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In 2019, the US Undocumented Population Continued a Decade-Long Decline and the Foreign-Born Population Neared Zero Growth

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Keywords
undocumented population, return migration, US population, American, community survey

Introduction

This report presents new estimates of the undocumented population residing in the United States in July 2019, by country of origin and state of residence. The Center for Migration Studies (CMS) derived the estimates by analyzing data collected in the annual American Community Survey (ACS) conducted by the US Census Bureau (Ruggles et al. 2020**)**. The methodology used to estimate the undocumented population is described in the Appendix.

The report highlights an aspect of population change — the number leaving the population — that is often overlooked in discussions of immigration trends. The report shows that the annual numbers leaving the population, especially through return migration to Mexico, have been the primary determinant of population change in the undocumented population in the past decade. Increasing numbers leaving the population have also led to near-zero growth of the total foreign-born population, which grew by just 20,000 from July 2018 to June 2019, the slowest growth in that population in more than a half century. Major findings include the following:

- The undocumented population continued to decline in 2019, falling by 215,000 compared to 2018; this population has declined by 1.4 million, or 12 percent, since 2010.
- The undocumented populations from Central America and Asia increased at the same rate from 2010 to 2016.
- After 2016, the population from Asia stopped growing, and the population from Central America increased by about 200,000.
- Since 2010, the undocumented population from Mexico has fallen from 6.6 million to 4.8 million, or by 28 percent.
- In 2019, 42 states and Washington, DC, had fewer undocumented residents from Mexico than they had in 2010.
- The states with increases in undocumented persons from Mexico had small undocumented populations.
- The undocumented population in California continued its decade-long decline, falling by 23 percent from 2.9 million in 2010 to 2.3 million in 2019.
- Annual arrival and departure data for Mexico show that the US Senate–passed comprehensive immigration reform bill, which provided for a large legalization program, did not increase undocumented immigration; instead, it seemed to reduce emigration from the United States.
- Net growth of the total foreign-born population fell to just 20,000 from July 2018 to June 2019. The drop occurred because the number leaving the population increased sharply after 2015.

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Table 1. Annual Change in the Total Undocumented Population, 2010 to 2019 (Rounded to 5,000s).

Year (July 1)	Undocumented Population (July 1)	Annual Undocumented Population Change (July to June)			
			Net Change	Arrived	Left the Population
	(1)		(2) = (3) − (4)	(3)	(4)
		Total, 2010–2019	−1,375	4,500	5,875
2019	10,350				
2018	10,565	2018–2019	−215	590	805
2017	10,640	2017–2018	−80	555	635
2016	10,790	2016–2017	−150	605	750
2015	11,045	2015–2016	−250	560	815
2014	11,045	2014–2015	−0	545	550
2013	11,010	2013–2014	35	450	420
2012	11,110	2012–2013	−100	400	495
2011	11,315	2011–2012	−205	375	580
2010	11,725	2010–2011	−410	415	825

Note: Numbers rounded independently.
Source: Center for Migration Studies. See Appendix for method of estimation.

Terminology

In this report, a population estimate for a year always refers to the population on July 1 of that year.[1] For components of population change, such as arrivals, net change, or the number that left the population, the reference period is July 1 to June 30.

For the total foreign-born population, the term "left the population," as used here, includes voluntary emigration, removal by the US Department of Homeland Security (DHS), and deaths. For the undocumented population, the term includes voluntary emigration, removal by DHS, deaths, and adjustment to legal status.[2]

Separate estimates of the four ways of leaving the undocumented population — emigration, removal by DHS, adjustment of status, and death — are not shown because adequate statistics are not available to derive reliable estimates of those components. Estimation of the annual number that arrived and the total number that left the population is straightforward, however, as described in Section A of the Appendix. The report focuses on the role of arrivals and total departures from the population in shaping population trends during the past decade.

Undocumented Population Change, 2010 to 2019

The total undocumented population continued to decline in 2019, dropping by 215,000 from 2018 to 2019. Table 1 shows annual estimates of the population, the number that arrived, and the number that left the population each year. The population declined by 1,375,000, or 12 percent, from 2010 to 2019 (Table 1).

Trends in Population Growth from Central America and Asia

During the past decade, the undocumented populations from Central America and Asia have increased considerably. As Figure 1 shows, population growth from these two regions occurred on a parallel track from 2010 to 2016. After 2016, the pattern of growth from the two areas diverged. The population from Asian countries grew very slowly after 2016; the population from

[1] The American Community Survey (ACS), the source of the data used for this report, is conducted throughout each calendar year. For example, data collection for the 2019 ACS occurred from January through December 2019. As a result, an estimate of the population in the 2019 ACS refers to July 1, the average date of data collection.

[2] Three of the components of change listed here — deaths, removals by DHS, and adjustments to legal status — occur fairly evenly from year to year. For example, see columns 3, 4, and 5 in Table A2 in the Appendix. As a result, changes throughout time in the *pattern* in the number leaving the population are likely the result of changes in emigration as well as sampling variation.

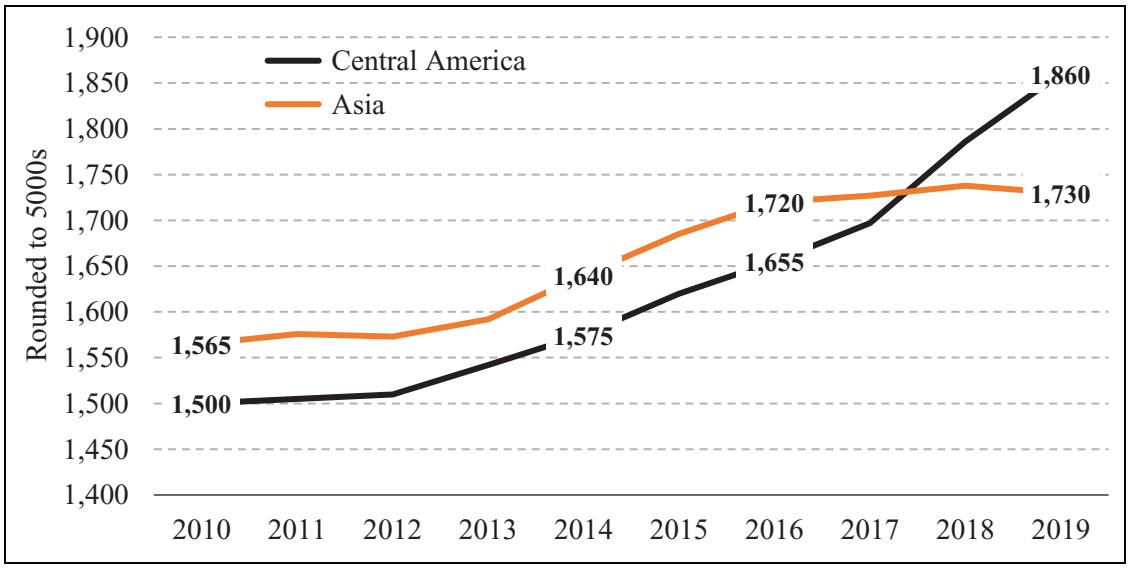

Figure 1. Estimated Undocumented Population from Central America and Asia: 2010 to 2019 (3-Year Moving Averages).

Table 2. Estimated Undocumented Population from Selected Central American and Asian Countries: 2010 to 2019 (Rounded to 5,000s).

Country	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
El Salvador	610	605	600	610	620	635	650	665	695	710
Guatemala	475	485	500	505	510	510	525	545	595	635
Honduras	305	305	310	330	345	375	385	395	410	440
Total	**1,390**	**1,395**	**1,410**	**1,445**	**1,475**	**1,520**	**1,560**	**1,605**	**1,700**	**1,785**
China	290	295	300	315	340	365	380	370	355	350
Korea	205	200	195	185	180	165	165	160	155	145
Philippines	255	255	255	250	245	235	220	200	190	185
Vietnam	110	110	110	115	120	120	110	95	95	100
India	370	385	395	410	430	455	505	560	605	615
Total	**1,230**	**1,245**	**1,255**	**1,275**	**1,315**	**1,340**	**1,380**	**1,385**	**1,400**	**1,395**

Note: Numbers rounded independently. Estimates computed using 3-year moving averages to reduce sampling variation.
Source: Center for Migration Studies. See Appendix for methods of estimation.

Central America increased by about 200,000 from 2016 to 2018 (Figure 1).

From 2010 to 2016, the five leading Asian countries of origin shown in Table 2 increased at approximately the same rate as the three Central American countries. The population from El Salvador, Guatemala, and Honduras grew steadily throughout the period, with growth increasing somewhat after 2015 (Table 2). From 2016 to 2019, the three Central American countries increased by 225,000, while the Asian countries increased by just 15,000 (Table 2). The populations from four of the top five Asian countries — China, Korea, the Philippines, and Vietnam — were lower in 2019 than in 2016. The population from India increased by 110,000 during the 2016 to 2019 period.

Declining Undocumented Population from Mexico

The undocumented population from Mexico declined so much in the past decade that its share dropped to less than half of the total population. From 2010 to 2019, the undocumented population from Mexico declined by about 1.9 million, and the undocumented population from the rest of the world increased by about 500,000 (Figure 2).

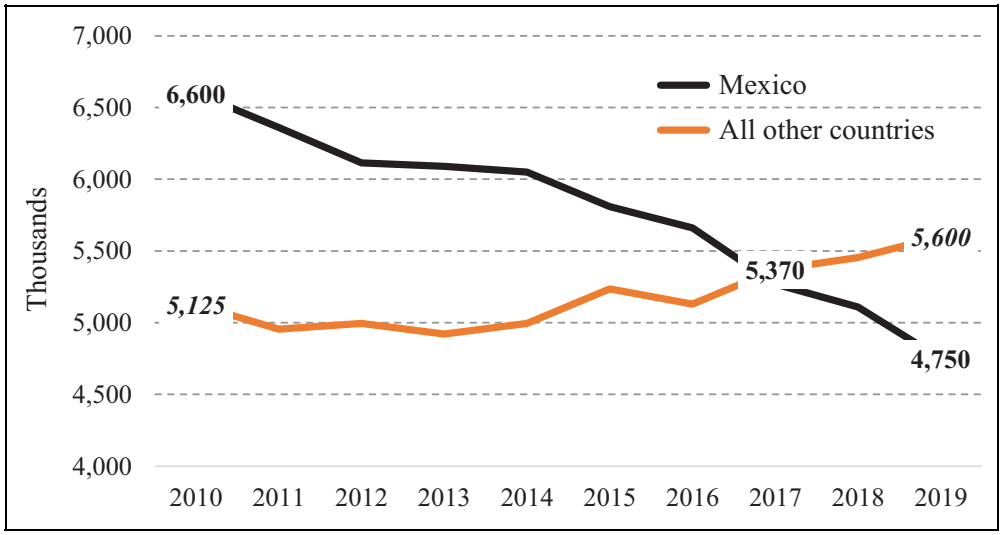

Figure 2. Undocumented Population from Mexico and from All Other Countries: 2010 to 2019 (Rounded to 5,000s).

Return Migration to Mexico and Undocumented Population Change

Return migration of undocumented residents to Mexico was principally responsible for the decline of almost 1.9 million in the total undocumented population from 2010 to 2019. Figure 3 shows that the drop occurred because of high and increasing numbers leaving the population and not because the inflow dropped (it remained steady in that period, as Figure 3 shows).

Changes from year to year in the total number leaving the population are likely the result of changes in emigration rather than changes in the other three components. Appendix Table A2 shows approximations of the four components — emigration, removals by DHS, adjustments to legal status, and deaths — that contribute to the number leaving the undocumented population from Mexico annually from 2010 to 2019.[3]

Figure 3 shows estimates of the number of arrivals, net population change, and the number that left the undocumented population from Mexico from 2010 to 2019. Except for the slight downturn in 2011 to 2014, arrivals were largely unchanged throughout the 9-year period. The most notable feature of Figure 3 is the increasing length of the light gray bars — the number leaving the population. It suggests that the undocumented population from Mexico declined because large and increasing numbers left the population.

Two features of Figure 3 are of special interest:

1. The estimated 545,000 that left in 2016–2017 and the 505,000 that left in 2018–2019 are more than 100,000 larger than the number that left in any other year. Other than those two years, the largest number leaving was slightly less than 400,000 (Figure 3). The total "excess" (that is, greater than 400,000) in those two years combined was about 250,000. Whether this recent increase in the number leaving the population was a result of the harsh policies of the Trump administration,[4] or represents a growing trend of returning to Mexico, is beyond the scope of this report. Clearly, however, return migration to Mexico was the essential component in the decline of the

[3] Adequate data were not available to compile acceptable estimates of deaths, removals, or adjustments to legal status for this report. For example, even though DHS publishes the number of removals each year, the data are not adequate for deriving population estimates because they include many migrants that have not established residence, so they overstate the number of removals from the resident undocumented population. Also, DHS collects data on adjustments of immigration status, but it does not track how many of them adjusted from undocumented status. The estimates of removals and adjustments from undocumented status shown in Appendix Table A2 were derived based on data and assumptions that are out of date (removals) or are based on unverified assumptions (adjustment of status).

[4] For a description of these policies during the past four years and recommendations on how to repair the damage done to the US immigration system, see Aleinikoff and Kerwin (2020) and Kerwin and Warren (2019).

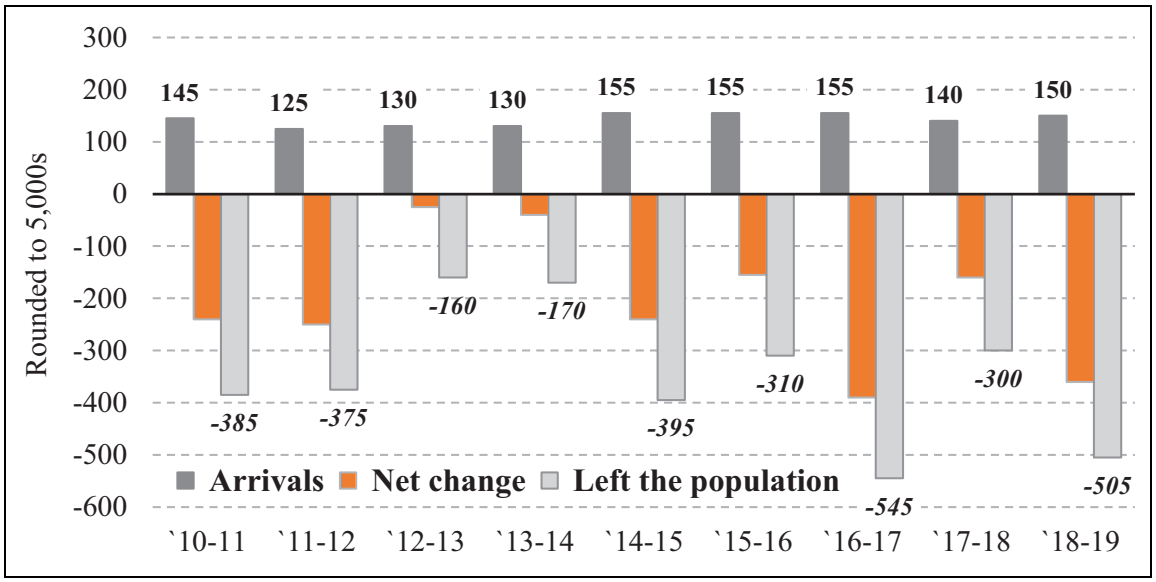

Figure 3. Arrivals, Net Change, and the Number That Left the Undocumented Population from Mexico: 2010 to 2019.

undocumented population in the 2010 to 2019 period.

2. The second feature of Figure 3 that deserves attention is the pattern of arrivals and departures in the 2012 to 2014 period. This allows us to observe the effect, if any, of the comprehensive immigration reform bill, S744, passed by the US Senate in June 2013, on the inflow and outflow of undocumented migrants.

It is often assumed that legalization programs for undocumented residents, or even discussions of them, have led and will lead to increased undocumented migration (Inserra 2017). The data in Figure 3 support an opposite assessment: that legalization legislation does not increase undocumented migration. Instead, it temporarily reduces the number leaving the population.

In Figure 3, arrivals did not increase in the years that legalization legislation was actively under consideration and nearly passed; in fact, they dipped slightly in 2011 to 2014. Departures from the population in those two years were less than half of the departures in any of the two years before and after them. This finding could provide significant support for immigration reform bills likely to be proposed by the Biden administration.

Decline in the Undocumented Population from Mexico, by State, 2010 to 2019

The total undocumented population from Mexico declined by 28 percent from 2010 to 2019. The decline occurred in most of the states, but there was variation among states. Table 3 shows estimated change in the undocumented population from Mexico from 2010 to 2019 in the top 15 US states of residence of undocumented migrants from Mexico. New York and Illinois declined by 44 percent and 41 percent, respectively. The undocumented population from Mexico declined by about a third in five other states — Georgia, North Carolina, Colorado, New Jersey, and Oregon (Table 3).

Decline in the Undocumented Population in California, by Country of Origin

From 2010 to 2019, the total undocumented population residing in California declined from 2,915,000 to 2,250,000, a drop of 665,000, or 23 percent. Figure 4 shows how much the top 10 countries of origin changed throughout that period. The most striking feature of Figure 4 is the decline of 705,000, or 35 percent, in the undocumented population from Mexico. Other countries that declined were the Philippines (−42,000) and Korea (−19,000). The largest increases were for India (49,000) and China (38,000), followed by Guatemala (10,000) and El Salvador (8,000).

Number Leaving the Total Foreign-Born Population, 2010 to 2019

In 2015, the ACS counted 43.1 million foreign-born, an increase of 927,000 compared to the previous year. After 2015, net growth of that population declined sharply. In

Table 3. Change in the Undocumented Population from Mexico, 2010 to 2019, in the Top 15 States of Residence of Undocumented Migrants from Mexico (Rounded to 5,000s).

State of Residence	Population in 2010	Population in 2019	Change, 2010 to 2019	% Change
All states	6,600	4,750	−1,850	−28%
California	2,015	1,310	−705	−35%
Texas	1,330	1,155	−175	−13%
Illinois	395	235	−165	−41%
Arizona	260	200	−60	−23%
Georgia	240	150	−90	−37%
North Carolina	220	150	−70	−32%
Washington	150	140	−15	−8%
Florida	175	130	−45	−27%
New York	200	115	−90	−44%
Nevada	135	110	−25	−17%
Colorado	145	95	−50	−35%
New Jersey	110	70	−35	−34%
Oklahoma	80	65	−10	−14%
Oregon	100	65	−35	−34%
Tennessee	75	65	−10	−16%
All other states	970	695	−275	−28%

Note: All numbers and percentages rounded independently.
Source: Center for Migration Studies. See Appendix for method of estimation.

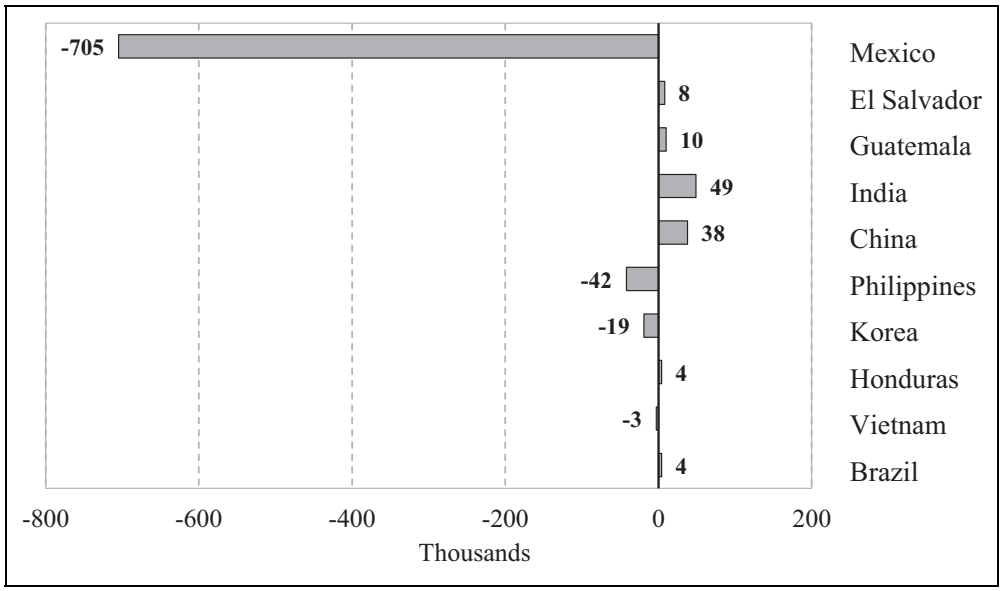

Figure 4. Change in the Undocumented Population in California, 2010 to 2019, Top 10 Countries (Ranked by 2019).

2019, the foreign-born population was just 21,000 higher than it was in 2018.

The drop in net growth has been attributed to restrictive immigration policies that have supposedly led to decreased admissions. For example, Frey (2020) noted that "the Trump administration's crackdown on immigration — taking the form of refugee limits, immigrant bans, public-charge regulations, and more — has sharply reduced the growth of our foreign-born population." In 2019, the Census Bureau stated, "The decline in net migration — which measures people who move out and people who move into a country — is

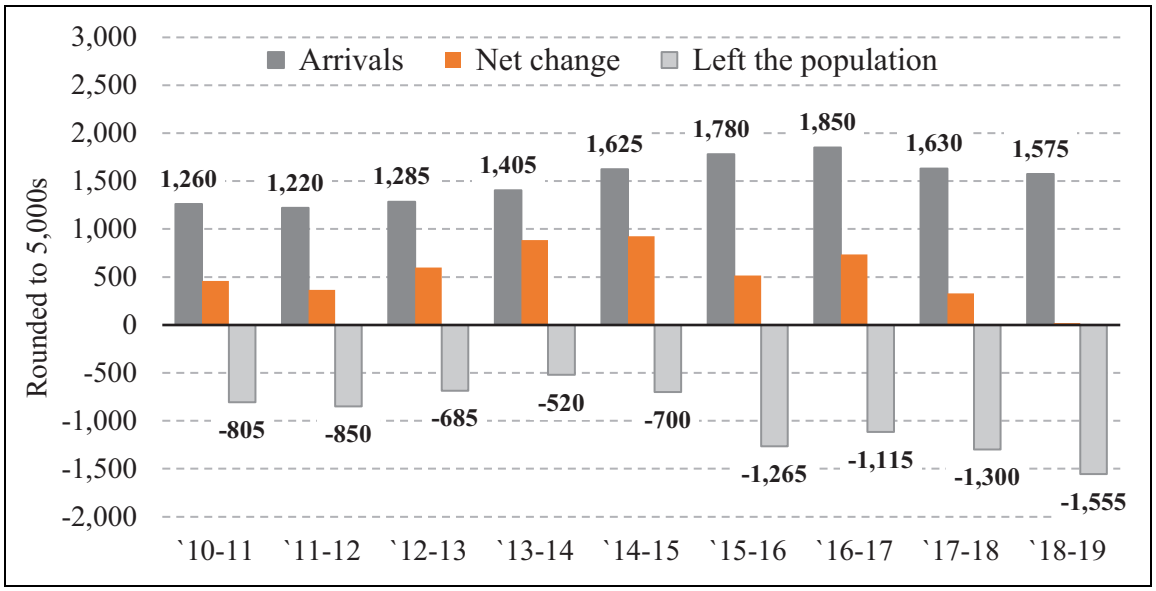

Figure 5. Total Foreign-Born Arrivals, Net Change, and the Number That Left the Population: 2010 to 2019.

largely due to a steep drop in foreign-born immigration" (Andrew 2019).

The analysis of ACS data presented here suggests that "a steep drop in foreign-born immigration" was not the primary reason why foreign-born population growth fell to nearly zero by 2019. Instead, the drop was caused by increasing numbers leaving the population after 2015. Figure 5 shows annual arrivals, net change in the population, and the number that left the population annually from 2010 to 2019. All the information in Figure 5 was compiled directly from annual ACS counts.

The increase in foreign-born arrivals from 2010 to 2016, and the subsequent decline to 2019, are the result of typical fluctuations in the US immigration system. The pattern of annual arrivals in Figure 5 is consistent with the following information shown in the DHS *Yearbook of Immigration Statistics 2019* (DHS 2019):

1. The number of immediate relatives of US citizens — spouses, minor children, and parents — admitted by DHS increased by 158,000 from 2013 to 2016, then declined by almost the same amount from 2016 to 2019.
2. The number of temporary workers and students, and family members of both groups, increased from 4.4 million to 5.9 million, or about one-third, from 2010 to 2016, and then admissions remained largely unchanged after 2016.
3. Refugee admissions dropped from 84,988 in fiscal year (FY) 2016 to 29,916 in FY 2019.

In summary, the increase in arrivals from 2010 to 2016 and the subsequent decline to 2019 do not represent a "steep drop in foreign-born immigration," as reported by the Census Bureau. In fact, arrivals from 2017 to 2019 were more than 300,000 higher than they were in the first two years of the decade (Figure 5).

Net immigration of the foreign-born fell to nearly zero in 2019, primarily because the number that left the population increased considerably after 2015 (Figure 5). In the four years after 2015, the number leaving the population averaged about 1.3 million per year compared to about 700,000 annually from 2010 to 2015. If the number leaving the population after 2015 had continued to be 700,000 per year, as it was in 2014–2015, the population would have continued to grow at a constant rate of about 900,000 each year.

Summary and Policy Implications

The estimates for 2019 continue the decade-long decline in the undocumented population. The large numbers returning to Mexico, especially in the past four years, have been primarily responsible for the decline. In 2019, the number of undocumented residents from Mexico who were living in California was almost 1.9 million, or 28 percent, lower than it was in 2010.

Undocumented population growth from Central America and Asia was on the same track from 2010 to 2016 — the population from each area grew by 155,000 during that period. The pattern changed after 2016. By 2019, the population from Asia had almost stopped growing, while the population from Central America had increased by 205,000. The population from El Salvador, Guatemala, and Honduras grew steadily throughout the period, with growth increasing somewhat after 2015. The populations of four of the top five Asian countries — China, Korea, the Philippines, and Vietnam — were lower in 2019 than in 2016. The population from India increased by 110,000 during the 2016 to 2019 period.

The total foreign-born population grew by the smallest amount in a half century, increasing by just 20,000, from 2018 to 2019. Annual growth declined after 2015 because the average number leaving the population in 2015 to 2019 was 1.3 million per year, compared to 700,000 annually from 2010 to 2015. Foreign-born arrivals were more than 300,000 higher at the end of the period than they were at the beginning.

An important finding is that the comprehensive immigration reform bill, S744, passed by the US Senate in June 2013, did not cause an increase in undocumented immigration from Mexico. Instead, return migration fell by about half during the period that the bill was under active consideration. The finding that proposed legalization programs do not increase undocumented migration provides support for legalization proposals forthcoming from the Biden administration.

The large and growing numbers leaving the US foreign-born population provide strong support for renewed consideration of an important policy change — reissuing visas of those that emigrate to reduce backlogs for immigrant visas and speed up family reunification. Kerwin and Warren (2017) noted, citing Warren and Kraly (1985), that "[r]ecognizing and measuring the emigration of former U.S. immigrants would allow U.S. immigration policy to become more flexible and responsive to changing circumstances." If this proposal had been adopted as part of the Immigration and Control Act of 1986 (IRCA), a total of 6.5 million visas would have been available from 1987 to 2017. As Warren and Kraly noted, these visas could have been used for emergency situations, as well as to speed up the reunification of families already in the United States. As a result, the undocumented population would be far smaller today, possibly only one-half of its current size. Tracking emigration and reissuing visas would add flexibility to US immigration policy and add an important tool for managing immigration-related crises and reducing backlogs.

Appendix

Computing Annual Arrivals, Net Change, and Number That Left the Population

Annual Arrivals

Table A1 illustrates the method that the CMS used to estimate the number of arrivals each year (July to June). In the ACS, the data for year of arrival are collected throughout calendar years (see columns 1 and 3 in Table A1). In this report, population data are for July 1 of each year, and the components of population change (entries in this example) are for July through June. As shown in columns 4 and 5 of Table A1, we selected the relevant portion of the data collected in the 2010 and 2011 ACS to estimate the total number that arrived from July 2010 through June 2011. This method was used to estimate arrivals for each year.

Net Change

In this report, net change for a year is computed as the difference between the population in a year minus the population in the previous year. In other words, it is the change in the population from year to year.

Number That Left the Population

The number that "left the population" in a year is computed as net change minus arrivals. Essentially, the term refers to the number that was in the population at the beginning of a year and was no longer in the population at the end of the year. The number that left the population includes different components for the foreign-born population and undocumented population.

- For the total foreign-born population, "left the population" includes voluntary emigration from the United States, removal by DHS, and death.
- For the undocumented population, "left the population" includes voluntary emigration from the United States, removal by DHS, death, and adjustment of status in the United States.

Table A1. Method Used to Estimate Arrivals to the Total Foreign-Born Population for July 2010 through June 2011.

Year of ACS	Year of Arrival in ACS Data (1)	ACS Data (2)	Entry Period Covered by ACS Data in Column 2 (3)	Data Needed to Estimate Arrivals for July 2010–June 2011 (4)	Arrived July 2010–June 2011 (5) = (2) / 2.0
2010	CY 2010	695,437	January–December 2010	July–December 2010	347,719
2011	CY 2010	1,156,565	January–December 2010	July–December 2010	578,283
2011	CY 2011	672,711	January–December 2011	January–June 2011	336,356

Note: The total number that entered from July 2010 through June 2011 is the sum of the numbers in column 5, which is 1,262,358. That figure, rounded to 5,000s, is shown for 10–11 in Figure 5. ACS: American Community Survey; CY: calendar year.
Source: Center for Migration Studies.

Approximations of Adjustments to Legal Status, Removals by DHS, and Deaths for the Undocumented Population from Mexico, 2010 to 2019

As noted in the text, information about removals by DHS, adjustments to legal status, and deaths is not adequate to derive precise estimates of these components of change. The data in columns 3, 4, and 5 of Table A2 are, however, reasonably good approximations of these components for Mexico from 2010 to 2019. The methods and sources of these estimates are described below.

The purpose of compiling these approximations was twofold: (1) to give a sense of how many undocumented residents from Mexico emigrated voluntarily; and (2) to illustrate that removals, adjustments, and deaths occurred evenly during this period, and thus the pattern observed in column 2 — the low numbers for 2012 to 2013 compared to the adjacent pairs of years, and the relatively larger figures from 2016 to 2019 — was the result of voluntary returns to Mexico rather than, for example, an increase in DHS enforcement actions. Of course, it is possible that emigration increased partly because the enforcement system made life more threatening and untenable for immigrants.

Removals by DHS

Annual statistics on removals, by country of origin, are available from DHS. They overstate the numbers of residents (comparable to the ACS data), however, because they include removals of undocumented migrants that have arrived recently and thus are not included in the ACS data. The figures shown in column 3 of Table A2 are: annual DHS data on removals of noncriminal aliens × .42. The .42 figure is based on statistics compiled in the 1990s by the former US Immigration and Naturalization Service (INS); it was derived as: the number of removals that had a US residence / total removals. Data for removals that have a US residence, and thus are likely to be counted in the ACS, are no longer available.

Adjustments to Legal Status

Adjustments to legal status are based on unpublished DHS data on adjustments of status by country of birth and year of last arrival. The data are not differentiated by legal status at adjustment. The figures shown in column 5 of Table A2, adjustments to legal status of undocumented immigrants from Mexico, were computed by summing the number that had resided in the United States for seven years or more before adjusting status.

Deaths

The annual numbers of deaths are based on the age distribution of the undocumented population from Mexico and age-specific survival rates. The annual crude death rate was 4.1 per 1,000 total undocumented people from Mexico.

CMS Methodology for Estimating the Undocumented Population

Step 1: Deriving US Estimates of Undocumented Residents Counted in the 2010 ACS

The first step was to derive estimates of the undocumented population counted in the 2010 ACS, by country of origin. The estimate for each country had to fit within two parameters:

1. The total undocumented population counted in the 2010 ACS had to sum to 10,850,000, an estimate published in the *International Migration Review* (IMR) (Warren and Warren 2013).

2. For each country/area, the population counted in the 2010 ACS could not exceed the "edited" population. Edited population, as used here, refers to noncitizens in the ACS that arrived after 1981, minus those judged to be legal residents based on the logical edits.[5]

Within those two parameters, CMS used the residual technique to derive provisional estimates for each of the 146 countries/areas.[6] Next, independent databases were used to refine the individual country estimates. This made the 146 countries/areas sum to 10,850,000 and generated the best empirical relationships between the countries.

After this step was completed, an estimate of undocumented residents counted in the 2010 ACS was available for each of the 146 countries/areas; the sum was 10,850,000, consistent with the Warren and Warren (2013) estimates published in IMR. A more detailed description of the CMS method of estimation for 2010 is provided in Warren (2014).

Step 2: Assigning Legal Status to Respondents in the 2010 ACS

The estimates of the undocumented population described in step 1 were the numerators of a set of ratios (also referred to as selection ratios) used to assign legal status to respondents in the 2010 ACS. The term ratio refers to the undocumented population divided by the "edited" population. The edited population is ACS data for noncitizens that arrived after 1981 minus those assigned legal status based on the logical edits. The ratios for each of the 146 countries/areas were used to randomly select cases from the edited ACS microdata.

Step 3: Deriving Annual Estimates of Undocumented Counted in the ACS, 2011 to 2016

The ratios compiled in step 2 were used, along with annual ACS data, to derive estimates of the undocumented population from each country/area (listed in IPUMS [Integrated Public Use Microdata Series]) for each year from 2011 to 2016. The procedure used each year was straightforward: the edited population from each country/area was multiplied by that country/area's ratio derived for 2010, and the result was randomly selected from the edited population.

Step 4: Updating the Population Estimates, and thus the Selection Ratios, to 2017

The rationale for using the same ratio to derive the estimates from 2011 to 2016 was that the population numbers for 2010, and thus the 2010 ratios, are the cumulative result of legal and undocumented entries throughout the entire 28-year period from 1982 to 2010. If the proportion of undocumented to legal entries in 2011 deviated from that long-term trend, the effect on the ratio, and thus the estimate, would likely be small. Examination of the annual ACS data for noncitizens, and of annual DHS data for legal permanent residents (LPRs) admitted, shows that arrivals and population trends for nearly all countries tend to be stable throughout time. Finally, the (presumably) minor changes that might occur each year in the ratios for each of the 145 countries or areas would offset each other to some extent, producing stable estimates of the total undocumented population throughout time.

The justification in the previous paragraph for using the same country-specific ratios from year to year is likely to be valid in the short run. In the longer term, however, it is important to have an empirically based procedure to validate that assumption, and to update the estimates and therefore the ratios — in this case, after seven years. For the 2017 estimates, the ratios for 116 countries were revised, as needed, based on changes in the estimated legally resident population, derived from DHS administrative data and estimates of deaths and emigration.[7] Table A3 shows how the ratio for Mexico was revised in 2017.

[5] The term "logical edit" refers to the process of examining survey data to identify likely legal residents. For example, respondents were assigned to the legal category if they worked in occupations that generally require legal status, had the characteristics of legal temporary migrants, were immediate relatives of US citizens, received public benefits restricted to legal residents, were from countries where most arrivals would be refugees, or were age 60 or older at entry. "Edited population" refers to ACS data for noncitizens that arrived after 1981, minus likely legal residents.

[6] The countries and areas are those that (1) are listed in IPUMS, and (2) had residents counted in the ACS in 2010.

[7] The population and components for all other countries were so small that any changes in the ratios throughout time would have only a miniscule effect on the estimates.

Table A2. Estimated Number That Left the Undocumented Population from Mexico, by Component of Change, 2010 to 2019 (Rounded to 5,000s).

Year (July–June)	Total That Left the Population (1)	Voluntary Emigration (2) = (1) − sum (3) to (5)	Removed by DHS (3)	Died (4)	Adjusted to Legal Status (5)
Total	3,145	1,580	955	215	395
2018–2019	505	340	90	20	55
2017–2018	300	140	90	20	50
2016–2017	545	385	85	25	50
2015–2016	310	145	100	25	40
2014–2015	395	230	100	25	40
2013–2014	170	−10	115	25	40
2012–2013	160	−35	130	25	40
2011–2012	375	185	125	25	40
2010–2011	385	200	120	25	40

Source: Center for Migration Studies.

As Table A3 shows, the estimated legally resident noncitizen population is the critical component in this method of revising the ratios. Data are readily available for estimating the components of change of this population — items 6 through 10 in Table A3. The likely margin of error for the total legally resident population in 2017 (item 11) is small because the largest components of change (LPRs and naturalizations) are well-measured administrative data.

The selection ratio for Mexico changed from .956 to .945. The revised ratio reduced the 2010-based estimate of the undocumented population from Mexico by 53,000, or 1.0 percent. This decline occurred because the undocumented population from Mexico dropped steadily after 2010, while the legally resident population increased (Table A3). The revised ratios raised the estimated undocumented population for some other countries and reduced the population for other countries. For the total population, the net result of updating the ratios in 2017 was less than 0.5 percent. That is, the updated ratios changed the total population in 2017 by less than 0.5 percent compared to estimates for 2017 derived using the original 2010 ratios.

Overall, this exercise has shown that keeping the ratios constant for seven years introduced little error into estimates for the leading sending countries and for the total estimated undocumented population. The analysis and revisions also show that adequate information is available to make any necessary adjustments.

Step 5: Deriving Annual Estimates of Undocumented Counted in the ACS, 2018 to 2019

The updated ratios compiled in step 4 were used, along with annual ACS data, to derive estimates of the undocumented population from each country/area (listed in IPUMS) for 2018 and 2019. The procedure was straightforward: the edited population from each country/area was multiplied by that country/area's updated ratio for 2017, and the result was randomly selected from the edited population.

Step 6: Adjusting for Undercount of Undocumented Residents in the ACS

The CMS estimates are adjusted for undercount using an approach similar to the one described by Warren and Warren (2013). The procedure is analogous to methods used by the (former) INS to derive estimates for 2000.[8] In both cases, the undercount rate is relatively higher for recent arrivals than for those who have been in the United States the longest. As noted above, in the Warren and Warren estimates, the number counted in the 2010 ACS was 11,850,000, and the population adjusted for undercount was 11,725,000. Within those two constraints, annual undercount rates were derived so that

[8]For the estimation procedure, see: https://www.dhs.gov/sites/default/files/publications/Unauthorized%20Immigrant%20Population%20Estimates%20in%20the%20US%201990%20to202000.pdf.

Table A3. Method Used to Update the Selection Ratio for Mexico from 2010 to 2017 (Numbers in Thousands, Rounded Independently).

1	8,062	2010 ACS count of noncitizens entered, 1982 to 2010
2	6,417	Edited population in 2010 compiled by CMS
3	6,138	CMS estimate of undocumented residents in 2010 ACS
4 = 3 / 2	.956	Selection ratio for 2010
5 = 1 − 3	1,924	Legally resident noncitizen population in 2010
6	1,031	LPRs admitted, 2010–2017, from DHS Yearbook
7	719	Naturalizations, 2010–2017, from DHS Yearbook
8	60	Change in nonimmigrant population, 2010–2017, from DHS estimates
9	85	Deaths @ 6 per 1,000 derived from ACS data and survival rates
10	141	Emigration of legal noncitizens, 2010 to 2017[a]
11 = 5 + 6 − 7 + 8 − 9 − 10	2,069	Legally resident noncitizen population in 2017
12	7,052	2017 ACS count of noncitizens entered, 1982 to 2017
13 = 12 − 11	4,983	Undocumented residents counted in 2017 ACS
14	5,265	Edited population in 2017 compiled by CMS
15 = 13 / 14	.946	Revised ratio for 2017

Note: ACS: American Community Survey; CMS: Center for Migration Studies; DHS: US Department of Homeland Security; LPR: legal permanent resident.

Source: Center for Migration Studies.

a. Annual rate of 1.0%, derived from 2010–2017 ACS data. Method of estimation of emigration rates available on request.

(1) undercount would be highest in the most recent year of entry, and (2) the undercount rate would decline to about 2% in 1982 (the earliest year of entry of undocumented residents).

Specifically, for the 2010 CMS estimates, those that entered in 2010 and 2009 were adjusted for undercount by 13.2 percent and the rate dropped by 7 percent each year, falling to 1.9 percent for those who entered in 1982. Adjustments for undercount were made by re-weighting the microdata by single year of arrival from 1982 to the survey date. The CMS undercount assumptions are generally consistent with undercount rates for the Hispanic male population counted in the ACS as measured by the Census Bureau (Jensen, Bhaskar, and Scopilliti 2015).

Step 7: Plausibility of the Estimates

During the past few years, non-demographers have attempted to estimate the size of the undocumented population in the United States. Their numbers have often been two or three times as large as the approximately 11 million figure accepted by demographers. The outsized numbers[9] are often accompanied by the assertion that undocumented residents are not likely to respond to censuses or surveys, which are the source of data for these and other standard estimates. The validity of the CMS and other similar estimates rests on the adequacy of the adjustments for undercount in the ACS. The comparisons in the next few paragraphs demonstrate conclusively that (1) the CMS adjustments of undercount are statistically sound, and (2) the implausibly large estimates that appear occasionally are based on faulty assumptions.

One way to evaluate the accuracy of the CMS adjustments for undercount in the ACS is to compare the CMS estimates to reliable independent administrative counts of the undocumented population. Two such datasets are available from DHS — the number that applied for Deferred Action for Childhood Arrivals (DACA) and the number of Temporary Protected Status (TPS) beneficiaries, principally from El Salvador, Honduras, and Haiti.

If, in fact, the CMS estimates were too low, the CMS projections of the number that would apply for DACA

[9] An example of implausibly large estimates based on woefully inadequate assumptions was published in *PLoS ONE* in 2018 (Fazel-Zarandi, Feinstein, and Kaplan 2018). A critique of those estimates, titled "The Estimate of 22 Million Undocumented Residents Is Vastly Overstated, for Reasons Described Here" (Warren 2018), is available at https://journals.plos.org/plosone/article/comments?id=10.1371/journal.pone.0201193.

would have been lower than the number that applied. The CMS projection was higher than the number of DACA applicants, about 1.2 million compared to about 800,000 applicants, a difference that would be expected because some who were eligible for DACA did not apply for various reasons.

The number of TPS beneficiaries is especially difficult to estimate because the numbers to be estimated are for specific countries and for specific periods of entry. The DHS data are based on administrative records. For each country, the CMS estimates are higher than the DHS data. The CMS and DHS numbers differ because of sampling variability in the ACS, timing of the estimates (2015 vs. 2017), and other differences in the underlying data. The similarity of these figures, however, provides additional strong support for the overall population size and the adequacy of the CMS adjustments for undercount in the ACS.

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