# Impacts of the Relocation Program on Native American Migration and Fertility

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This paper estimates the migratory and fertility effects of the federal Relocation Program, which attempted to move Native American individuals to urban areas under the promises of financial assistance and job training. I find the Relocation Program increased the Native American population in the target cities by more than 100,000 people. I also find that second- and third-generation Native American women living in cities have a 50 percent lower fertility rate than those living in areas with historically large Native American populations. These findings indicate that this program meaningfully shifted the spatial distribution of the Native American population.

Throughout U.S. history, the United States government has regularly sought to relocate Native Americans,[1] both through force and through policy. While some of these policies are infamous—the Indian Removal Act of 1830 led to between 4,000 and 8,000 Cherokee deaths[2]—there is relatively little known about the broad consequences of more recent relocation policies. This paper examines the migratory and fertility impacts of one large, recent program known simply as the Relocation Program.[3]

[1] Because of the broad scope of the Relocation Program, I use the term Native American throughout this paper to refer to the original inhabitants of North America generally, but I acknowledge that the term is imprecise and disputed. In cases where the data or policy use different terminology, I use the term that is consistent with the data and policy language.

[2] The 4,000 to 8,000 death estimate refers solely to deaths on the Trail of Tears. Historical estimates place total population losses at greater than 10,000 (Thornton 1984).

[3] The program was renamed the Employment Assistance Program when Congress expanded the program through the Indian Relocation Act of 1956, but for consistency, it will be referred to as the Relocation Program or Relocation throughout this paper.

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The Relocation Program, which was available to Native Americans of all tribes and ran from 1952 to 1973, offered financial assistance and job counseling to Native Americans who moved to one of the program's target cities.[4] In this paper, I estimate the causal effect of the Relocation Program on Native American migration.

I employ a generalized difference-in-differences approach to answer the question of how the Relocation Program affected Native American migration patterns. For my main specification, I use decennial census data to compare the American Indian and Alaska Native population in the relocation target cities to populations in all other metropolitan statistical areas (MSAs). I find that there was a large and statistically significant increase in the Native American population in the program's target cities relative to the other MSAs. The baseline estimates suggest that the average target MSA saw an increase in the Native American population of almost 12,000 individuals relative to the non-target MSAs between 1960 and 1990. The effect of the program is consistent in magnitude and significance across various subsets of the main control group. Further, the results remain significant when I apply a doubly robust difference-in-differences specification using propensity-score methods, though the magnitude is somewhat attenuated. To provide some insight into the extent of this impact on reservations, I also calculate counterfactual population estimates for counties with reservations absent the program.

Previous work in anthropology and sociology has examined factors associated with migration through the program and the demographic characteristics of participants (Ablon 1965; Chadwick and White 1973), as well as economic and assimilation outcomes for those who were part of the program (Ablon 1964; Gundlach, Reid, and Roberts 1977; Gundlach and Roberts 1978; Price 1968; Sorkin 1969, 1971, 1978). Some of these papers have used historical administrative records to estimate migration through the Relocation Program, but the number is disputed, with estimates ranging from less than 70,000 to more than 150,000[5] (Fixico 2000; Gundlach and Roberts 1978; Philp 1985; Rosenthal 2012; Sorkin 1978). Further, these estimates are limited in that they only consider program participation and are unable to account for return migration and non-participant migration that was caused by the program, for example, grandparents moving to relocation cities to reunite with family members who participated in the Relocation Program. Estimates for return migration

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[4] More information about the history and details of the Relocation Program is provided in the Background section.

[5] These estimates come from various administrative record sources, such as program documentation and Bureau of Indian Affairs budget justification documents.

range from 30–75 percent[6] and little is said about program-induced non-participant migration, leaving the net effect of the Relocation Program an open question (Fixico 1980; Gundlach and Roberts 1978). Additionally, participation in the program does not necessarily provide evidence of a causal effect of the program on migration. This paper overcomes these limitations by examining the broad impact of the Relocation Program on target city Native American population changes and estimating the causal impact of the program on migration to the target cities.

Establishing a causal estimate for the program's impact on migration enhances our understanding of the program's historical impacts and informs current policy. Firstly, the Relocation Program was exceptionally large, targeting the entire Native American population in the United States for two decades. Estimating the causal impact of the program on migration contributes to a fuller understanding of the history of the relationship between the U.S. government and the geographic distribution of Native American people. Secondly, this research contributes to our understanding of how U.S. policies have impacted the economic well-being of Indigenous people. There is a rich and growing economics literature documenting the history of Indigenous economies in North America. Carlos, Feir, and Redish (2022) provide a detailed review of the relationship between Indigenous nations and United States economic history, focusing primarily on the period through the mid-1800s. Other work in this area has focused on more recent policy impacts. This literature has documented the impacts of policies such as the Dawes Act (e.g., Carlson 1978, 1981, 1983; Dippel and Frye 2021; Dippel, Frye, and Leonard 2020), residential schools (Gregg 2018), the Indian Reorganization Act (Frye and Parker 2021), and broadly defined assimilation policy (Miller 2023). This paper contributes to this area of study by extending the research to the Relocation Program and documenting the initial impacts of the program on the important economic outcome of migration.

Establishing the causal link between the Relocation Program and net migration also sets the stage for examining the causal impacts of the Relocation Program on other important economic outcomes. In particular, studying the Relocation Program allows for the estimation of long-run outcomes, which cannot be studied with more recent relocation targeting programs. This is important for understanding the longer-term

[6] Official statistics from U.S. government Relocation Program documentation between 1953–1957 suggest that return migration was as low as 30 percent (Fixico 1980). After 1957, official government reporting on return migration stopped in response to criticism of inadequate reporting from the U.S. Comptroller General. Reporting from social workers at several of the urban relocation centers and other critics of the program places the return migration rate much higher at closer to 50–75 percent (Fixico 1980; Gundlach and Roberts 1978; Sorkin 1971).

impacts of policies aimed at internally relocating people. I begin this work here by examining second- and third-generation fertility rates for Native American women in the program's targeted cities.

One outcome that I do not examine in this paper is employment. There are three main reasons for this. First, while wage work for tribal members living on reservations in the United States in the mid-twentieth century was increasingly common, many tribal members still relied on a mix of subsistence and wage work. The lack of well-measured subsistence activity and the likely bias that would be introduced into a comparison of reservation and urban employment by not including subsistence activity make simplistic employment comparisons ill-suited for describing the economic well-being of movers and non-movers. Further, even if employment could serve as a noisy measure of economic well-being, small sample sizes of Native American populations in publicly available individual data preclude me from running this type of employment analysis. Finally, while job counseling was one aspect of the Relocation Program, it is clear from historical work that migration and assimilation were the main aims of the program. This quote from Russell Means (1995 p. 68), an Oglala Lakota activist and leader in the American Indian Movement, emphasizes this understanding of the program at the time:

> Eventually, I learned that the Eisenhower administration had come up with yet another plan to depopulate Indian reservations. The idea was to integrate Indians into urban ghettos so that in a few generations we would intermarry and disappear into the underclass. Then the government could take the rest of our land and there would be no one left to object.

Thus, the focus of this paper is on the impact of the Relocation Program on migration, the main objective of the program.

Beyond the main migration results, I also analyze the relationship between the Relocation Program and second- and third-generation fertility. There are three main factors that motivate this analysis. Firstly, as the Russell Means quote in the previous paragraph highlights, this program was seen not only as a way to move Native Americans but also as a way to assimilate the Native American population and ultimately make them disappear. Second- and third-generation fertility rates provide evidence for these two secondary aims, namely, assimilation and disappearance. Fertility has been shown to be a dimension whereby individuals assimilate to new cultures (e.g., Bleakley and Chin 2010; Milewski 2007; Parrado and Morgan 2008), and fertility rates are a direct input into changes in population levels over generations. Thus, fertility serves as an ideal measure for better understanding the potential impacts of the

program. Secondly, examining fertility rates in this large-scale internal migration setting contributes to the rich empirical literature examining the multitude of theoretical pathways whereby migration and fertility interact (e.g., Andersson 2004; Goldstein 1973; Kulu 2005; Milewski 2007). In particular, this paper focuses on providing insight into the less well understood relationship between internal migration and fertility outcomes for descendants of migrants. Finally, there are considerable limitations in publicly available data for examining long-run outcomes for the population of interest here. Therefore, second- and third-generation fertility outcomes are examined in part because of data availability.

I find that in the 1990s, the fertility rate for Native American women living in cities was almost half that of those living in the rural parts of states with historically high Native American populations. While this finding does not imply causality, it does suggest differences in fertility outcomes for the children of those who were affected by the Relocation Program. This result could have important implications for the future of the Native American population distribution across the United States and for other programs that target or induce migration.

## BACKGROUND

The Relocation Program began in 1952, during what is known as the termination era of U.S. tribal policy. The joint policies of termination and relocation aimed to assimilate the Native American population by terminating tribal trust relationships with the U.S. federal government and urging Native Americans to relocate to urban centers, away from reservations. While this paper focuses on the effects of the latter policy, I also include a brief outline of the termination policy, as the two are inextricably linked.

### Relocation

The Relocation Program originally began as part of an $88 million, ten-year rehabilitation act passed by Congress in April 1950 that aimed to aid the Navajo and Hopi Reservations after an extreme summer drought and severe winter at the end of the 1940s devastated the area. In addition to providing for a number of reservation development programs, the bill also allocated funds to provide financial aid to individuals seeking off-reservation employment. Specifically, the bill provided payment of relocation expenses and direct employment services for individuals from the Navajo and Hopi Reservations who moved to Denver, Salt Lake

City, or Los Angeles. The program was almost immediately expanded by the Bureau of Indian Affairs (BIA)[7] to allow individuals from any U.S. tribe to participate. During this period, the BIA was run by Dillon S. Myer. It is important to note that prior to being named Commissioner of Indian Affairs in 1950, Myer served as the director of the War Relocation Authority, the agency charged with the internment of Japanese Americans during WWII. He brought many of his colleagues from the War Relocation Services with him to work at the BIA on implementing the Relocation Program on a national scale.

The first relocatees of what became the Relocation Program arrived at the newly opened relocation office in Chicago in February of 1952 (Fixico 1980). The Relocation Program grew throughout the early 1950s. In addition to the relocation offices in Denver, Salt Lake City, Los Angeles, and Chicago, offices were added in Cleveland, Cincinnati, Dallas, Oakland, St. Louis, San Jose, and San Francisco.[8] While changes were made to which cities were included as relocation target cities throughout the 1950s, all of the target cities were added between the 1950 and 1960 decennial censuses, meaning that the analysis here is based on a single timing for treatment with the post period beginning with the 1960 census. The BIA chose these cities for relocation offices because of their "diversified, abundant industrial employment" (Madigan 1956). While there is little in the historical record directly addressing the choice of relocation cities beyond this quote from Madigan (1956), most sources do note that the aim of the program was to provide resettlement to areas with more job opportunities than were available on the reservations.

The first step in the relocation process was to apply at a local BIA area office. There were no demographic restrictions, such as age or gender, on who could apply, although Madigan (1956) suggests that acceptance was based on the relocation officer's expectations of an applicant's success in the program. Records show that drunkenness, physical or mental health issues, marital problems, or arrests were all grounds for disqualification of applicants. There were also complaints of prejudice among the relocation officers, who were mostly non-Native Americans (Fixico 1980).

Upon acceptance into the program, a relocatee and their family received one-way tickets to one of the relocation cities in the relocatee's top choices

[7] The BIA was established in 1824 under the Department of War but became part of the Department of the Interior after its establishment in 1849. The BIA acts as a liaison between the federal government and sovereign tribes. The president and Congress are responsible for creating federal tribal policy, and the BIA is responsible for administering the policies.

[8] The cities listed here are the target cities included in the main analysis for this paper. A consistent list of target cities, however, is not fully established in the historical record. More information about my chosen list of target cities can be found in the Results section.

as well as money for the journey. In the relocation city, the relocatee met with a relocation officer, who would assist them in finding temporary housing and provide financial assistance for the first month, including money for rent and some money for clothes and food. Additionally, the relocation officer would provide the relocatee with "intensive employment counseling" (Madigan 1956).

Criticisms of the program, including complaints of slum housing, temporary and unstable job placements, and inadequate preparation for cultural differences, pushed Congress to reassess the program in 1955 and 1956. Congress responded with the passage of Public Law 959—also known as the Indian Relocation Act of 1956—which consisted of two additional components: adult vocational training and on-the-job training. The adult vocational training program trained participants in industrial skills such as plumbing or steel work and targeted individuals between the ages of 18–35. The on-the-job training program focused on finding employment opportunities near reservations where individuals could be trained in a specific industry while working. The BIA would subsidize the wages of trainees during their training period, with the possibility of the trainees gaining full employment upon completion of the training. These training programs were meant to serve as a precursor to relocation in an attempt to better prepare relocatees for life in the relocation cities (Fixico 1980).

## Termination

During the same time as the Relocation Program was being adopted, the federal government was also advancing assimilationist goals through its termination policy. Termination policy consisted of ending the trust relationship between tribes and the U.S. federal government. This meant that for tribes whose federal recognition was withdrawn, any land that belonged to the tribe would be released from its trust status. This generally resulted in the land being appraised and sold to the highest bidder, with the proceeds from the sale distributed to the members of that tribe. Additionally, Native Americans who were part of the tribe would be subject to state and federal laws and taxation from which they were previously exempt, and all special federal programs at the tribal and individual level were discontinued. Essentially, termination meant the end of tribal sovereignty, as without land, tribal governments had nowhere to exert their jurisdiction (Wilkinson and Biggs 1977). The stated aim of termination was to "make Indians within the territorial limits of the United States subject to the same laws and entitled to the same privileges and responsibilities as are applicable to other citizens of the United States, to

end their status as wards of the United States and to grant them all of the rights and prerogatives pertaining to American citizenship."[9] Advocates of termination had two main motivators. First, they wanted to "free" Native Americans from the federal trusteeship, which proponents of termination believed was paternalistic and kept Native Americans dependent on government aid. Secondly, terminationists wanted to reduce the amount of federal funding allocated to tribal programs. Those opposed to termination cited the desire of many Native Americans to keep reservations intact to preserve tribal homelands and to avoid the loss of sovereignty that comes with the loss of communal property. Additionally, termination opponents also condemned the meager payment on assets in the forced sale of tribal trust land and suggested that high poverty rates on reservations were evidence of the continued need for federal education, health, and welfare services (Sorkin 1971). One of the most critical opponents of termination, former Commissioner of Indian Affairs John Collier, asserted that termination was truly motivated by greed for land and natural resources owned by the tribes (Fixico 1980).

In 1953, House Concurrent Resolution No. 108 was passed. It called for the ending of the trust relationship between the U.S. government and roughly 100 tribes throughout California, Florida, New York, Texas, Wisconsin, Oregon, Utah, Oklahoma, South Carolina, and Nebraska, affecting over 10,000 Native Americans and over one million acres of land held in trust by these tribes. While House Concurrent Resolution No. 108 directed the implementation of the termination policy, individual legislation with a plan for termination rollout was required for each individual tribe whose trust relationship with the U.S. government was being dissolved. Tribal consent was not deemed necessary, but tribes were nonetheless often coerced into providing consent.

Tribes were designated for termination legislation based on their perceived preparedness for the withdrawal of BIA services. In 1947, Acting Commissioner William Zimmerman, Jr., created a plan for potential broad reductions in BIA services that was later used as criteria for determining a tribe's readiness for termination. These criteria were "(1) degree of acculturation; (2) economic resources and condition of the tribe; (3) willingness of the tribe to be relieved of federal control; and (4) willingness of the state to assume jurisdiction" (Wilkinson and Biggs 1977, p. 146). This framework, however, was not applied consistently and may not have been the only criteria used to determine individual termination legislation (Prucha 1984).

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[9] House Concurrent Resolution No. 108.

At the same time, Congress passed another law aimed at termination, which granted states jurisdiction over civil and criminal offenses on reservations in five states while allowing all other states to adopt similar practices if they chose. Strong opposition to these termination policies and poor outcomes among tribes whose trust relationship with the U.S. government was ended led to a reversal of policy in the 1960s, though many of the impacted tribes did not regain federal recognition until much later (Wilkinson and Biggs 1977).

Given that I estimate migration impacts of the Relocation Program to be more than ten times larger than the total number of Native Americans directly affected by termination policy, I do not believe that termination itself is the main driver of my results.[10] While the threat of termination and the environment that the termination policy may have created could have contributed to increased migration off reservations, this broader policy environment would have affected all tribes and does not seem likely to have driven migration specifically to Relocation Program target MSAs except through the Relocation Program itself. Nevertheless, this termination environment serves as an important context for understanding the main results.

## DATA

### *Migration*

The main data I use to measure migration comes from the U.S. Decennial Census. Specifically, I use population estimates for the American Indian and Alaska Native (AIAN) population by county and by MSA for all areas in the contiguous United States. For the years 1910–1940, I calculate county-level population by race by aggregating the Integrated Public Use Microdata Series (IPUMS) complete count of U.S. census microdata. For the years 1950 onward, county-level population estimates for the American Indian and Alaska Native population and the total population come from U.S. Decennial Census Publications and County Data Books, which have, in part, been digitized by Gardner and Cohen (1992) and Haines (2010). All of the county-level population estimates are corrected for changing county borders, following Eckert et al. (2020). The final county population estimates follow the 1990 county borders. I then match these counties to the 1990 U.S. Census MSAs to

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[10] In fact, members of tribes who lost federal recognition were ineligible for the Relocation Program once that recognition was lost.
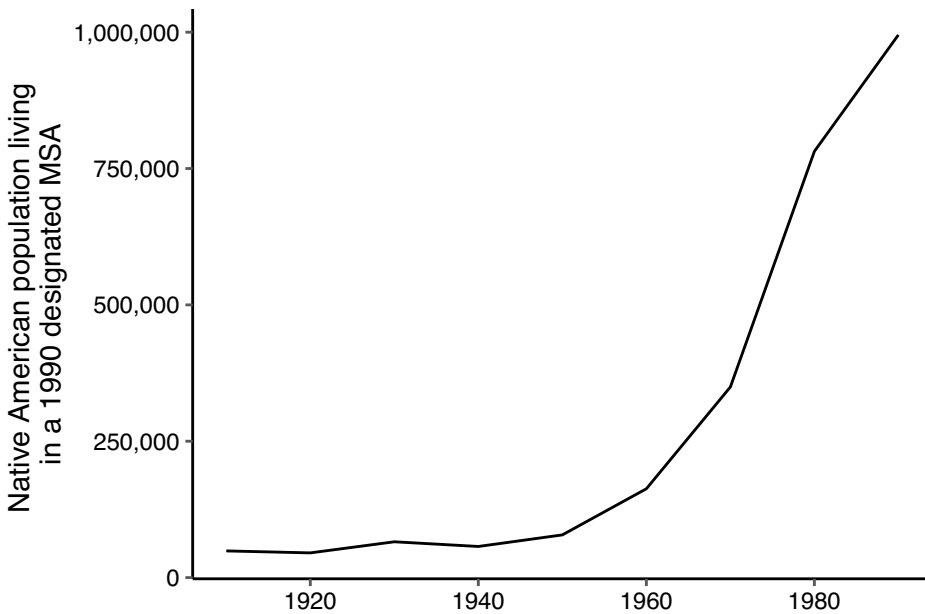
FIGURE 1
NATIVE AMERICAN MSA POPULATION TRENDS 1910–1990

*Notes*: Population trends for all Native American people living in an MSA in each decennial census year.
*Sources*: Author's calculations from U.S. Bureau of the Census Decennial Census Data.

create MSA-level population counts. The final dataset contains population estimates for the American Indian and Alaska Native and total population for each MSA in the United States for every decennial year from 1910–1990.[11]

Figure 1 shows the overall trend in the number of Native American people living in a 1990-designated MSA over the time horizon of the study. The figure suggests that there was very little growth in the Native American population living in these areas between 1910 and 1950. After 1950, there is steady growth that only begins to slow in 1990. Figure 1 also shows that while the decennial census data comes from several sources, the aggregate numbers show smooth growth and are generally consistent with other estimates of the urban Native American population.[12] Table 1 shows the same MSA-level Native American population trend with

[11] Information on how to access publicly available data and replication files are available in Kopriva (2023)

[12] The estimates shown in Figure 1 are slightly higher than estimates of urban Native American populations because I have constructed these estimates around the 1990 MSA areas rather than census definitions of urban and rural, and the number and size of MSA areas have grown over time.

TABLE 1
MSA-LEVEL NATIVE AMERICAN POPULATION BY YEAR

| Year | Mean MSA-Level Native American Population (Standard Deviation) |
|------|---------------------------------------------------------------|
| 1910 | 174 (651) |
| 1920 | 161 (543) |
| 1930 | 234 (887) |
| 1940 | 203 (672) |
| 1950 | 282 (773) |
| 1960 | 579 (1,472) |
| 1970 | 1,244 (3,327) |
| 1980 | 2,781 (7,500) |
| 1990 | 3,541 (8,507) |

*Notes*: The Native American population data is the total number of individuals registered by the U.S. Census Bureau as American Indian or Alaska Native for each decennial census year 1910–1990.
*Sources*: Author's calculations from U.S. Bureau of the Census Decennial Census Data.

standard deviations. The standard deviation information shows that there is substantial variation in the Native American population across MSAs throughout the sample period.

*Fertility*

To examine fertility outcomes, I use the National Center for Health Statistics' (NCHS) Vital Statistics Natality Birth Data along with the Survey of Epidemiology and End Results (SEER) U.S. state and county population data. The natality data contains all births in the United States from 1985–2002 with information on the year of the birth as well as the mother's race, current place of residence, and age. The SEER population data gives population estimates at the county level by race, sex, and single year of age from 1990–2018. I combine these data from 1990–2002 to create general fertility rates by place of residence, year, and race.

I break up the fertility data into three types of locations: target MSAs, other MSAs, and the non-MSA parts of states with historically large

Native American populations. This final location type is used as a proxy for reservation areas. I am unable to examine the fertility rates for counties with reservation areas directly because the place of residence variable is censored in the publicly available natality data for counties with less than 100,000 people. In the natality data, all counties with less than 100,000 people are grouped into a single rural indicator county FIPS code. To create my estimate for this final location type, I aggregate all births within the state where the place of residence county is not part of an MSA. This estimate includes the births combined into the single rural indicator county FIPS code. I designate a state as having a historically large Native American population if, in all years prior to 1952, at least 1 percent of the population identified as American Indian or Alaska Native in the decennial census.[13]

The general fertility rate equals the total number of births for a given location category in a given year divided by the total female population aged 15–44 for that location category and year multiplied by 1,000. Therefore, the general fertility rate represents the total births per 1,000 women aged 15–44 for the given location type in a given year.

## RESULTS

### *Migration*

My main approach for answering the question of how the Relocation Program affected migration patterns in urban areas is a generalized difference-in-differences specification with a single treatment timing. Here, the two dimensions of the difference-in-differences approach are geography: whether or not the MSA was targeted by the program and time: whether the decennial census year is before or after the program was implemented. The main estimating equation takes the following form.

For MSA, *m*, in decennial year, *y*:

$$AIANPopulation_{my} = \beta(TargetMSA_m \times Post_y) + \gamma_m + \delta_y + \varepsilon_{my} \qquad (1)$$

The dependent variable is the total Native American population in MSA, *m*, in decennial year, *y*. Given that the aim of the program was to move the Native American population out of rural reservations and into the program's target cities, the outcome of interest is the number of Native Americans living in a given target MSA as a result of the program.

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[13] These states are Arizona, Montana, Nevada, New Mexico, Oklahoma, and South Dakota.
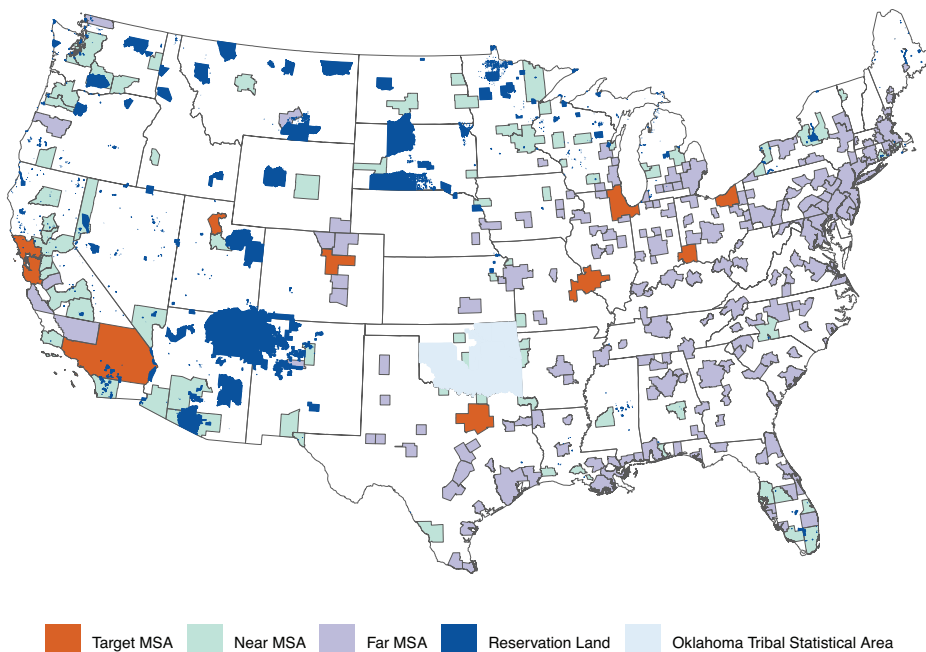
FIGURE 2
MAP OF RELOCATION PROGRAM TARGET CITIES

*Notes*: MSA borders are based on the 1990 census and reservation land borders are based on 2018 borders.
*Sources*: MSA: University of Minnesota IPUMS NHGIS data; Reservation Land: Bureau of Indian Affairs (BIA) Branch of Geospatial Support (BOGS) New Land Area Representation GIS dataset 2018.

Therefore, the analysis uses population levels as the dependent variable.[14] For the main analysis, I include all MSAs. Thus, MSAs not targeted by the Relocation Program act as the control group. Note that non-MSA areas are dropped. Figure 2 shows where the target and control cities are located. The main control group includes both the near MSAs (MSAs near reservations) and far MSAs (MSAs that are not near reservations) that are shown on the map. Reservations and Oklahoma tribal statistical areas[15] are shown for reference.

The independent variable of interest is the interaction between $TargetMSA_m$ and $Post_y$. $TargetMSA_m$ is a dummy variable indicating that

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[14] Log population estimates are not used both because percent change in population is not the outcome of interest in this setting and because substantial zero and small Native American population levels in the target and control MSAs prior to the program make percent changes difficult to interpret. Results using log population, however, are reported in Table A1 in the Online Appendix.

[15] Oklahoma Tribal Statistical Areas represent former reservation lands that existed prior to Oklahoma's statehood in 1907. The borders were determined by the U.S. Census Bureau in consultation with the American Indian tribes residing in Oklahoma.

the MSA, *m*, is one of the cities targeted by the Relocation Program. The target cities used for this analysis are Chicago,[16] Cincinnati, Cleveland, Dallas, Denver, Los Angeles, San Francisco,[17] Salt Lake City, and St. Louis.[18]

The dummy variable $Post_y$ indicates that the decennial year, *y*, is after the start of the program in 1952. This means that for each of the decennial years from 1960 onward, $Post_y$ takes on a value of 1, while for each of the decennial years from 1910–1950, $Post_y$ is 0. To be clear, while the introduction of new target cities continued throughout the 1950s, all of the target cities had been determined by 1960, meaning that there is no staggering of treatment in my setting as the rollout of the program happened entirely between decennial censuses. The interaction of these dummies gives the program effect. Fixed effects for the MSA and decennial year are represented by $γ_m$ and $δ_y$, respectively. The error term is represented by $ε_{my}$. Standard errors throughout the primary analysis are clustered at the MSA.

The results of the main analysis are presented in Table 2. Column (1) shows the baseline specification with MSA and year fixed effects. Column (2) adds more restrictive state by year fixed effects. The coefficient on the interaction term in both columns shows that there is a positive and statistically significant increase in the Native American population in the target cities associated with the implementation of the Relocation Program. The baseline estimate suggests that, on average, between 1960 and 1990, the Relocation Program increased the Native American population in target cities by almost 12,000 individuals relative to all other MSAs. These results show that beyond individuals participating in the program, there was migration to these target cities induced by the program itself.

Identification for determining a causal effect of the program on migration to the target cities relies on the assumption that, absent the treatment, the control and treatment MSAs would have similar trends in

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[16] The Chicago MSA includes the cities of Joliet and Waukegan, Illinois, which also may have briefly had their own relocation offices. These cities are not listed separately given the limited number of references that include them in the list of target cities and the short duration of the offices' operations (Philp 1985; Prucha 1984).

[17] The San Francisco MSA also includes the cities of Oakland and San Jose, which had separate relocation offices as well.

[18] An official list of target cities for the Relocation Program is not fully identified among historians. For this paper, I utilize the most consistent list of cities I was able to find in the available historical literature and administrative records, relying primarily on Fixico (1980), Gundlach, Reid, and Roberts (1977), Madigan (1956), Philp (1985), Prucha (1984), and Sorkin (1978), as well as a conversation with Dr. Donald Fixico. I do, however, also run my baseline regressions using four other sets of target cities to verify that my selection of target cities is not driving the results. I find similar results across all of the specifications, as can be seen in Table A2 in the Online Appendix.

TABLE 2
BASELINE NATIVE AMERICAN POPULATION RESPONSE
TO THE RELOCATION PROGRAM

| Dependent Variable: | Native American Population | |
|---|---|---|
| | (1) | (2) |
| Target MSA × Post | 11,866** | 12,696*** |
| | (5,392) | (4,712) |
| MSA FE | Yes | Yes |
| Year FE | Yes | Yes |
| State x Year FE | No | Yes |
| Observations | 2,526 | 2,526 |

*Notes*: *p<0.1; **p<0.05; ***p<0.01. The Native American population data is the total number of individuals registered by the U.S. Census Bureau as American Indian or Alaska Native for each decennial census year 1910–1990 by MSA. Here, the control group consists of all MSAs that were not targeted by the Relocation Program. Standard errors are clustered at the MSA.
*Sources*: Author's calculations from U.S. Bureau of the Census Decennial Census Data.

Native American population counts. One way that this assumption is often supported is by showing parallel trends of the treatment and control units in the pre-treatment period. Figure 3 shows the trends in the Native American population for the three types of MSAs: the target MSAs, near-reservation MSAs, and all other MSAs. The colors in Figure 3 correspond to the map (Figure 2) as a reference for which MSAs fall into which of the three MSA types. Figure 3 suggests that prior to the introduction of the program, all three types of MSAs had similar average levels (near zero) and trends (no growth) in the Native American population. After the introduction of the program in 1952, we see that the average Native American population in target MSAs quickly grows substantially larger than in the other two types of MSAs.

To more carefully examine whether the parallel trends assumption likely holds, I also conduct an event study that supports the assumption that prior to the implementation of the Relocation Program, target MSAs and all other MSAs had similar trends in Native American population counts. The results of the event study are shown in Figure 4, which plots the interaction of the *TargetMSA*$_m$ variable with each decennial year from 1910–1990; 1950 is the reference year. From the event study, it is clear that prior to the implementation of the program, trends in Native American population for target and non-target MSAs are very similar. After the program was implemented in 1952, we can see that there is a sharp increase in the number of Native American individuals living in the target cities relative to all other MSAs. This increase in the target MSA Native American population relative to the other MSAs continues
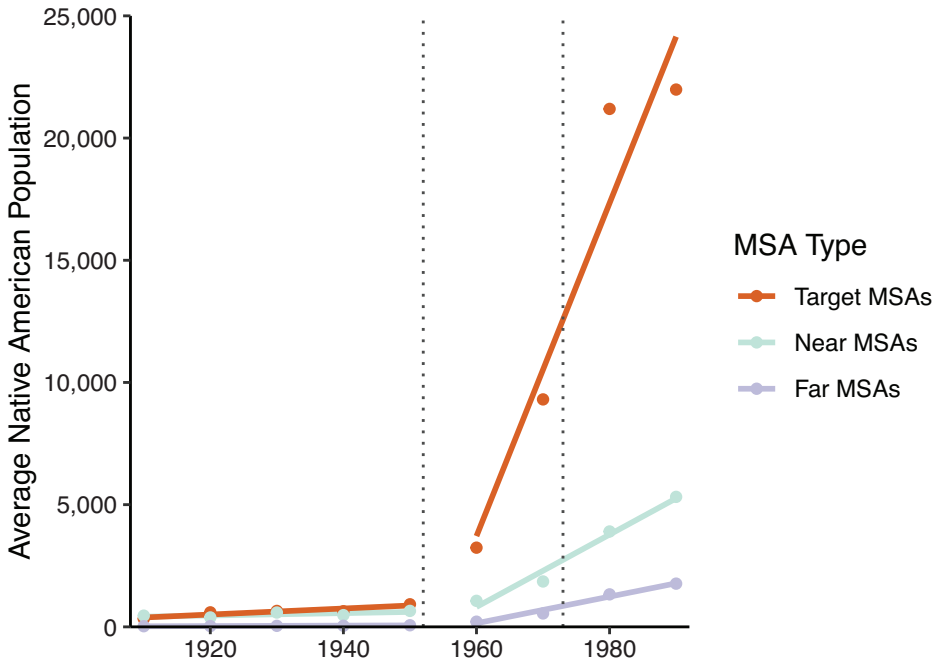
FIGURE 3
NATIVE AMERICAN POPULATION TRENDS BY MSA TYPE

*Notes*: Trends for the target and non-target MSAs from 1910–1990. Non-target MSAs are broken into two groups based on proximity to reservations. The points represent average MSA Native American population. Best fit lines are estimated by MSA type for the pre and post periods. The dotted lines correspond to the start and end of the Relocation Program in 1952 and 1973, respectively.
*Sources*: Author's calculations from U.S. Bureau of the Census Decennial Census Data.

through 1970 and 1980. After 1980, the effect of the program levels off. This is not surprising, as the program ended in 1973 (17 years prior to the 1990 census).

These estimates take into account the full impact of the Relocation Program, which includes the direct migratory impacts from participation in the program as well as the secondary and indirect effects such as return migration and program-induced non-participant migration. These results suggest that the net effect of the Relocation Program was a substantial increase in the Native American population in the target cities relative to the non-target cities. All in all, I estimate that the target cities saw, on average, a roughly 1200 percent increase in the Native American population as a result of the Relocation Program.

For the main analysis, all MSAs are considered part of the control group, but this approach has its drawbacks. Most notably, the cities targeted by the program were mainly located in the West and Midwest, where there
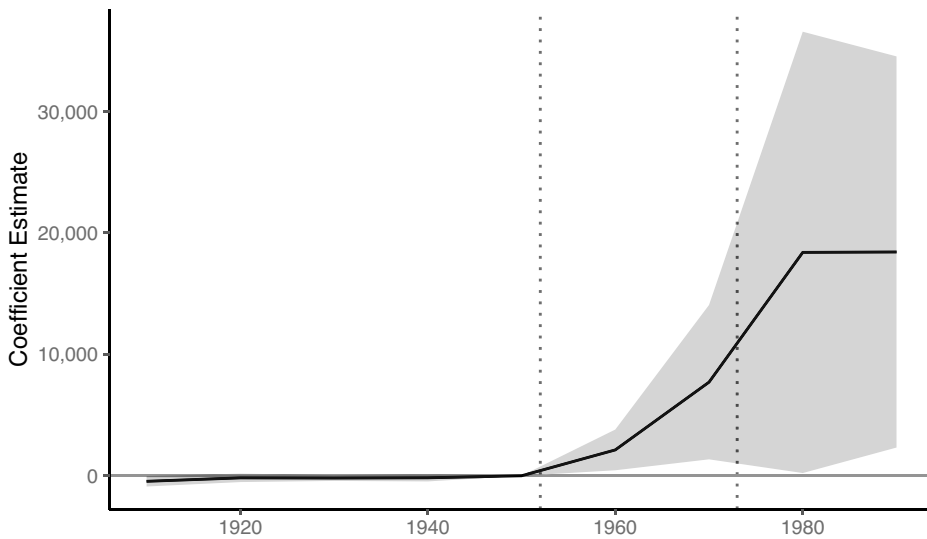
FIGURE 4
ESTIMATES OF THE RELOCATION PROGRAM'S MIGRATION EFFECTS
OVER TIME

*Notes*: The figure shows the coefficient estimates for the interaction of the target city dummy and each of the decennial years. The estimating equation includes MSA fixed effects, and the standard errors are clustered at the MSA. The gray ribbon represents the 95 percent confidence interval. The dotted lines represent the beginning and end of the program in 1952 and 1973, respectively.
*Sources*: Author's calculations from U.S. Bureau of the Census Decennial Census Data.

are more reservations, while many of the MSAs in the United States are located in the South and on the East Coast. The geographic concentration of the target MSAs relative to the set of control MSAs could be a problem given that the start of the program coincided with the end of WWII, which also may have been related to Native American migration to urban centers. If there was greater migration after the end of the war to cities near reservations, then this migration to target cities could in part be driven by post-WWII migration patterns rather than program effects. Therefore, I employ several more restrictive control groups in the additional specifications presented in Table 3. In Column (1), the first alternative control group includes only MSAs located near reservations (those labeled Near MSAs in Figure 2).[19] Near-reservation MSAs are chosen as they offer a plausible, lowest-cost alternative to migration through the Relocation Program, as they are likely easier and cheaper to get to than other MSAs. One drawback of using this alternative control group is that

[19] An MSA is considered a near-reservation MSA if it is the closest MSA to at least one reservation area measuring from centroid to centroid.

TABLE 3
NATIVE AMERICAN POPULATION RESPONSE TO THE RELOCATION PROGRAM,
ALTERNATIVE CONTROL GROUPS

| Dependent Variable: | Native American Population | | | |
|---|---|---|---|---|
| | Near MSAs (1) | Far MSAs (2) | Target State MSAs (3) | Top 50 MSAs (4) |
| Target MSA × Post | 10,780** | 12,394** | 12,116** | 10,206* |
| | (5,427) | (5,396) | (5,413) | (6,058) |
| MSA FE | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes |
| Observations | 882 | 1,725 | 882 | 448 |

*Notes*: *p<0.1; **p<0.05; ***p<0.01. The Native American population data is the total number of individuals registered by the U.S. Census Bureau as American Indian or Alaska Native for each decennial census year 1910–1990 by MSA. Standard errors are clustered at the MSA.
*Sources*: Author's calculations from U.S. Bureau of the Census Decennial Census Data.

with the expansion of the program in 1956 to include vocational and on-the-job training in areas closer to reservations, it is possible that people chose to stay in these near-reservation cities where the job training took place rather than participating in the direct employment program after their training period ended. Thus, these MSAs may not be unaffected by the program. Therefore, the second alternative control group I consider is far from reservation MSAs. These results can be found in Column (2). This control group includes only the MSAs that are not included in the near-reservation MSA group (those labeled Far MSAs in Figure 2). This control group is considered because it is the least likely control group to be affected by the actual treatment from the program. The results in Column (3) use an alternative control group that includes only the MSAs that are in the same state as the target MSA. This sample includes all MSAs in California, Colorado, Illinois, Indiana, Missouri, Ohio, Texas, Utah, and Wisconsin. Finally, all but one of the target MSAs were among the top 50 most populous cities in the United States at the time of the program's development. The fact that the target cities were more populous on average than the group of all other MSAs could have important consequences for my analysis since I am specifically looking at population changes. Therefore, the final alternative control group includes only the top 50 most populous MSAs in 1950. These results are displayed in Column (4). All four columns produce estimates that are similar in significance and magnitude to the baseline specification, further solidifying the main results of the primary approach. Notably, Column (2), which consists of the control group that is least likely to have been partially treated, has the largest point estimate.

During the 1960s and 1970s, there was a well-documented increase in the number of individuals who identified as American Indian or Alaska Native in the U.S. Census (Passel 1976; Passel and Berman 1986). This could pose a threat to identification in this setting if Native American individuals in target MSAs were more likely than Native American individuals in non-target MSAs to increasingly identify as American Indian or Alaska Native in the census. Given that the target cities were documented to have been chosen based on economic opportunities, I believe it is unlikely that there is a particular divide across targeted and non-targeted cities on this dimension that would be driving these results (Madigan 1956). I do several additional checks, however, to further validate that this change in racial self-identification is not driving my results. One particularly compelling piece of evidence that differential changes in census racial identification are not driving my main results is that Passel and Berman (1986) document that this increase in racial self-identification as American Indian or Alaska Native in the census does not begin until the 1970 census. In my event study specification, it is clear that even in 1960, the first decennial census year after the program, there was a significant change in the Native American population levels in the target MSAs relative to the non-target MSAs.

Additionally, as described previously, I consider a specification where I only include MSAs in states with target cities as my control group. If there are specific cultural factors in the target MSAs that might motivate Native American residents in these areas to differentially identify as American Indian or Alaska Native in the 1960s and 1970s, then using MSAs that are near the target MSAs may control for these cultural factors. The estimate of the program impact from this specification is similar in magnitude and significance to the main analysis confirming the main results. I also conduct a doubly robust difference-in-differences estimation of the main estimating equation described in detail next. The estimates from this analysis, while smaller in magnitude, do affirm the main results of the paper. These results suggest that at least observable baseline characteristics do not appear to be what are driving the differences in population growth after the implementation of the program. Finally, there is evidence of differential migration from small counts of microdata available through IPUMS. These migration estimates are not used for the main analysis because of the small number of observations available for use in the public repositories. These limited available data do, however, support the main results. Together, the results from these additional tests highlight the robustness of the main findings and provide support for the main driver of the results coming from the program rather than differential changes in census racial identification.
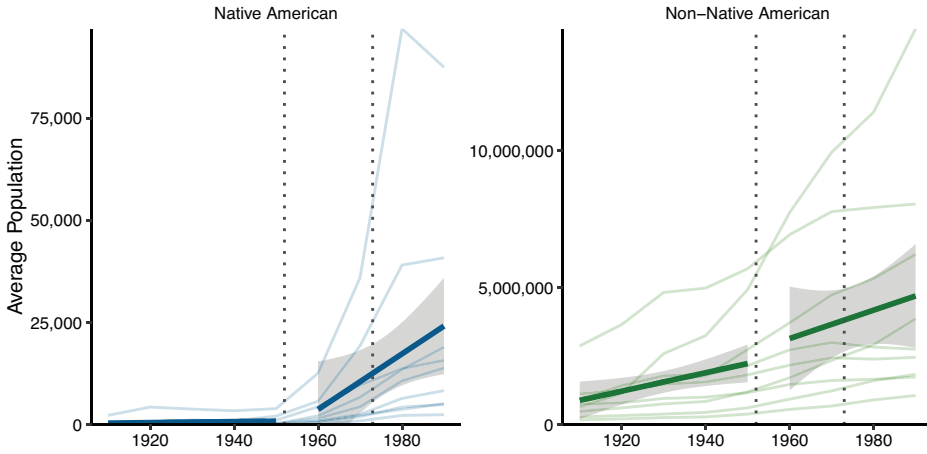
FIGURE 5
TARGET CITY POPULATION TRENDS BY RACE

*Notes*: The bold lines estimate linear trends in MSA population by race for the pre and post periods. Background lines show individual MSA population totals by race for each of the target cities. The dotted lines depict the start and end of the Relocation Program in 1952 and 1973, respectively.
*Sources*: Author's calculations from U.S. Bureau of the Census Decennial Census Data.

## Additional Robustness Analysis

One potential threat to identification in the main analysis would be if the program specifically targeted cities that were growing differentially at the time of the program's implementation for reasons other than the program itself. To examine this concern, I compare the change in Native American population to that of the non-Native American population in the target cities over the period of 1910–1990. Figure 5 shows the population trends in the target cities for the Native American population on the left and the non-Native American population on the right. These graphs suggest that even with the large population growth in the target cities over the time period, there do seem to be differential trends for the Native American population following the start of the Relocation Program. This suggests that the changes in the Native American population in the target cities corresponding with the time of the Relocation Program seen in the main analysis are likely indeed a result of the program and not other attributes specific to the target cities from the 1950s onward.[20]

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[20] A more formal triple difference analysis can be found in Table A3 in the Online Appendix, though the results of this analysis should be considered with caution given the difference in magnitude of the Native American and non-Native American populations and the lack of parallel trends across these groups in the pre-period.
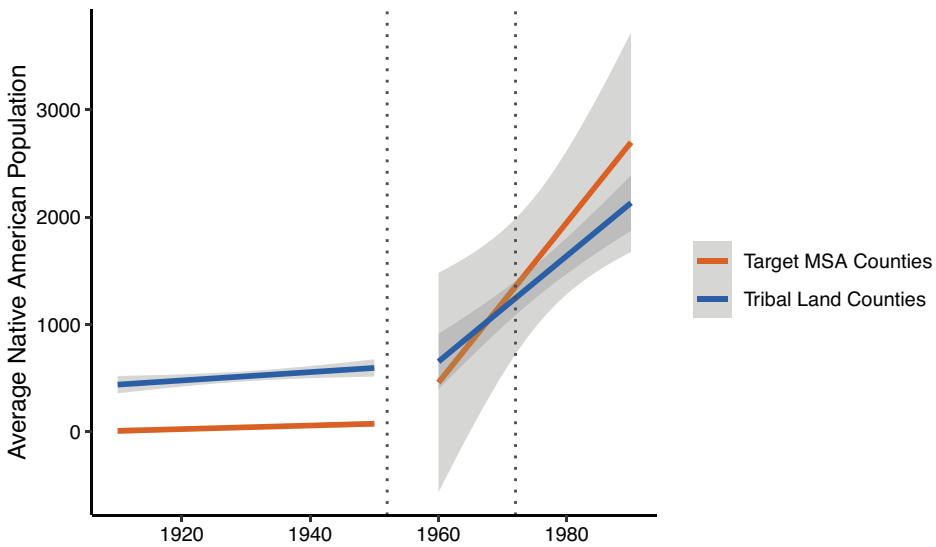
FIGURE 6
NATIVE AMERICAN POPULATION TRENDS FOR TARGET MSAS VERSUS
RESERVATIONS

*Notes*: Trends in average county-level Native American population for the target MSA and
reservation counties from 1910–1990. Best fit lines are estimated by county type for the pre and
post periods. The dotted lines correspond to the start and end of the Relocation Program in 1952
and 1973, respectively.
*Sources*: Author's calculations from U.S. Bureau of the Census Decennial Census Data.

Given that one of the program's main aims is to move Native Americans
off of reservations to urban centers, I also compare the average Native
American population in target MSAs to the Native American popula-
tion on reservation lands. Because there is no data available on Native
American population counts by reservation throughout this time period,
I examine Native American population counts at the county level.
Specifically, I compare average Native American population counts in
counties that are in target MSAs to those counties that contain reserva-
tion land, as shown in Figure 6. Figure 6 suggests that the increase in
the Native American population in the target MSAs is so large that the
average county-level target MSA Native American population may even
exceed that of counties with reservations by the end of the relocation
program.

I also verify my main results by using a doubly robust difference-
in-differences specification. The second level of robustness relies upon
the propensity-score methods literature (Rosenbaum and Rubin 1983),
namely, inverse probability weighting. While there is little said in the
official record about exactly why the target MSAs were selected, one

consistently noted reason for selection was opportunities for employ-
ment (Madigan 1956). If these cities did in the baseline year have more
robust employment opportunities than the non-targeted cities, then selec-
tion rather than program effects could be driving results. While similar
population pre-trends provide evidence that selection effects are unlikely
to be driving the main results, the alternative control groups noted previ-
ously and the doubly robust difference-in-differences estimation strategy,
which directly takes into account several observable characteristics of the
MSAs in 1950, provide further support that selection is not the primary
driver.

Using a logistic regression, I model the probability of an MSA being
targeted by the program as a function of a set of baseline controls,
namely: total population, percent of the population that is non-white,
percent change in the total population since 1940, percent change in
the non-white population since 1940, the male and female employment
rate, and the minimum distance to a reservation, as well as an expanded
set of controls, which additionally include the 1950 Native American
population, median family income in 1950, and the percent of the popu-
lation that is Hispanic in 1940. Using the logit regression estimates, I
calculate inverse probability of treatment weights using the formula:
$w_i = \frac{TargetMSA_m}{p_m} + \frac{1 - TargetMSA_m}{1 - p_m}$, and apply these weights to my baseline differ-
ence-in-differences estimating equation to form a doubly robust estimator
(Hirano, Imbens, and Ridder 2003). The results of the doubly robust
inverse probability-weighted regression are found in Table 4. Column (1)
shows the results for the baseline set of controls, and Column (2) shows
the results for the expanded set of controls. While the estimates of the
coefficient of interest on the interaction of *TargetMSA × Post* are smaller
than the baseline estimate, it is still statistically significant at traditional
levels and further supports the finding that the Relocation Program led to
increased migration to the target cities.

There are several target cities where the Native American population
grew substantially in the post-period relative to some of the other target
cities, as can be seen in the individual target city Native American popu-
lation trend graphs in Figure A1 in the Online Appendix. To be sure
that no single city nor the two California cities are driving the results, I
rerun the main regression iteratively, dropping each target city. Across all
of these specifications, the coefficient remains positive and statistically
significant, though the magnitude varies some, with the two California
MSAs seemingly seeing a greater impact than most of the other target
MSAs. The results for these regressions can be found in Table A4 in the
Online Appendix.

TABLE 4
DOUBLY ROBUST DiD USING INVERSE PROBABILITY
OF TREATMENT WEIGHTING

| Dependent Variable: | Native American Population | |
|---|---|---|
| | (1) | (2) |
| Target MSA × Post | 6,714*** | 4,449* |
| | (2,273) | (2,536) |
| MSA FE | Yes | Yes |
| Year FE | Yes | Yes |
| Additional Controls | No | Yes |
| Observations | 954 | 747 |

*Notes*: *p<0.1; **p<0.05; ***p<0.01. The Native American population data is the total number of individuals registered by the U.S. Census Bureau as American Indian or Alaska Native for each decennial census year 1910–1990 by MSA. The additional controls in Column (2) include Native American population at baseline (1950), median family income at baseline, and proportion Hispanic in 1940. Standard errors are clustered at the MSA.
*Sources*: Author's calculations from U.S. Bureau of the Census Decennial Census Data and County and City Data Books.

Finally, up to this point, my analysis has focused on total population counts rather than specific migration variables. This is mainly due to a lack of available data on Native American migration over the period during which the program ran. There is, however, a limited amount of data available in the IPUMS samples, which I use to examine migration in Figure 7. Here I explore the place of residence by year for Native Americans born in one of the six states with the highest Native American population prior to the start of the program in 1952.[21] Figure 7 shows the average percent of individuals who were born in a state with a historically large Native American population that are living in a target MSA versus the average percent living in a non-target MSA at the time of the census. While migration out of states with historically large Native American populations seems to be increasing for both groups in 1960 and 1970, there is a much higher average percent of people moving to the target MSAs than non-target MSAs. Overall, this supports the main findings that Native Americans were migrating to target cities more than other MSAs during the time of the Relocation Program.

*Fertility*

The fundamental aim of the Relocation Program was to alter the distribution of Native Americans in the United States and to promote

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[21] The states with historically large Native American populations here are the same as those chosen for the fertility analysis. As a reminder, these states are those with at least 1 percent of the population identifying as American Indian or Alaska Native in the decennial census for all years 1910–1950.

FIGURE 7
MIGRATION TRENDS FOR NATIVE AMERICANS BORN IN STATES WITH
HISTORICALLY LARGE NATIVE AMERICAN POPULATIONS

*Notes*: Lines show the average percent of the Native American population that was born in one of the six states with historically large Native American populations that now live in an MSA. The MSAs are broken into two types based on whether the MSA was a target MSA.
*Sources*: Author's calculations from the University of Minnesota IPUMS USA Data.

assimilation. In the preceding sections, I have documented the migratory impacts of the program, which show a shift in the Native American population to the urban centers targeted by the Relocation Program. In this section, I examine the long-run fertility differences among Native American women living in target MSAs versus states with a historically large Native American population.

To study the impacts of the Relocation Program on fertility, I compare second- and third-generation fertility rates for women living in target cities to those of women living in other urban areas and the rural parts of states with historically high Native American populations. I focus specifically on second- and third-generation outcomes for two reasons. First, examining fertility for the second and third generations provides insight into the long-run effects of the program. Analyzing the long-run impacts is particularly important in this setting, as other economic research on migration programs has found that the economic and health outcomes of such programs are greatest for those of the second generation or the children of movers (Chetty and Hendren 2018a, 2018b; Chetty, Hendren, and Katz 2016; Elmhirst 2002; Katz, Kling, and Liebman 2001; Kling,

Liebman, and Katz 2007; Pollack et al. 2019, and more). Secondly, the publicly available data on births in the United States that is disaggregated by geographic region and race is only available starting in 1990. Given the time of the program, the sample of women who are of childbearing age from 1990 onward is mainly second- and third-generation women. The main measure of fertility that I use is the generalized fertility rate, which gives the number of births per 1,000 women of childbearing age (15–44). Specifically, I calculate the generalized fertility rate for each year from 1990 to 2002 for three racial groups, namely, white, black, and Native American, and by three types of residence: target MSA, non-target MSA, and rural parts of states with historically large Native American populations. I compare the general fertility rate across these three racial groups and the three types of residence to determine the unique fertility patterns among Native American women in target MSAs relative to these other groups.

Before I discuss my fertility results, it is important to note that in the 1970s, there was widespread forced sterilization of Native American women living on reservations. Because the Indian Health Services had such singular control over healthcare on reservations, Native American women were particularly vulnerable to this practice during this period. Estimates suggest that one in four Native American women of child-bearing age were forcibly sterilized at this time (Lawrence 2000). Given that I see even lower rates of fertility for Native American women living in urban areas compared to Native American women living in states with a historically large Native American population, this period of forced sterilization does not change how I understand these fertility data as they relate to the Relocation Program. It does, however, underline the importance of examining fertility as an outcome of interest in this setting and provide important context for this discussion.

Figure 8 shows the general fertility rates from 1990 to 2002 for white, black, and Native American women living in target MSAs, non-target MSAs, and the rural parts of states with historically large Native American populations. Figure 8 suggests that there is a large gap in the fertility rate between those individuals living in an MSA versus those living in non-MSA areas of states with historically large Native American populations. Further, the first two panels show that this same gap does not appear to exist for white or black women. These findings provide preliminary evidence of how the Relocation Program may have contributed to shifting fertility outcomes for Native American women. Figure 9 disaggregates the fertility rate by age and shows that the gap is largest for women ages 21–25, with the gap shrinking steadily in the older age
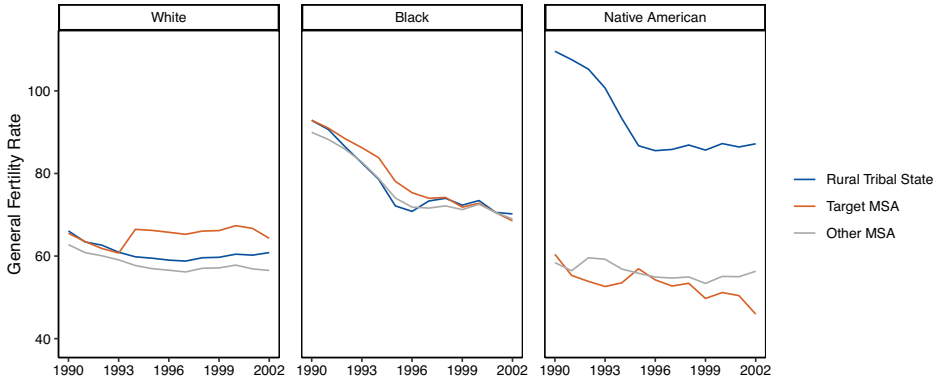
FIGURE 8
GENERAL FERTILITY RATE BY RACE AND CURRENT RESIDENCE

*Notes*: The general fertility rate represents the number of births per 1,000 women aged 15–44. The lines show the general fertility rate by race for each of three types of current residence: target MSA, other MSA, and rural state with historically large Native American populations.
*Sources*: Author's calculations from the CDC National Vital Statistics System natality data and SEER population data.

groups. This suggests that Native American women living in cities are likely to delay fertility as well as have fewer children overall.

These fertility findings are broadly consistent with other estimates of fertility around this time. Snipp (1997) shows that total fertility rates for Native American women are declining between 1970 and 1990 and that the total fertility rates for Native American women living in nonmetro areas are consistently higher than for those living in metro areas. Additionally, Cannon and Percheski (2017) find evidence that the declining total fertility rate for the American Indian and Alaska Native population is unlikely to be due solely to changes in self-identification in the census. They suggest changes in marriage patterns as one explanation for the changing fertility rates but recommend further investigation into geographic regions as a possible additional driver of these changing patterns.

There are a number of economic theories for what drives fertility decisions, starting with the seminal work from Becker (1960), which (with some unfortunate jargon) models children as "normal" goods with a "quality" component to represent expenditures on child development. This model suggests typical income and price effects whereby increased income increases the "demand for children," but increased prices for expenditures needed to raise children decrease the "demand for children." This model alone would suggest that the price effect outweighs any income advantage that Native American families in cities could
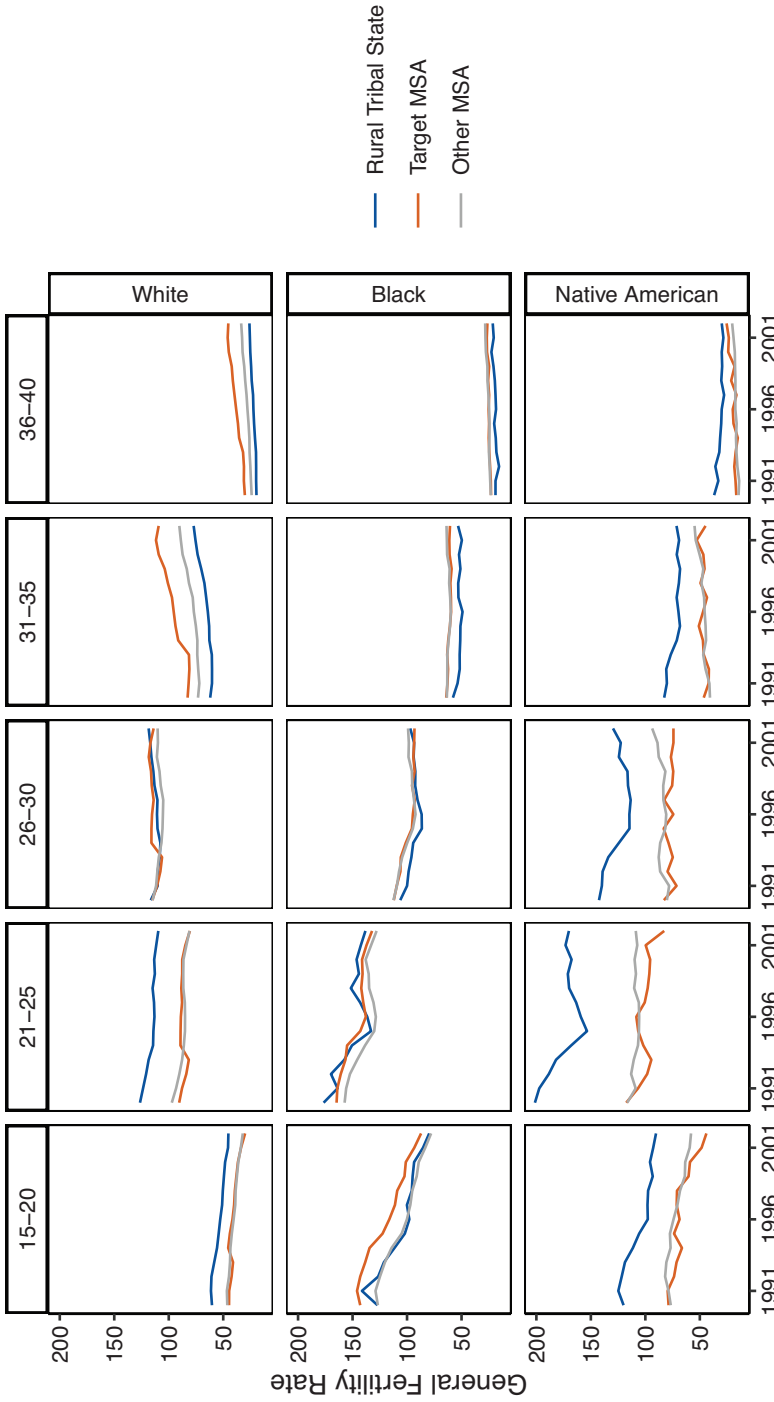
FIGURE 9
GENERAL FERTILITY RATE BY AGE

*Notes*: The general fertility rate by age represents the number of births to women within the specified age range per 1,000 women in the age group.
*Sources*: Author's calculations from the CDC National Vital Statistics System natality data and SEER population data.

have over those living in states with historically large Native American populations.

There are, however, several other applicable economic theories that have been suggested as explanations for the decline in fertility that is observed as countries' incomes increase. These theories have been comprehensively summarized by Kearney, Levine, and Pardue (2022). Here, I will just briefly outline the most relevant theories. First, Becker and Lewis (1973) suggest that as incomes grow, there may be a "quantity-quality" tradeoff whereby parents reduce their overall quantity of children and instead invest more in each child's development. Second, increases in women's wages have been shown to increase the opportunity cost of childbearing and therefore reduce overall fertility (Butz and Ward 1979; Schaller 2016). Third, increased access to effective contraceptives could help families better target their optimal number of children, lowering total fertility (e.g., Bailey 2010; Kearney and Levine 2009; Kelly, Lindo, and Packham 2020). Finally, changes in fertility could reflect a change in preferences through assimilation, as has been shown in immigrant populations (e.g., Bleakley and Chin 2010; Milewski 2007; Parrado and Morgan 2008). This final theory is also known as adaptation theory in the migration-fertility literature in demography. Outside of the economic fertility literature, there are two other main migration-fertility theories in the demography literature that are applicable to this setting. Firstly, selection theory suggests that individuals who migrate have fertility preferences that are similar to the individuals in their destination areas, and therefore the similarities we see between migrants and individuals in the destination are a result of who is selecting into migration, not a change in the fertility behavior of the migrants (e.g., Kulu 2005; Macisco, Bouvier, and Weller 1970; Myers and Morris 1966). Secondly, there is the minority-group status hypothesis, which suggests that minority groups may have lower fertility rates in response to discrimination (Milewski 2010).

One puzzling aspect of these results is that Native American women living in the target cities in 1990–2002 seem to have lower rates of fertility than black and white women living in the target cities, similar to the findings of Macisco, Bouvier, and Weller (1970) in Puerto Rico. This finding is seemingly incompatible with many of the theories described earlier but would be consistent with selection into the program of families with low fertility preferences that extend to future generations or the minority-group status hypothesis. However, limited data availability precludes me from examining these mechanisms further. Future research into the first generation's fertility outcomes and additional heterogeneity

analysis by women's wages, education, or language may help explain the mechanisms driving the disparity in fertility rates seen here. The fact that these differences in fertility exist in the generation after the Relocation Program, however, suggests long-term, persistent demographic effects from the two-decade-long program.

## RESERVATION POPULATION COUNTERFACTUALS

To better understand the magnitude of these migration and fertility effects on the reservation population, I calculate a set of back-of-the-envelope counterfactual Native American population estimates for counties with reservations. I consider three separate counterfactual population estimates.

### ADJUSTED MIGRATION, UNADJUSTED BIRTH RATE

This counterfactual estimates the reservation county Native American population had those induced to migrate by the program remained on reservations and had a birth rate equal to the birth rate observed over this period for Native American populations in states with historically high Native American populations. The model used to estimate this population counterfactual is, for decennial year $y$:

$$AIANPopulation_{y+10} = AIANPopulation_y \times (1 + r_1)^{10} \qquad (2)$$

Here, $AIANPopulation_y$ is the Native American population living in counties with reservations in decennial year $y$, and $AIANPopulation_{y+10}$ is the Native American population living in counties with reservations in the following decennial year, ten years after $y$. The variable $r_1$ is the population growth rate based on birth and death rates for the Native American population in states with historically large Native American populations.[22] Beginning with the 1950 decennial census Native American population data, this counterfactual models how the Native American population in counties with reservations would have grown had there been net zero migration and had birth and death rates for this population looked the same as those actually observed for Native American populations in states with historically large Native American populations.

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[22] The states with historically large Native American populations here are the same as those chosen for the fertility analysis. As a reminder, these states are those with at least 1 percent of the population identifying as American Indian or Alaska Native in the decennial census for all years 1910–1950.

ADJUSTED MIGRATION, ADJUSTED BIRTH RATE

This counterfactual estimates the reservation county Native American population had those induced to migrate by the program remained on reservations and had a birth rate 35 percent below the birth rate seen over this time period in the states with historically high Native American population levels in the early twentieth century. This adjusted birth rate is based on the 1990 gap in birth rates between Native American women living in target MSAs and Native American women living in the rural parts of states with historically large Native American populations, as estimated in Figure 8. The model used to estimate this population counterfactual is, for decennial year $y$:

$$AIANPopulation_{y+10} = (AIANPopulation_y - Migration_{y+10}) \quad (3)$$
$$\times (1 + r_1)^{10} + Migration_{y+10} \times (1 + r_2)^{10}$$

Here, all variables described previously remain the same. $Migration_{y+10}$ is the estimated total migration in decennial year $y + 10$ based on the event study estimates in Figure 4. I calculate total migration for each decennial year by multiplying the coefficient by the number of treated units and subtracting the previous decennial year coefficient as the event study coefficients are cumulative. The adjusted population growth rate is represented by $r_2$. It is calculated using a birth rate that is 35 percent lower than the observed birth rate for the Native American population in states with historically large Native American populations. Beginning with the 1950 decennial census Native American population data, this counterfactual models how the Native American population in counties with reservations would have grown had there been net zero migration, but the gap in the birth rates still remained even had these individuals not moved to the target MSAs. In other words, this model assumes that the gap in fertility shown in Figure 8 is completely a result of selection and therefore would have been present regardless of migration.

UNADJUSTED MIGRATION, UNADJUSTED BIRTH RATE

This final counterfactual estimates the reservation county Native American population with the estimated program-induced migration that has occurred and with the population growth based on the birth rates observed over this period for Native American populations in states with

a historically high Native American population. The model used to esti-mate this population counterfactual is, for decennial year $y$:

$$AIANPopulation_{y+10} = (AIANPopulation_y - Migration_{y+10}) \quad (4)$$
$$\times (1 + r_1)^{10}$$

Here again, all variables described previously remain the same. The population model implicitly assumes net zero migration, so those esti-mated to have migrated as a result of the program are subtracted out when calculating each decennial census population estimate. I create this third counterfactual population estimate with no adjustments for migration or birth rates as a comparison group for the other two population estimates. As noted previously, the census population estimates show a substantial increase in the number of individuals identifying as "American Indian/ Alaska Native" during this period. There is no evidence of a differential increase in identifying as Native American across my treatment and control MSAs, so this should not cause any problems for the identification of my main findings. It does, however, make it hard to compare my counterfac-tual population estimates. Thus, the population described in Equation (4) serves as a more comparable estimate of what the Native American popu-lation growth in counties with reservations would have looked like under actual historic conditions. While the population described in Equation (4) is more directly comparable, I have also included the recorded decennial census Native American population trend in the figure with my counter-factual estimates.

As can be seen in Figure 10, there would have been a substantially larger Native American population living in counties with reservations in 1990 if individuals had remained on reservations rather than migrating as a result of the Relocation Program. My population growth model suggests that, absent the Relocation Program, there would be over 300,000 addi-tional Native Americans living in reservation counties in 1990. Thus, in addition to the increased population from returning the roughly 100,000 estimated migrants back to the reservations, there is a further increase of 200,000 Native Americans living on reservations associated with the higher estimated natural growth rate. Moreover, this additional popula-tion would have been even more substantial if the forced sterilization in the 1970s had not decreased the birth rate. An additional model, which can be found in Figure A2 in the Online Appendix, suggests that, absent these factors, the Native American population living in counties with reservations in 1990 would have been more than 50 percent larger than that of the unadjusted population estimated in model 3.
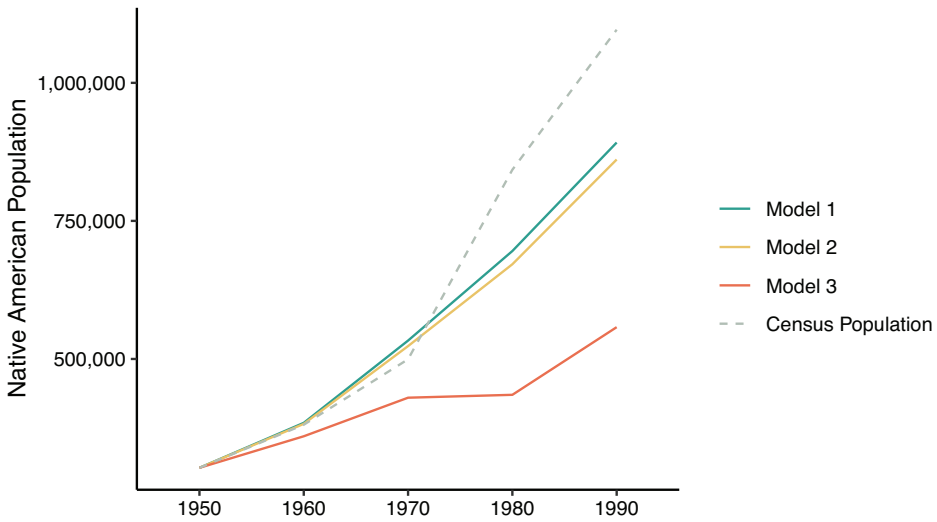
Model 1: Estimated population growth on reservations without migration
  (using reservation estimated birth and death rate)
Model 2: Estimated population growth on reservations without migration
  (using birth rate that maintains fertility gap estimated in the fertility results section)
Model 3: Estimated population growth on reservations with migration

FIGURE 10
COUNTERFACTUAL NATIVE AMERICAN POPULATION IN RESERVATION
COUNTIES

*Notes*: The three models in the figure match the descriptions at the beginning of this section. Birth and death rates are based on number of births and deaths in states with the highest rates of Native American population prior to relocation as described in the data section. Population estimates are based on the Native American population living in counties with reservation lands.
*Sources*: Author's calculations from the CDC National Vital Statistics System natality data and author estimates of decennial migration induced by the Relocation Program.

CONCLUSION

This paper shows how government-sponsored migration programs can affect the migration patterns of targeted populations and potentially impact long-run fertility. I find that the Relocation Program had a large and significant impact on the migration outcomes for Native Americans in the second half of the twentieth century. This policy led to a sorting of the Native American population into the program's target MSAs relative to all other MSAs, shaping the distribution of the Native American population across the United States today. The point estimates from my analysis suggest that during this period, roughly 100,000 additional Native Americans were living in the program's target cities as a result of the program. The magnitude of these impacts for the Native American

population on reservations is made clear in the counterfactual population estimates, which suggest that, absent the Relocation Program, there would have been an additional 300,000 Native American individuals living on reservation land in 1990. The gap in the fertility rate between Native Americans living in MSAs versus traditionally large Native American population states suggests that there are likely important long-run consequences for those affected by the program as well as their descendants.

These findings indicate some fulfillment of the program's stated aim—to relocate Native Americans away from reservations and into urban centers with the overarching goal of assimilation. I document strong evidence of the program's contribution to the relocation of Native American people, specifically to the program's targeted cities. I also find lower fertility rates for second- and third-generation Native American women living in MSAs relative to Native American women in states with historically large Native American populations, which may indicate evidence of assimilation. Additional research is needed to determine the extent to which assimilation contributes to the fertility gap detailed here.

One important note about the interpretation of the main findings is that my difference-in-differences estimates compare populations across urban areas. This means that I cannot say whether those induced to move to the target cities by the program would or would not have chosen to stay where they were absent the program. Rather, my estimates suggest that an additional 100,000 Native American individuals moved specifically to the program's targeted cities as a direct consequence of the program.

This paper is the first to establish this causal relationship between the Relocation Program and net migration to the program's target cities. The magnitude of the migration estimates is suggestive of a potentially large impact, but large standard errors across the main estimates advise some caution in relying too heavily on the exact point estimate. While this analysis using publicly available population data provides new insight into the direction and approximate magnitude of the program effects, future research using individual micro-data will be needed to further strengthen our understanding of the exact size of the net impacts of the program.

Keeping these precision limitations in mind and focusing on the average effect, these estimates suggest that more individuals moved to the target cities as a result of the program than those recorded as having moved directly through the Relocation Program, according to the program's administrative data. U.S. Department of the Interior Budget Justifications from fiscal years 1970–1974 provide estimates of participation in the

direct relocation program at roughly 85,000.[23] Therefore, even if the return rate for participants is only 30 percent, as the BIA consistently reported, substantial additional non-participant migration to the target cities also must have occurred. My baseline estimates suggest that if there was a 30 percent return rate for program participants, then the Relocation Program induced an additional 45,000 individuals to move to the program's targeted cities as non-participants. If the return rate for participants is higher than the 30 percent reported by the BIA, as many sources have suggested, then this number of non-participant migrants could potentially be even higher. Overall, this shows that the Relocation Program had net impacts that reached beyond direct participant uptake, shaping the spatial distribution of urban Native Americans across the United States.

While I am able to document one important dimension of the Relocation Program by determining the effects on migratory outcomes, the full impacts of this movement to these major urban centers have yet to be examined. By establishing the effect of the Relocation Program on migration, this paper sets up a first stage for further research into other long-term economic and health outcomes for those induced to move by the program.

## REFERENCES

Ablon, Joan. "Relocated American Indians in the San Francisco Bay Area: Social Interaction and Indian Identity." *Human Organization* 23, no. 4 (1964): 296–304.
———. "American Indian Relocation: Problems of Dependency and Management in the City." *Phylon* 26, no. 4 (1965): 362–71.
Andersson, Gunner. "Childbearing after Migration: Fertility Patterns of Foreign-Born Women in Sweden." *International Migration Review* 38, no. 2 (2004): 747–74.
Bailey, Martha J. "'Momma's Got the Pill': How *Anthony Comstock and Griswold v. Connecticut* Shaped U.S. Childbearing." *American Economic Review* 100, no. 1 (2010): 28–45.
Becker, Gary. "An Economic Analysis of Fertility." In *Demographic and Economic Chante in Developed Countries,* edited by George B. Roberts, 209–40. Princeton: Princeton University Press, 1960.
Becker, Gary S., and H. Gregg Lewis. "On the Interaction Between the Quantity and Quality of Children." *Journal of Political Economy* 81, no. 2 (1973): S279–S288.

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[23] These estimates are for participants in the direct employment program. It is unclear from the BIA estimates whether or not individuals who participated in the vocational training program first are included in these estimates. It is also unclear to what extent individuals or families who participated in the direct employment program more than once are being double or triple counted in these estimates, as people could participate up to three times. As noted at the beginning of the paper, this is not the only estimate of direct program participation from government documents. This estimate was chosen as the comparison here because it is at least one credible source of government information that is verifiable by the author through digitized versions of the original source documents, and it is in the middle of other reported estimates.

Bleakley, Hoyt, and Aimee Chin. "Age at Arrival, English Proficiency, and Social Assimilation Among U.S. Immigrants." *American Economic Journal: Applied Economics* 2, no. 1 (2010): 165–92.

Butz, William P., and Michael P. Ward. "The Emergence of Countercyclical U.S. Fertility." *American Economic Review* 69, no. 3 (1979): 318–28.

Cannon, Sarah, and Christine Percheski. "Fertility Change in the American Indian and Alaska Native Population, 1980–2010." *Demographic Research* 37 (2017): 1–12.

Carlos, Ann M., Donna L. Feir, and Angela Redish. "Indigenous Nations and the Development of the U.S. Economy: Land, Resources, and Dispossession." *Journal of Economic History* 82, no. 2 (2022): 516–55.

Carlson, Leonard A. "The Dawes Act and the Decline of Indian Farming." *Journal of Economic History* 38, no. 1 (1978): 274–76.

———. "Land Allotment and the Decline of American Indian Farming." *Explorations in Economic History* 18, no. 2 (1981): 128–54.

———. "Federal Policy and Indian Land: Economic Interests and the Sale of Indian Allotments, 1900–1934." *Agricultural History* 57, no. 1 (1983): 33–45.

Chadwick, Bruce A., and Lynn C. White. "Correlates of Length of Urban Residence Among Spokane Indians." *Human Organization* 35, no. 1 (1973): 9–16.

Chetty, Raj, and Nathaniel Hendren. "The Impacts of Neighborhoods on Intergenerational Mobility I: Childhood Exposure Effects." *Quarterly Journal of Economics* 133, no. 3 (2018a): 1107–62.

———. "The Impacts of Neighborhoods on Intergenerational Mobility II: County-Level Estimates." *Quarterly Journal of Economics* 133, no. 3 (2018b): 1163–228.

Chetty, Raj, Nathaniel Hendren, and Lawrence F. Katz. "The Effects of Exposure to Better Neighborhoods on Children: New Evidence from the Moving to Opportunity Experiment." *American Economic Review* 106, no. 4 (2016): 855–902.

Dippel, Christian, and Dustin Frye. "The Effect of Land Allotment on Native American Households during the Assimilation Era." Unpublished manuscript, 2021. Available at https://dustinfrye.github.io/files/dawes_.pdf.

Dippel, Christian, Dustin Frye, and Brian Leonard. "Property Rights without Transfer Rights: A Study of Indian Land Allotment." NBER Working Paper Series No. 27479, Cambridge, MA, July 2020.

Eckert, Fabian, Andrés Gvirtz, Jack Liang, and Michael Peters. "A Method to Construct Geographical Crosswalks with an Application to US Counties since 1790." NBER Working Paper Series No. 26770, Cambridge, MA, February 2020.

Elmhirst, Rebecca. "Daughters and Displacement: Migration Dynamics in an Indonesian Transmigration Area." *Journal of Development Studies* 38, no. 5 (2002): 143–66.

Fixico, Donald. "Termination and Relocation: Federal Indian Policy in the 1950's." Ph.D. diss., University of Oklahoma, 1980.

———. *The Urban Indian Experience in America*. Albuquerque, NM: University of New Mexico Press, 2000.

Frye, Dustin, and Dominic Parker. "Indigenous Self-Governance and Development on American Indian Reservations." *American Economic Review: Papers and Proceedings* 111 (2021): 233–37.

Gardner, John, and William Cohen. "Demographic Characteristics of the Population of the United States, 1930-1950: County-Level." Inter-university Consortium for Political and Social Research [distributor], 1992-02-16. https://doi.org/10.3886/ICPSR00020.v1

Goldstein, Sidney. "Interrelations Between Migration and Fertility in Thailand." *Demography* 10, no. 2 (1973): 225–41.

Gregg, Matthew T. "The Long-Term Effects of American Indian Boarding Schools." *Journal of Development Economics* 130, no. 1 (2018): 17–32.

Gundlach, James H., P. Nelson Reid, and Alden E. Roberts. "Migration, Labor Mobility, and Relocation Assistance: The Case of the American Indian." *Social Service Review* 51, no. 3 (1977): 464–73.

Gundlach, James H., and Alden E. Roberts. "Native American Indian Migration and Relocation: Success or Failure." *Pacific Sociological Review* 21, no. 1 (1978): 117–28.

Haines, Michael R., and Inter-university Consortium for Political and Social Research. "Historical, Demographic, Economic, and Social Data: The United States, 1790-2002." Inter-university Consortium for Political and Social Research [distributor], 2010-05-21. https://doi.org/10.3886/ICPSR02896.v3

Hirano, Keisuke, Guido W. Imbens, and Geert Ridder. "Efficient Estimation of Average Treatment Effects Using the Estimated Propensity Score." *Econometrica* 71, no. 4 (2003): 1161–89.

Katz, Lawrence F., Jeffrey R. Kling, and Jeffrey L. Liebman. "Moving to Opportunity in Boston: Early Results of a Randomized Mobility Experiment." *Quarterly Journal of Economics* 116, no. 2 (2001): 607–54.

Kearney, Melissa S., and Phillip B. Levine. "Subsidized Contraception, Fertility, and Sexual Behavior." *Review of Economics and Statistics* 91, no. 1 (2009): 137–51.

Kearney, Melissa S., Phillip B. Levine, and Luke Pardue. "The Puzzle of Falling U.S. Birth Rates Since the Great Recession." *Journal of Economic Perspectives* 36, no. 1 (2022): 151–76.

Kelly, Andrea, Jason M. Lindo, and Analisa Packham. "The Power of the IUD: Effects of Expanding Access to Contraception through Title X Clinics." *Journal of Public Economics* 192 (2020): 104288.

Kling, Jeffrey R., Jeffrey B. Liebman, and Lawrence F. Katz. "Experimental Analysis of Neighborhood Effects." *Econometrica* 75, no. 1 (2007): 83–119.

Kopriva, Mary. "Impacts of the Relocation Program on Native American Migration and Fertility." Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 2023-12-18. https://doi.org/10.3886/E195727V1.

Kulu, Hill. "Migration and Fertility: Competing Hypotheses Re-examined." *European Journal of Population* 21, no. 1 (2005): 51–87.

Lawrence, Jane. "The Indian Health Service and the Sterilization of Native American Women." *American Indian Quarterly* 24, no. 3 (2000): 400–19.

Macisco, John J., Leon F. Bouvier, and Robert H. Weller. "The Effects of Labor Force Participation on the Relation Between Migration Status and Fertility in San Juan, Puerto Rico." *The Milbank Memorial Fund Quarterly* 48, no. 1 (1970): 51–70.

Madigan, La Verne. *The American Indian Relocation Program.* New York, NY: The Association of American Indian Affairs, Inc., 1956.

Means, Russell, and Marvin Wolf. *Where White Men Fear to Tread: The Autobiography of Russell Means*. New York, NY: St. Martin's Press, 1995.

Milewski, Nadja. "First Child of Immigrant Workers and Their Descendants in West Germany: Interrelation of Events, Disruption, or Adaptation?" *Demographic Research* 17, no. 29 (2007): 859–96.

———. *Fertility of Immigrants: A Two-Generational Approach in Germany. (Demographic Research Monographs)*. Verlag Berlin Heidelberg: Springer, 2010.

Miller, Douglas K. *Indians on the Move: Native American Mobility and Urbanization in the Twentieth Century*. Chapel Hill, NC: University of North Carolina Press, 2019.

Miller, Melinda C. "Assimilation and Economic Development: The Case of Federal Indian Policy." *Public Choice* (2023): https://doi.org/10.1007/s11127-023-01049-w.

Myers, George C., and Earl W. Morris. "Migration and Fertility in Puerto Rico." *Population Studies* 20, no. 1 (1966): 85–96.

Parrado, Emilio A., and S. Philip Morgan. "Intergenerational Fertility Among Hispanic Women: Evidence of Immigrant Assimilation." *Demography* 45, no. 3 (2008): 651–71.

Passel, Jeffrey S. "Provisional Evaluation of the 1970 Census Count of American Indians." *Demography* 13, no. 3 (1976): 397–409.

Passel, Jeffrey S., and Patricia A. Berman. "Quality of the 1980 Census Data for American Indians." *Social Biology* 33, no. 3–4 (1986): 163–82.

Philp, Kenneth R. "Stride Toward Freedom: The Relocation of Indians to Cities, 1952–1960." *Western Historical Quarterly* 16, no. 2 (1985): 175–90.

Pollack, Craig Evan, Amanda L. Blackford, Shawn Du, Stefanie Deluca, Rachel L. J. Thornton, and Bradley Herring. "Association of Receipt of a Housing Voucher with Subsequent Hospital Utilization and Spending." *JAMA-Journal of the American Medical Association* 322, no. 21 (2019): 2115–24.

Price, John A. "Migration and Adaptation of American Indians to Los Angeles." *Human Organization* 27, no. 2 (1968): 168–75.

Prucha, Francis P. *The Great Father: The United States Government and the American Indians*. Lincoln, NE: University of Nebraska Press, 1984.

Rosenbaum, Paul R., and Donald B. Rubin. "The Central Role of the Propensity Score in Observational Studies for Causal Effects." *Biometrika* 70, no. 1 (1983): 41–55.

Rosenthal, Nicholas G. *Reimagining Indian Country: Native American Migration and Identity in Twentieth-Century Los Angeles*. Chapel Hill, NC: University of North Carolina Press, 2012.

Schaller, Jessamyn. "Booms, Busts, and Fertility: Testing the Becker Model Using Gender- Specific Labor Demand." *Journal of Human Resources* 51, no. 1 (2016): 1–29.

Snipp, C. Matthew. "The Size and Distribution of the American Indian Population: Fertility, Mortality, and Residence." *Population Research and Policy Review* 16 (1997): 61–93.

Sorkin, Alan L. (1969). "Some Aspects of American Indian Migration." *Social Forces* 48, no. 2 (1969): 243–50.

———. *American Indian and Federal Aid*. Washington, DC: Brookings Institute, 1971.

——— . *The Urban American Indian*. Lexington, MA: Lexington Books, 1978.

Thornton, Russell. "Cherokee Population Losses during the Trail of Tears: A New Perspective and a New Estimate." *Ethnohistory* 31, no. 4 (1984): 289–300.

Wilkinson, Charles F., and Eric R. Biggs. "The Evolution of the Termination Policy." *American Indian Law Review* 5, no. 1 (1977): 139–84.