CHILDREN OF MIGRANTS

Dependent variable	Year of education			
Sample	Children born after KF		Children born 10 years after KF	
	(1)	(2)	(3)	(4)
Migration to KF	-0.209**	-0.215***	-0.062**	-0.046**
× Post-1975	(0.081)	(0.081)	(0.026)	(0.019)
R-squared	0.106	0.153	0.040	0.493
District fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
Observations	136,212	136,212	173,984	173,984

Notes: Children born after the Killing Fields are non-migrants, but their parents migrated and gave birth between 1976 and 1985. In the 1998 Census, they are aged 13 to 22. Children born 10 years after the Killing Fields are non-migrants, but their parents migrated and gave birth after 1985. In the 1998 Census, they are 12 years old or younger. Columns 2 and 4 control for individual characteristics including gender, age, and age-squared. Standard errors in parentheses are clustered at the district level.
$^{*}p < 0.10$; $^{**}p < 0.05$; $^{***}p < 0.01$.

education, traumatic experiences endured during the Khmer Rouge regime, and a limited supply of educational resources further hindered access to schooling for these descendants (Ross, 1987).

Our results show a significant negative causal effect of migration to the Killing Fields on the educational attainment of descendants. These findings highlight the long-lasting effects of the Khmer Rouge regime on the education of subsequent generations. The devastating impact on the Cambodian educational system, the loss of a large number of educators, and the subsequent challenges in rebuilding the system are all understood to contribute to this negative effect.

6 Conclusion

We exploit a unique historical event, the forced migration of urban "new people" to rural areas by the Khmer Rouge regime, as a natural experiment in order to estimate the causal

effect of relocation on economic and educational outcomes. We explore the causal effect of this migration on the structural transformation of the labor market. Our results find that individuals who were compelled by the Khmer Rouge regime to migrate to the Killing Fields were more likely to transition out of the agricultural sector and into the service sector. This finding highlights the role of forced migration in driving significant changes to individuals' employment patterns and the overall structure of the labor market.

Furthermore, we examine the causal effect of migration on educational outcomes. Specifically, we find that younger cohorts subjected to forced migration experienced a decrease in their years of schooling. The descendants of those who migrated to the Killing Fields also experienced a significant negative impact on their educational attainment. Even children born a decade after the events of the Killing Fields exhibited lower levels of education than their counterparts whose parents did not undergo forced migration. This suggests that the repercussions of the Khmer Rouge regime continued to affect educational outcomes generations later.

Our study sheds light on the uneven distribution of the benefits of migration within families. Prior research on the intergenerational effects of migration has suggested that parents bear the costs of moving, while the gains tend to accrue to their children. However, our findings challenge this notion by demonstrating a different dynamic in the context of the Khmer Rouge regime. We find that parents who were exhausted by agricultural activities during the Khmer Rouge period derived benefits by transitioning out of agriculture and into the service sector. This shift in employment allowed them to escape the challenges associated with the agricultural productivity gap and potentially experience improved economic opportunities.

The descendants of those who were compelled to migrate to the Killing Fields, as well as the children who experienced forced migration, did not benefit from the move. The educational challenges resulting from the lack of educational resources and low demand for education within the Killing Fields contributed to this disparity. As a consequence, these children faced obstacles to a quality education and did not experience the anticipated gains typically associated with migration. While previous studies have sometimes emphasized the positive

intergenerational effects of migration, our study underscores the need to consider context-specific factors. In the case of the Khmer Rouge Killing Fields, the adverse conditions limited the potential benefits for the children of migrants.

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