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REPORT

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Mexican Immigrants: How Many Come? How Many Leave?

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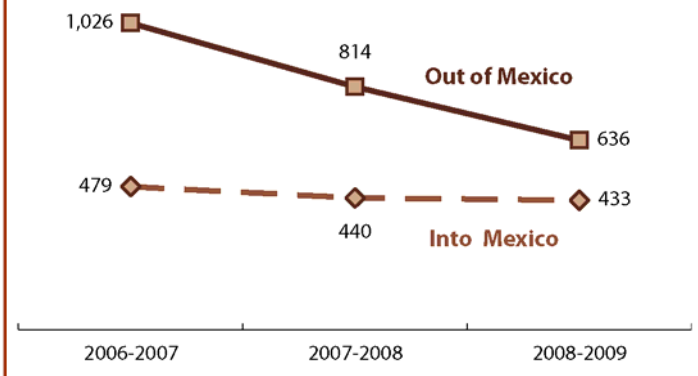
Executive Summary

The flow of immigrants from Mexico to the United States has declined sharply since mid-decade, but there is no evidence of an increase during this period in the number of Mexican-born migrants returning home from the U.S., according to a new analysis by the Pew Hispanic Center of government data from both countries.

The Mexican-born population in the U.S., which had been growing earlier in the decade, was 11.5 million in early 2009. That figure is not significantly different from the 11.6 million Mexican immigrants in 2008 or the 11.2 million in 2007. (Figure A-1)

The current recession has had a harsh impact on employment of Latino immigrants, raising the question of whether an increased number of Mexican-born residents are choosing to return home. This new Hispanic Center analysis finds no support for that hypothesis in government data from the United States or Mexico.

Figure 1
Migration of Mexicans Into and Out of Mexico: Mexican National Survey of Occupation and Employment, 2006-2009
(thousands)



Note: About 97% of Mexicans leaving Mexico go to the U.S., and 93-96% of those returning come from the U.S. See Methodological Appendix. Figures reported are for February to February.
Source: Table 1, based on Mexican government data from Instituto Nacional de Estadística y Geografía (INEGI), Encuesta Nacional de Ocupación y Empleo (ENOE, National Survey of Occupation and Employment).

Mexico is by far the leading country of origin for U.S. immigrants, accounting for a third (32%) of all foreign-born residents and two-thirds (66%) of Hispanic immigrants. The U.S. is the destination for nearly all people who leave Mexico, and about one-in-ten people born there currently lives in the U.S.

Patterns of migration between the U.S. and Mexico are varied. Many immigrants come from Mexico to settle permanently, but large numbers also move both ways across the U.S.-Mexico border throughout the year, sometimes staying for only a few months, a pattern known as circular migration. Mexican-U.S. migration also tends to be seasonal, with larger northbound flows in the spring and summer and larger southbound flows in the fall and winter.

This report examines whether the recent annual volume of movement between the U.S. and Mexico in either direction has gone up or down. It relies on major national population surveys from Mexico and the U.S., as well as on U.S. Border Patrol apprehension figures. No single source presents the full picture of

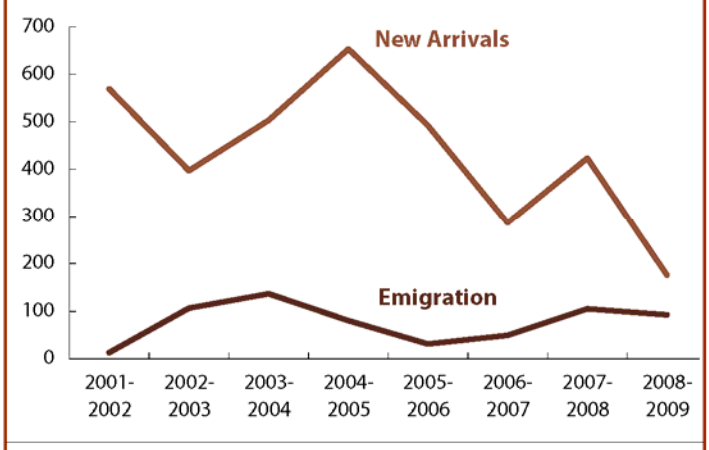
migration flows between the two countries, but the three sources examined here point to similar conclusions.

Data from population surveys taken in the U.S. and Mexico indicate that in recent years there has been a large flow of migrants back to Mexico, but the size of the annual return flow appears to be stable since 2006. Mexico's National Survey of Employment and Occupation estimates that 433,000 Mexican migrants returned home from February 2008 to February 2009. For the same period in 2007-2008, 440,000 did, compared with an estimated 479,000 from February 2006 to February 2007.

As for immigration to the U.S. from Mexico, data from several sources attest to recent substantial decreases in the number of new arrivals.

The inflow began to diminish in mid-decade, and has continued to do so through early 2009, according to an analysis of the latest available population surveys from both countries. This finding is reinforced by data from the U.S. Border Patrol showing that apprehensions of Mexicans attempting to cross illegally into the United States decreased by a third between 2006 and 2008.

Figure 2
Migration of Mexicans Into and Out of the United States: U.S. Current Population Survey, 2000-2009
(thousands)



Note: Estimates based on Mexican-born population entering the United States in 1990 and later. Figures reported are for March to March.
Source: Table 2 from Pew Hispanic Center, based on tabulations of monthly Current Population Surveys with weights modified for consistency with Vintage 2008 population estimates; data for average of January-April. See Methodological Appendix for definitions and details.

Immigration flows from Mexico, like those from other countries, surged in the late 1990s. Immigration flows dropped by 2002 before beginning to grow again in 2004. But the slowdown in immigration after 2006 was such that by 2008, flows were down at least 40% from mid-decade. The change was driven largely by unauthorized immigrants; flows of legal permanent residents have been steady this decade.

The recent downturn in immigration from Mexico has been steep—a conclusion based on data from multiple sources. The evidence on emigration is not as clear-cut, but appears to point to a stable outflow to Mexico. It remains to be seen whether either trend points to a fundamental change in U.S.-Mexico immigration patterns or is a short-term response to heightened border enforcement, the weakened U.S. economy or other forces.

There is no single direct measure of immigrant arrivals. One particular challenge in measuring the influx of Mexicans is that most Mexican immigrants are unauthorized, including 80% to 85% of Mexicans who have been in the U.S. for less than a decade. As for departures, the U.S. does not track emigration, so any U.S. data can be obtained only indirectly. This analysis draws its conclusions from three data sources (for more information on methodology, see Appendix B):

- The Census Bureau's monthly Current Population Survey was used to extract estimates of the size and level of change of the Mexican-born population in the U.S. without regard to legal status. The analysis focused on arrivals since 1990 because this measure offers the most reliable sample for examining current immigration flows**.** This group has leveled off at 7.4 million in 2009 **(**Figure A-2).

- Mexico's National Survey of Employment and Occupation (ENOE, by its Spanish acronym), a household survey, has provided quarterly estimates of migration to and from Mexico since 2006. Nearly all Mexicans who leave the country go to the United States.

- The Department of Homeland Security's Office of Immigration Statistics reports trends in apprehensions by the U.S. Border Patrol. This analysis focuses on apprehensions of people born in Mexico crossing into the United States.

A Note on Terminology

The terms “Hispanic” and “Latino” are used interchangeably in this report, as are the terms “foreign born” and “immigrant.”

About the Authors

Jeffrey S. Passel is a senior demographer at the Pew Hispanic Center. He is a nationally known expert on immigration to the United States and on the demography of racial and ethnic groups. In 2005, Dr. Passel was made a fellow of the American Statistical Association, which cited his outstanding contributions to the measurement of population composition and change. He formerly served as principal research associate at the Urban Institute’s Labor, Human Services and Population Center. From 1987 to 1989, he was assistant chief for population estimates and projections in the Population Division of the U.S. Census Bureau.

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Contents

No Evidence Mexican Immigrants Are Leaving

Recent data from U.S. and Mexican population surveys provide no evidence that an increased number of immigrants have left the United States to return to Mexico since 2006.

Mexico's National Survey of Employment and Occupation, which began in 2006, has released data through the first three months of 2009. It offers data on flows into and out of Mexico. Estimates from the survey are released quarterly.[1]

The survey asks each household in the survey whether any members returned from abroad since the previous quarter. Because migration flow is both seasonal and circular, some of the same people might be counted as outflow in one quarter and inflow in another.

Although there is variation from quarter to quarter, on an annual basis, the number of arrivals home has not increased for any year-to-year period since the Mexican survey began in 2006. From February 2006 to February 2007, an estimated 479,000 Mexicans returned home from other countries, mainly the U.S. For the same period in 2007-2008, 440,000 did. For the 2008-2009 period, 433,000 did.

The Current Population Survey, conducted monthly by the U.S. Census Bureau, includes data on the foreign-born population. While not an ideal vehicle for measuring immigration or

Table 1
International Migration to and from Mexico, by Quarter: February 2006-February 2009

Period	Migration from Mexico	Migration to Mexico	Net Flow from Mexico
Annual Totals -- February to February			
2006-2007	1,026,000	479,000	547,000
2007-2008	814,000	440,000	374,000
2008-2009	636,000	433,000	203,000
1st Quarter -- February to May			
2006	369,000	87,000	282,000
2007	276,000	86,000	191,000
2008	217,000	96,000	121,000
2nd Quarter -- May to August			
2006	266,000	112,000	153,000
2007	234,000	83,000	151,000
2008	155,000	83,000	72,000
3rd Quarter -- August to November			
2006	202,000	138,000	64,000
2007	145,000	150,000	-6,000
2008	127,000	115,000	11,000
4th Quarter -- November to February			
2006-2007	189,000	141,000	48,000
2007-2008	159,000	121,000	38,000
2008-2009	137,000	139,000	-1,000

Note: Figures rounded independently to nearest 1,000.
Source: Mexican government, Instituto Nacional de Estadística y Geografía (INEGI), Encuesta Nacional de Ocupación y Empleo (ENOE, National Survey of Occupation and Employment). Press release, "Informacion Sobre el Flujo Migratorio Internacional de Mexico," June 2, 2009, at http://www.inegi.org.mx/inegi/contenidos/espanol/prensa/comunicados/flujomigratorio.asp.

[1] In the Mexican survey, the first quarter is defined as February to May; the second quarter is May to August; the third quarter is August to November; and the fourth quarter is November to February of the subsequent year. In this analysis, quarterly flow sometimes is abbreviated as the last month of that quarter – e.g., February 2009 for the fourth quarter of 2008.

emigration, the CPS includes data about an immigrant's year of arrival in the U.S. After adjusting the estimates to ensure that all years were consistently weighted, data were extracted for Mexicans who arrived since 1990 to examine changes in the number moving to and from the U.S.

Emigration is estimated by subtracting new arrivals and deaths during the year from the change in the Mexican-born population for that year.[2] These estimates of annual migration flows from the Current Population Survey average slightly less than 100,000 per year for 2001-2008. There is no indication of substantially higher outflows in 2007 or 2008; estimates for these years are close to average.

Another approach to assessing emigration flows is to examine changes over time in the size of arrival-year groups. It is to be expected that the size of each group would decline slowly over time as some immigrants return home and some die (although mortality is relatively low for recently arrived immigrants because they are younger than the overall U.S. population).

Detection of trends is complicated by the random nature of sampling variability in the CPS, but in general, the Pew Hispanic Center analysis finds that there has not been a greater-than-expected decline in the size of arrival-year classes. The one exception is the 2004-2005 entry group, which shows a statistically significant decline between 2008 and 2009.

Table 2
Estimated Annual Components of Change for Mexican-Born Population Entering the U.S. 1990 and Later: Current Population Surveys, 2001-2009, Average of January-April Surveys
(thousands)

SURVEY DATE#	ENTERED 1990 & LATER	COMPONENTS OF CHANGE		
		Population Change	New Arrivals	Emigration
2009	7,369	69	175	93
2008	7,300	307	424	106
2007	6,993	227	287	50
2006	6,767	452	492	31
2005	6,315	564	653	80
2004	5,751	358	503	137
2003	5,393	283	397	107
2002	5,109	550	570	13
2001	4,559	n/a	n/a	n/a

The Annual Components are for the year ending with the first four months of the year. So, "2009" begins with the first quarter of 2008 and ends with the first quarter of 2009.
n/a Not applicable.
Note: The component estimates for 2008-2009 based on additional assumptions. See Methodological Appendix for details.
Source: Pew Hispanic Center tabulations from monthly CPS files. Survey weights adjusted to be consistent with Vintage 2008 population controls. Data for 1996-1997, 2004-2005 and 2006-2009 entry groups are modified to account for response anomalies. See Methodological Appendix for details.

[2] Because emigration is estimated as the difference of two components that are themselves estimated as differences, its variance is a function of the variances of all four components. The resulting standard error can be quite large—in excess of 150,000—compared with the estimate of emigration, meaning that changes in emigration must be even larger to be statistically detectable.

Fewer Mexican Immigrants Are Arriving

Immigration from Mexico to the U.S., especially unauthorized immigration, began to drop off in mid-2006, and that pattern has continued into 2009, according to population surveys in both countries and U.S. enforcement data.

By the period spanning March 2008 to March 2009[3], the estimated annual inflow of immigrants from Mexico—about 175,000 as estimated from the Current Population Survey—was lower than at any point during the decade and only about half of the average for the previous two years (Table 2).

Annual immigration from Mexico has risen and fallen several times during the decade, according to CPS estimates. For example, immigration dropped by about one-third, from 570,000 for March 2000-March 2001 to an estimated 397,000 for March 2002-March 2003. For the three-year period of March 2003-March 2006, Mexican inflows nearly regained their previous levels and averaged about 550,000.[4] Since then, immigration from Mexico has decreased substantially, dropping almost 40% to an annual average of about 350,000 for March 2006-March 2008 and continuing with the sharp decline noted for the most recent year.

Mexico's National Survey of Employment and Occupation (ENOE), which asks questions of each household in its sample about people who departed for other countries, shows a similar pattern. The flow out of Mexico, more than a million for February 2006-February 2007, declined by more than 20% to about 814,000 for the same period in 2007-2008. It decreased by another 20% to about 636,000 for the same period in 2008-2009 (Table 1).

Although the changes over time are similar to those shown in the CPS, the flow levels reported by the Mexican survey are quite a bit higher because the two surveys are not measuring the same group of migrants. The CPS is designed to measure people whose principal residence is in the U.S. and who are settled on a long-term or permanent basis. The Mexican survey, meanwhile, provides estimates for a broader group of migrants. They include Mexicans who come to the U.S. for short periods and may return home within weeks or months. Some

[3] Measures reported here are based on differences in recent arrivals from Mexico as measured by CPS averages of January-April from one year to the next. So the results from January-April 2009 CPS measure immigration from roughly March 1, 2008, to March 1, 2009.

[4] Because of the range of error for individual flow estimates calculated from population differences, the three annual flow estimates for 2003-2004, 2004-2005 and 2005-2006 are not significantly different from one another. Thus, we report based on their average.

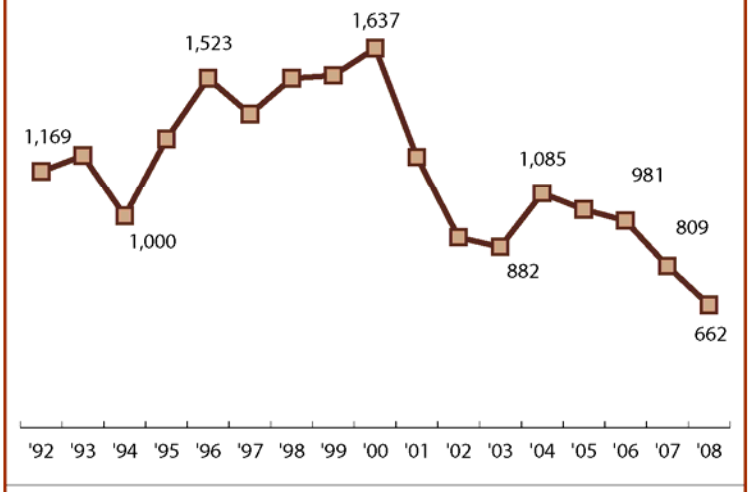
people counted as leaving Mexico in one quarter may be included in the count of returnees in a subsequent quarter. Those "circular" migrants may not appear in the CPS.

ENOE, the Mexican survey, measures migration flows on a quarterly basis, but because migration to and from the U.S. is highly seasonal, it is not appropriate to track quarter-to-quarter changes in the number of Mexicans leaving for the U.S. However, annual data show that number of people leaving Mexico has declined each quarter on a year-to-year basis.

Apprehensions by the U.S. Border Patrol of Mexicans attempting to enter the United States illegally show a pattern very similar to that in the CPS and ENOE data. The number of apprehensions declined by about one-sixth from fiscal 2006 to fiscal 2007 followed by a similar percentage decline in 2008. By fiscal 2008, the number of Mexicans apprehended by the Border Patrol—662,000—was 40% below the mid-decade peak of 1.1 million in 2004.

The total number of apprehensions in 2008—724,000—was at the lowest level since 1973. More than 90% of people detained by the Border Patrol are Mexican.

Figure 3
U.S. Border Patrol Apprehensions of Mexicans: Fiscal Years 1992-2008
(thousands)



Source: Table A-1, Pew Hispanic Center based on Department of Homeland Security (2009)

Apprehensions by the Border Patrol are not a direct measure of immigration for a number of reasons. First, apprehensions include an unknown number of people detained more than once. Second, they represent only the people prevented from entering and not those who are successful. Finally, to some degree the number of apprehensions is a function of how many agents the Border Patrol places at the border and how successful they are at apprehending clandestine border crossers. The Department of Homeland Security, which oversees the Border Patrol, cautions that "the relationship between the number of border apprehensions to either the number of attempted illegal entries or the number of successful illegal entries is not known."

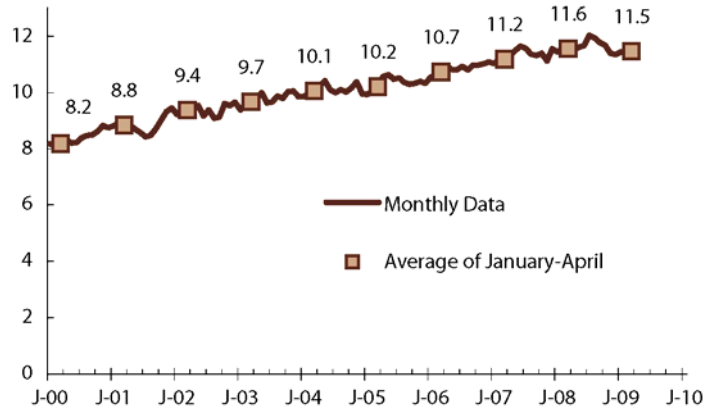
The Border Patrol attempts to stop illegal entries to the U.S. and does not generally apprehend unauthorized immigrants who are leaving the country, so the

data address only inflows to the U.S. Nonetheless, the apprehensions data provide an indicator of the magnitude of the flow across the border that tends to rise and fall with the number of successful entries and with immigration levels. The record year for apprehensions was 1986, just before enactment of the Immigration Reform and Control Act, which allowed several million unauthorized immigrants to legalize their status and instituted stricter enforcement.

These data do not address the reasons for the drop in apprehensions. A Department of Homeland Security fact sheet suggests that the decrease could be due to factors including the weakened U.S. economy as well as stepped-up border enforcement. The threat of being caught could discourage some would-be immigrants from attempting to enter the U.S. Some scholars suggest that stepped-up enforcement also could discourage unauthorized migrants from leaving the U.S. for home visits, because they would risk capture when they tried to re-enter.

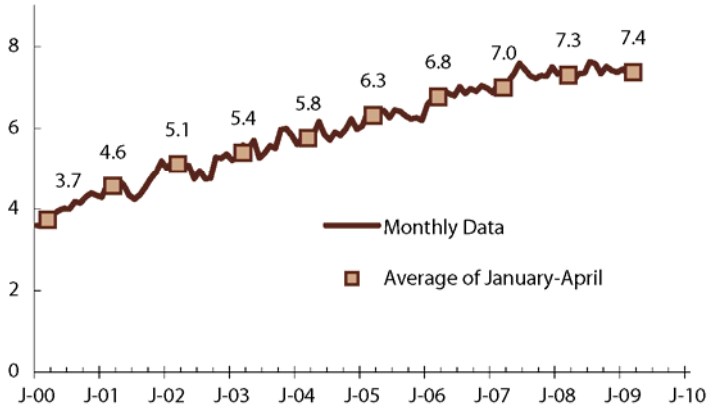
Appendix A: Additional Figures and Table

Figure A-1
Mexican-Born Population of the United States:
Current Population Survey, 2000-2009
(millions)



Source: Pew Hispanic Center tabulations from monthly CPS, January 2000-April 2009.
Weights for 2000-2008 adjusted for consistency with Vintage 2008 population estimates.
See Methodological Appendix for details.

Figure A-2
Mexican-Born Population Entering the U.S 1990 and Later:
Current Population Survey, 2000-2009
(millions)



Source: Pew Hispanic Center tabulations from monthly CPS, January 2000-April 2009.
Weights for 2000-2008 adjusted for consistency with Vintage 2008 population estimates.
See Methodological Appendix for details.

Table A-1
U.S. Border Patrol Apprehensions by Nationality:
Fiscal Years 1992 to 2008

Fiscal Year	Total Apprehensions	Mexican
1992	1,200,000	1,169,000
1993	1,263,000	1,230,000
1994	1,032,000	1,000,000
1995	1,324,000	1,294,000
1996	1,550,000	1,523,000
1997	1,413,000	1,388,000
1998	1,556,000	1,523,000
1999	1,579,000	1,535,000
2000	1,676,000	1,637,000
2001	1,266,000	1,224,000
2002	955,000	918,000
2003	932,000	882,000
2004	1,160,000	1,085,000
2005	1,189,000	1,024,000
2006	1,089,000	981,000
2007	877,000	809,000
2008	724,000	662,000

Note: Fiscal years end Sept. 30. Data for 1992-2004 are current as of Oct. 31, 2007. Data for 2005-2007 as of Nov.-Dec. 2008. Figures rounded to nearest 1,000.

Source: U.S. Department of Homeland Security. Data for 2005-2008 from Nancy Rytina and John Simanski, *Apprehensions by the U.S. Border Patrol: 2005–2008*, June 2009, http://www.dhs.gov/xlibrary/assets/statistics/publications/ois_apprehensions_fs_2005-2008.pdf. Unpublished data for 1992-2004 supplied by Rytina and Simanski.

Appendix B

Methodology: Measuring Immigration Flows

Using the Current Population Survey

The Current Population Survey (CPS), a monthly survey conducted by the Census Bureau for the Bureau of Labor Statistics, is what the U.S. government uses to measure official employment and unemployment trends and levels. The survey, which currently interviews approximately 54,000 households, has included questions on country of birth, citizenship and date of arrival in the U.S. since 1994. With these data, it is possible to monitor changes over time in the foreign-born population from specific countries in period-of-entry groups.

The foreign-born population grows with the addition of new immigrants and is reduced when immigrants already in the country depart (i.e., emigrate) or die. Changes in the size of the foreign-born population reflect the total impact of all three of these processes. Determining how immigration and emigration flows change separately requires further data and assumptions.

Even with the data items collected in the CPS, it is not especially well-designed to measure immigration flows, particularly on an annual basis. Although the CPS asks respondents when they came to live in the U.S., the data publicly available do not provide the most detailed information because responses are grouped into categories of two or more years of entry. As a result, annual inflows must be inferred as differences in the period-of-entry categories across different years. This methodology increases the range of error in the estimated flows, making changes harder to identify. Further, using survey results from multiple years requires consistency over time in weighting, survey coverage and methods. These difficulties are compounded in estimating annual emigration flows because most methods, including the application here, require taking differences of measures that are themselves differences over time (i.e., population change and estimated arrivals).

This Appendix describes the methods used in this report to estimate annual arrivals and departures of Mexican immigrants. Following that is a discussion of adjustments to CPS survey weights required to put the 2000-2009 CPS estimates on a consistent basis, and then a discussion of the sampling error of the resulting estimates. Then, the Appendix has a description of adjustments made to correct for anomalies and possible errors in the underlying data. Finally, there is a brief description of Mexican data sources, principally the Mexican government's National Survey of Employment and Occupation (ENOE), which is used to measure international migration flows out of and into Mexico.

Estimation of New Arrivals and Emigration

Period or Year of Immigration

The CPS collects information from respondents born outside the U.S. about when they "came to live in the U.S." These data, interpreted as "year of entry" or "year of immigration" to the U.S., are released in CPS data files in intervals rather than as exact years. To protect respondent privacy, all intervals must encompass at least two full years. This restriction means that the interval that includes the year of the survey is, of necessity, always at least two full years plus part of a third. Because the Census Bureau defines recent periods of arrival as starting in even-numbered years, the interval for the most recent period of arrival in even-numbered survey years is two full years plus part of the current year: in 2008, 2006-2008; in 2006, 2004-2006; in 2004, 2002-2004; etc. In odd-numbered survey years, the most recent arrival interval is three full years plus part of a fourth. Thus, the most recent intervals are: in 2009, 2006-2009; in 2007, 2004-2007; in 2005, 2002-2005; etc. This grouping occurs because the alternative of starting with an even-numbered year would result in an interval of less than two full years; for example, if the 2009 CPS provided data on 2006-2007 arrivals, the remaining interval of 2008-2009 would be only one full year and part of a second.

This method of grouping years of arrival limits our ability to analyze comparable groups over time. For example, the number of immigrants arriving in the two-year interval 2000-2001 is not available from the CPS until 2004, when the subsequent immigrants can be identified as having arrived in 2002-2004. This limitation shortens the observation interval for period of arrival cohorts and means that if we want to estimate 2000-2001 arrivals with data from before 2004, we must develop an estimate by subtracting survey estimates for consecutive years.

Table B-1 shows CPS data on the number of Mexican immigrants arriving in different periods (based on averages over the four months of January through April in each year). Each column specifies the year in which the data were collected, and the rows specify the year of arrival. The boxes in the table show which periods are identified in the CPS data and how the most recent period of arrival encompasses different arrival years for different survey years. Thus, from the 2007 surveys, we find that 1.339 million Mexicans arrived during 2004-2007; in the 2008 surveys, 890,000 arrived in 2004-2005 and 874,000 in 2006-2008.

Measuring New Arrivals

Because the CPS does not provide a direct measure of immigrants arriving in each year, the measures reported here are developed by examining differences over time in the size of the cohort that arrived most recently. As a result of the definitions of arrival periods, the estimation method is slightly different for even-numbered and odd-numbered survey years. For odd-numbered CPS years, the

estimation of new arrivals is relatively straightforward as the difference of the most recent arrivals from the previous two years; thus,

$$Arr[y,y\text{-}1] = CPS[y]_{y,y\text{-}3} - CPS[y\text{-}1]_{y\text{-}1,y\text{-}3} \quad (1)$$

where $Arr[y,y\text{-}1]$ = Arrivals between March of year *y-1* and March of year *y*;

$CPS[y]_{y,y\text{-}3}$ = CPS data from year *y* on immigrants arriving between years *y-3* and *y*;

$CPS[y\text{-}1]_{y\text{-}1,y\text{-}3}$ = CPS data from year *y-1* on immigrants arriving between years *y-3* and *y-1*.

For the specific example of arrivals between March 2006 and March 2007 using data from Table B-1, we subtract from arrivals in 2004-2007 as estimated from the 2007 CPS (1,339,000) the number of arrivals in 2004-2006 as estimated from the 2006 CPS (1,053,000) to estimate the number of arrivals in March 2006-March 2007 (287,000)[5]; the result is shown in Table 2:[6]

$$Arr[2007,2006] = CPS[2007]_{2007,2004} - CPS[2006]_{2006,2004} \text{ or}$$

$$287{,}000 = 1{,}339{,}000 - 1{,}053{,}000$$

For even-numbered CPS years, it is necessary to include the most recent two arrival groups in the current year for the year-of-arrival groups to align properly; so,

$$Arr[y,y\text{-}1] = CPS[y]_{y,y\text{-}2} + CPS[y]_{y\text{-}3,y\text{-}4} - CPS[y\text{-}1]_{y\text{-}1,y\text{-}4} \quad (2)$$

where $Arr[y,y\text{-}1]$ = Arrivals between March of year *y-1* and March of year *y*;

$CPS[y]_{y,y\text{-}2}$ = CPS data from year *y* on immigrants arriving between years *y-2* and *y*;

$CPS[y]_{y\text{-}3,y\text{-}4}$ = CPS data from year *y* on immigrants arriving between years *y-3* and *y-4*;

$CPS[y\text{-}1]_{y\text{-}1,y\text{-}4}$ = CPS data from year *y-1* on immigrants arriving between years *y-4* and *y-1*.

We illustrate this calculation with the specific example of arrivals between March 2007 and March 2008 using data from Table B-1. We first add arrivals in 2006-2008 as estimated from the 2008 CPS (874,000) and arrivals in 2004-2005 as estimated from the 2008 CPS (890,000) to get an estimate of arrivals in 2004-

[5] Figures rounded separately to nearest 1,000.

[6] The illustrative calculation is from 2007 instead of 2009 because the estimate using 2009 data requires further assumptions.

2008 (1,763,000). From this, we subtract the number of arrivals in 2004-2007 as estimated from the 2007 CPS (1,339,000) to estimate the number of arrivals in March 2007-March 2008 (424,000); the result is shown in Table 2:

$$Arr[2008,2007] = CPS[2008]_{2008,2006} + CPS[2008]_{2005,2004} - CPS[2007]_{2007,2004} \text{ or}$$

$$424{,}000 = 874{,}000 + 890{,}000 - 1{,}339{,}000$$

Because this method employs data from successive years, changes in CPS weighting or coverage would erroneously be incorporated into the estimate of new arrivals. Likewise, any errors in the period-of-arrival data—both sampling and nonsampling—affect the resulting estimate of new arrivals. In most years, the estimate of new arrivals is relatively large compared with the period-of-arrival groups, so sampling error is not a major concern. However, for the period described in this report, 2000-2009, there were a number of changes in CPS weighting procedures and a few anomalies in response patterns that affect the estimates. These issues are discussed later in this Appendix.

For the data shown in Table 2, Equation (1) is used to derive new arrivals for 2008-2009, 2006-2007, 2004-2005, and 2002-2003; Equation (2) is used for new arrivals in 2007-2008, 2005-2006, 2003-2004, and 2001-2002.

Table B-1
Mexican-Born Population by Period of Entry* to United States:
Current Population Surveys, 2001-2009, Average of January-April Surveys
(thousands)

Period of Entry	Survey Year								
	2009	2008	2007	2006	2005	2004	2003	2002	2001
All periods	11,464	11,560	11,183	10,733	10,209	10,057	9,668	9,374	8,844
1990 & Later	7,369	7,300	6,993	6,767	6,315	5,751	5,393	5,109	4,559
2009 2008 2007 2006	952	874	1,339	1,053	1,428	774	1,410	1,012	1,506
2005 2004	699	890							
2003 2002	805	811	815	867					
2001 2000	1,121	1,104	1,235	1,198	1,229	1,138			
1999 1998	1,055	893	987	889	948	1,074	1,155	1,064	
1990-1997	2,737	2,728	2,617	2,760	2,710	2,764	2,828	3,033	3,053
Before 1990	4,095	4,260	4,190	3,966	3,894	4,307	4,276	4,265	4,284

* The CPS reports periods of entry in two-year groups except for the most recent period of arrival, which varies from year to year as either a three-year or four-year period. The boxes in the table show periods covered by the CPS data; for example, in the 2009 CPS, 805,000 Mexicans are estimated to have entered the U.S. in 2002-2003.
Source: Pew Hispanic Center tabulations from monthly CPS files. Survey weights adjusted to be consistent with Vintage 2008 population controls. Data for 1996-1997, 2004-0505 and 2006-2009 entry groups are modified to account for response anomalies. See Methodological Appendix for details.

Estimating Emigration

For the United States, change in the foreign-born population is a function of only three of the four demographic components—immigration, emigration and mortality—because births to immigrants are counted as part of the native population. This relationship enables us to estimate annual emigration (or outmigration) of former immigrants as new arrivals less change in the foreign-born population and deaths to immigrants; or

$$Emig[y,y-1] = Arr[y,y-1] - (FB[y] – FB[y-1]) - Dth[y,y-1] \quad (3)$$

where Emig[y,y-1] = Foreign-born emigration between March of year *y-1* and March of year *y*;

Arr[y,y-1] = Arrivals between March of year *y-1* and March of year *y* as estimated from equations (1) or (2);

FB[y] = CPS data on the foreign-born population in year *y*;

FB[y-1] = CPS data on the foreign-born population in year *y-1*;

Dth[y,y-1] = Foreign-born deaths between March of year *y-1* and March of year *y*.

This equation poses a number of complications when used with CPS data. The major problem is that the estimated number of emigrants tends to be small relative to the size of the foreign-born population, especially in consecutive years. Thus, any errors in measuring the foreign-born population—either sampling or nonsampling—have a disproportionate effect on the measures of emigration. To address this issue, the estimates presented here are based on averages of four monthly CPS for each year—January through April. Using these averages helps to reduce the impact of sampling error on the estimates of the foreign-born population in Equation (3). Further, because there is a seasonal pattern in Mexican migration and in the CPS estimates of the Mexican-born population, using the same four months of each year eliminates that problem.

Another approach to reduce the impact of sampling error on the emigration estimates is to restrict the population by date of arrival. For the Mexican-born population analyzed here, we have restricted the estimates to immigrants who arrived in the U.S. in 1990 and later. Changes in the size of Mexican-born population that entered the U.S. since 1990 largely reflect net immigration, which is dominated by new inflows; this leads to a generally increasing population until the past two years. The post-1990 Mexican population is relatively young and thus not subject to significant mortality. It also can be consistently measured throughout the period analyzed and slightly beyond (i.e., 1996-2009) and is large enough so as not to be subject to relatively large fluctuations from sampling variability. In contrast, the population of Mexican immigrants who entered the U.S. before 1990 has steadily decreased in size over time at a relatively constant

rate. While that group is subject to significant reductions from mortality and receives no additions from new arrivals, it has not shown significant population changes that would indicate shifts in emigration.

Even with this restriction of the population to post-1990 arrivals from Mexico, the estimation of emigration is not without issues. In Equation (3), emigration is estimated as a positive number—representing the number of Mexican-born people moving out of the U.S. There is nothing in the equation, however, to ensure that the estimate is greater than zero. If a negative estimate results, it suggests that there are measurement problems in the other components, either from sampling or nonsampling errors. Initial application of Equation (3) to data from the 2008 and 2009 CPS resulted in a small negative estimate. More detailed examination of the CPS data uncovered some problems in reporting period of arrival for the 1998-1999 entry cohort that led to understatement of the new arrivals. The estimate shown in Table 2 incorporates a correction for this problem (see below).

Similarly, application of Equations (1) and (3) to data from the 2000 and 2001 CPS did not produce interpretable results. Specifically, the measures give a large, and reasonable, estimate of new arrivals in 2000—615,000—larger than in subsequent years. However, coverage problems for cohorts that arrived earlier appear to overstate the amount of population change, leading to a large negative estimate of emigration. Other analyses of data from the American Community Survey (ACS) for 2001-2007 and other data items from the March Supplements to the CPS (Passel and Suro 2005) support the notion that inflows of immigrants, especially from Mexico, were larger in 2000 than in 2001 but not so much larger as to suggest a problem with the new arrival estimate from Equation (1) of 615,000. The main culprit appears to be problems in coverage of earlier arriving immigrants in the 2000 CPS; coverage of some immigrant cohorts in the 2000 CPS seems to have lagged. Thus, we note the high inflows for 2000 but do not use the CPS to estimate emigration for that year.

Equation (3) was used to estimate emigration flows as shown in Table 2 and Figure 2. Mortality estimates for the post-1990 Mexican immigrants ranged from about 5,000 per year for the early years to about 13,000 for later ones.

Weighting Corrections for the CPS, 2001-2008

The Current Population Survey is weighted to agree with monthly population estimates for the civilian, noninstitutional population by age group and sex for race and Hispanic groups with additional estimated totals for state populations. The population estimates, or population control totals, are produced by the Census Bureau. Because these population estimates affect the survey weights and the resulting population figures, they can have a direct bearing on estimates of immigration and emigration based on the methods described here.

At the end of each calendar year, the Census Bureau produces an estimate of the population of the U.S. and states for the middle of that calendar year (July 1). The estimate updates the population enumerated in the previous census using the latest available data on demographic components of change. So, in December 2008, the Census Bureau estimates the U.S. population as of July 1, 2008, by updating the census count of April 1, 2000, and taking into account the number of births over those eight years, the number of deaths, and net international migration since 2000. In the course of producing this estimate, the Census Bureau also produces estimates for each month from May 2000 through June 2008. This series of population estimates is referred to by the Census Bureau as the "Vintage 2008" population estimates. The Census Bureau then uses these estimates as a basis for projecting the population forward through the next calendar year (in this case, 2009). These short-term projections serve as the basis for the CPS weights throughout the calendar year. Thus, the weights for each month of the 2009 CPS are based on the Vintage 2008 population estimates; those for the 2008 CPS on the Vintage 2007 population estimates; etc.

For most years, any changes in the series of population estimates from one vintage to the next are small, reflecting mainly the incorporation of final data on births, deaths and immigration for the preliminary data used the year before. However, in 2007, the Census Bureau made a significant change in the way it measured international migration, leading to a reduction of about 700,000 in the estimated population for 2006 between the Vintage 2006 and Vintage 2007 population estimates (U.S. Bureau of Labor Statistics 2008; U.S. Census Bureau 2008). Although this change represented only about 0.2% of the U.S. population, it was concentrated in the Hispanic and Asian populations because immigration plays such a large role in these groups. The differences were further concentrated in adult age groups so that the impact on the Hispanic population was about 1%, with some age groups being as much as 2% smaller in the Vintage 2007 population estimate than the previous one. As a result, there is a major discontinuity between the CPS results for 2007 and earlier compared with those for 2008 and later.

Then, in 2008, the Census Bureau introduced a further large revision of the immigration data that led to a reduction in the estimated population for 2007 and earlier. These changes mean that CPS population figures, especially for Hispanics and for Hispanic immigrant groups such as Mexican immigrants, cannot be compared across time without taking into account the weighting changes. For example, a change of 2% in the size of the post-1990 entrants in the Mexican-born population for 2007 would mean a difference of about 140,000 in population size. Because Mexican immigration inflows are about 500,000 per year and emigration outflows about 100,000, a change of this magnitude due

entirely to revised population estimates would seriously affect the accuracy of immigration and emigration estimates.

Unfortunately for data users, the Census Bureau rarely reweights the CPS data series to take into account changes in the population estimates across vintages.[7] Reweighting the CPS is a complex process that can be very time-consuming and can only be approximated by data users outside the Census Bureau. However, for each new vintage of population estimates, the Census Bureau does release the entire time series of monthly population estimates from April 2000 through the year when the estimates are used for CPS weights. Thus, it is possible to assess the aggregate difference of the Vintage 2007 and Vintage 2008 revisions from the earlier vintage estimates used to weight the CPS.

Because the Hispanic population (by age and sex) is one of the groups used for CPS weighting and because the Mexican immigrant population is almost entirely Hispanic, differences between the Vintage 2008 population estimates and earlier CPS weights for Hispanics can be used as a basis for approximating what the estimated Mexican immigrant population would have been in each CPS had the entire series been weighted to the Vintage 2008 population estimates. The data used in this report have been modified to take into account differences between the Vintage 2008 population estimates and earlier ones.

The adjustment involved first using the Vintage 2008 population estimates (U.S. Census Bureau 2009) to produce monthly data from May 2000 through December 2008 for the Hispanic civilian, noninstitutional population by sex for 13 age groups[8]. Then, the same population figures were developed from the estimates of previous vintages where available and from the existing monthly CPS files otherwise. The Hispanic population for each earlier vintage used in each month's CPS weighing (for each age-sex group) divided by Hispanic population from the Vintage 2008 population estimate for that month (for each age-sex group) provided a series of adjustment factors to put the entire time series on a comparable weighting basis. For example, the February 2006 CPS was initially weighted to the Vintage 2005 population estimates for February 2006. The ratios of the Vintage 2008 population estimates for February 2006 by age-sex for Hispanics to the Vintage 2005 estimates for February 2006 provide a series of adjustment factors for the publicly available CPS data.

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[7] The Census Bureau issued revised weights for 2000-2002 to incorporate large changes engendered by the replacement of the updated 1990 Census with results from the 2000 Census. Because of the large change between the Vintage 2006 and 2007 estimates noted above, the Census Bureau revised CPS weights for research purposes, but for only one month of data—December 2007.

[8] These 13 age groups—0-4, 5-9, 10-15, 16-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-64 and 65+—are used for coverage controls for Hispanics in the CPS weighting.

Monthly CPS data for January 2000 through April 2009 was tabulated for the Mexican-born population by the 13 age groups, sex, and period of entry. The ratio adjustment factors described above were applied to the monthly series of data for May 2000 through December 2008 to produce the comparable series of population figures shown in Table B-1 and Table 2. Adjustments in the post-1990 Mexican-born population led to reductions of 70,000 to 144,000, or 1.2% to 2.1% for 2003-2008 and smaller modifications for 2000-2002 for the January-April averages shown in Table B-1 and Table 2.

Sampling Error in CPS-Based Immigration Estimates

A number of publications from the Census Bureau (e.g., 2009c) and the Bureau of Labor Statistics (e.g., 2006) provide guidance on estimating standard errors for statistics computed from the CPS. This section discusses how to adapt the CPS methods to the estimates of immigration. Because the immigration estimates use averages across four months of the CPS for each year (January-April), the standard errors of the basic population estimates are smaller than they would be using only a single month of CPS data. However, because there is considerable overlap in the CPS sample from month to month and year to year, the reduction in variance for the four-month average is less than would occur if the sample were expanded by a factor of four. For the U.S. Mexican-born population in a typical year (about 11 million people), the approximate standard error is 120,000 and annual increases of less than roughly 250,000 are not statistically significant. For the Mexican-born population arriving in 1990 or later (about 7 million in recent years), the approximate standard error is 100,000 and annual growth less than 220,000 is not statistically significant.

Because new arrivals are estimated as a function of either two or three period-of-entry groups (Equations 2 and 3), the variance of the estimate is an additive function of the variances of the components. Thus, the standard error of new arrivals is substantially larger than for each of the individual period-of-entry groups. A typical entry cohort has a standard error of about 40,000 in the late 2000s, or a coefficient of variation of about 5%. With this level of sampling error, the standard error of the estimated number of new arrivals in a typical year is in the range of 60,000 to 75,000 (depending on whether two or three components are involved), implying that annual changes of at least 150,000 are required for statistical significance. Fluctuations in the level of immigration from Mexico have been large enough during the 2000s to exceed even this high threshold. Immigration dropped significantly for March 2002 to March 2003 from levels of the previous two years. The decrease lasted for only a year; immigration increased for the three years from March 2003 to March 2006 back to levels roughly equivalent to those of 2000-2001 (Table 2). The next two years, March 2006 to March 2008, showed a significant decrease from the mid-decade level. Finally, for March 2008 to March 2009, the inflow of Mexicans to the U.S. declined

substantially to the point where it was only about one-third of the average inflow earlier in the decade.

The CPS-based estimates of emigration reported here are principally a function of new arrivals and change in the post-1990 Mexican-born population. The variance of an annual estimate of emigration is thus an additive function of the variances of one or two period-of-entry groups from two different survey years and the variances of the post-1990 Mexican-born population from two different survey years. Even though the measures are correlated, the standard errors for the emigration estimates are large relative to the amount of emigration. Typical standard errors for annual estimates of emigration are in a range of 75,000 to 100,000. With standard errors of this size, annual changes in emigration levels would need to exceed roughly 140,000 to be statistically significant. Over the 2001-2009 period, emigration levels averaged less than this amount and year-to-year changes did not approach the value needed for statistical significance.

Issues Affecting Accuracy of Period-of-Entry Data

The annual estimates of immigration and emigration rely heavily on analysis of changes over time in CPS data for Mexican-born immigrants by period of arrival. Any changes in reporting of period of arrival, survey weighting or survey coverage will affect the measurement of immigration unless explicit corrections for such changes are built into the analysis. Adjustments were made to the data, using methods described above, to correct for changes in CPS weighting that have occurred since 2000. Changes in CPS coverage may be affecting the estimates, but the data currently available do not point to substantial shifts nor provide sufficient information to correct for possible shifts in coverage. There are, however, some indications of problems in consistency of reporting for some periods of entry that affect the immigration estimates. This section describes the problems and the adjustments made to the CPS data for 2000-2009.

The number of immigrants in a period-of-entry group should decrease relatively slowly and steadily over time as some of the immigrants die and some leave the country. Because of the way the CPS releases data on period of arrival, we can track changes in the two-year entry cohorts from emigration and mortality only beginning with the survey data collected two years after the interval. Thus, the first complete observation on 1998-1999 entrants comes in the 2002 CPS; prior to that, the 1998-1999 entrants are grouped with either 1996-1997 entrants (in the 1998-1999 CPS) or 2000-2001 entrants (in the 2000-2001 CPS). Departures from the pattern of slow, steady decline can occur because of sampling variability (which would result in increases or decreases), increased levels of mortality or, more importantly, emigration (which would result in larger-than-expected decreases).

What generally should not happen is a sudden increase in the size of a period-of-entry cohort in excess of sampling variability. Such a pattern suggests that there has been misreporting or miscoding of entry dates or that there has been a significant return flow to the U.S. of former immigrants who had left (and that this return flow is concentrated in a particular entry cohort). In some circumstances, the increases in size of established entry cohorts could be considered part of the inflow of new immigrants.

The CPS data on Mexican immigrants for 2000-2009 generally fit the pattern of slow, steady decreases of established entry cohorts, suggesting no major changes in return migration to Mexico. Some exceptions do stand out: (1) the 1996-1997 entry cohort shows a sudden and unexplained increase of about 25% beginning in February 2007 that lasts for about 20 months before the cohort returns to a value in line with earlier trends; (2) the 1998-1999 entry cohort in the 2009 CPS is 20% larger than the year before, a difference of more than three standard errors; and (3) the 2004-2005 entry cohort in 2009 is about 20% smaller than in 2008. The latter can be explained by returns to Mexico by relatively short-term migrants in the U.S. While this pattern does not show up in other cohorts, it is consistent with a pattern of return migration by immigrants who are not well-established in the U.S. Emigration by this cohort constitutes a large fraction of the estimated emigration for 2008-2009 shown in Figure 2 and Table 2.

For February 2007 through August 2008, the 1996-1997 entry cohort is consistently more than three standard errors higher than the trend line traced from January 2000 through January 2007. Put differently, the average size of this entry group for the CPS of February 2007-August 2008 (860,000) is 25% larger than the average over the equivalent period two years earlier (690,000). Beginning with October 2008, the size of the 1996-1997 entry group drops back to levels only slightly above the values found before February 2007, averaging 730,000 for October 2007 through April 2009. Such a large and sustained increase, followed by a sizable drop, cannot be explained simply as random sampling error or weighting issues.

Examination of detailed data from the survey shows that there were almost twice as many individual respondents in selected months of the CPS and selected rotation groups as in the preceding and subsequent months who were coded as entering during this period. A possible explanation is that some of the respondents who were coded as entering the U.S. during 1996-1997 actually entered in 2006-2007 and that the entry date was miscoded.[9] Support for this hypothesis is bolstered by data for the group of immigrants entering in 2006 or later—data that

[9] Survey statisticians at the Census Bureau have been investigating potential explanations for this problem, but limitations of time and data may preclude ever learning what happened.

are only available for January 2008 and later. For the first eight months of 2008, the size of the 1996-1997 entry group averaged 860,000 with little month-to-month variation; for the next eight months (September 2008-April 2009), the average dropped to 740,000—again with little variation. In contrast, the 2006-and-later entry group averaged 730,000 for the first eight months but increased to 860,000 for the next eight months. In other words, the totals for the two groups combined stayed close to an average of 1.6 million for the 16 months. This pattern bolsters the possibility that the "excess" in the 1996-1997 entry group really represents new entrants during 2006-2007.

Another possible, but less likely, explanation could be that a large number of Mexican immigrants who originally entered the U.S. in 1996-1997 had returned to Mexico then came back to the U.S. in February 2007 and stayed for about 20 months. Regardless of which explanation is correct, the sudden excess reporting in the 1996-1997 entry cohort is appropriately re-coded to be treated as "new arrivals" in later years for the purposes of estimating immigration and emigration. To achieve this end with the estimation methods outlined in Equations (1) and (2), the period-of-entry cohort for 1996-1997 was reduced in size and the excess added to the most recent entry group. [10]

The reassignment involved three groups of survey months. First, three linear trends were estimated for the 1996-1997 entry group: (1) a trend for January 2000 through September 2006 was fitted and projected to April 2009; (2) a trend for February 2007 through August 2008 was fitted; and (3) a trend using October 2006-January 2007 and October 2008-April 2009 was fitted. Next, new values for the 1996-1997 entry group were estimated for February 2007-August 2008 by adding the trend estimate from (1) and the residual from (2). For October 2006-January 2007 and September 2008-April 2009, the new estimate was the trend value from (1) and the residual from (3). New values for the most recent arrival group for the CPS of October 2006 and later were obtained by taking the excess of the originally reported value for the 1996-1997 entry group over the revised value and adding it to the original CPS value for the most recent group. The revised figures for each of the two entry groups in each of the surveys for October 2006 through April 2009 were used in all analyses. The averages shown in Table B-1 are based on these revised values.

The group of Mexicans entering in 1998-1999 represents a similar problem for estimating immigration and emigration. After averaging 920,000 to 950,000 for each of the four years of 2005 through 2008, the entry group averaged 1,055,000 for the first four months of 2009. While the degree of excess in the 1998-1999

[10] 2004-2006 entrants for the 2006 CPS; 2004-2007 entrants for the 2007 CPS; 2006-2008 for the 2008 CPS; and 2006-2009 for the 2009 CPS.

cohort for 2009 is not as great as in the case of the 1996-1997 cohort discussed above, this group represents the only cohort in the nine-year data series in which the year-to-year increase[11] in an established cohort year was statistically significant. The case for miscoding in this cohort is not as strong. The unweighted CPS cases for this cohort in 2009 show what appears to be a slight excess (about 5%) over the number of cases in the preceding years. Regardless of the reasons for the excess—misreporting or miscoding of arrival date, return migration to the U.S. of an earlier cohort, or weighting issues—it is appropriate to consider the change as new immigration. This cohort does not have as long a series of misreports or the strong pattern over time that permitted the trend analysis of 1997-1998 entrants. In addition, only one data point needed to be corrected (1998-1999 entrants in the 2009 CPS). Accordingly, a simpler method was used, the excess of the 1998-1999 cohort in the 2009 CPS over its average value for 2004-2008 was treated as new arrivals and added to the estimate obtained from Equation (1). With this modification, the estimate of new arrivals for March 2008 to March 2009 increased from the initial estimate of 79,000 to the value of 175,000 shown in Table 2. Using this new value to estimate emigration yielded the estimate of 93,000 shown in Table 2. Without the modification, the estimate of emigration was -4,000—a logically impossible value.

Mexican Data Sources

Data from Mexico on the number of Mexicans leaving Mexico and the number returning from abroad were obtained from the Mexican government's National Survey of Occupation and Employment, or Encuesta Nacional de Ocupación y Empleo (ENOE). This is a national survey of approximately 120,000 households conducted quarterly by Mexico's version of the Census Bureau, the Instituto Nacional de Estadística, Geografía e Informática (INEGI). The survey uses a multistage stratified sample to provide labor force and socioeconomic data for each of Mexico's states, its large cities, and additional strata subdivided by size of place for smaller areas. ENOE began in the first quarter of 2005 as a successor to the National Survey of Employment, or Encuesta Nacional de Empleo (ENE). Because of transition issues between ENE and ENOE, complete data from ENOE were not used until 2006.

The design of ENOE permits the development of data on demographic dynamics, including births, deaths, internal migration within Mexico and international migration to and from Mexico. The quarterly sample of about 120,000 households is divided into five rotation groups, each containing about 24,000 households. The

[11] "Established" cohorts, or those where the end of the interval is earlier than the CPS used, are supposed to show only significant decreases (from mortality and emigration); increases should result only from random variability and thus should not be statistically significant.

households in a rotation group are each visited five times at three-month intervals; each quarter, one rotation group leaves the sample and is replaced by a new one. At interviews two through five, changes in household structure are noted. If a person is missing from the household, the interviewer asks if the person has moved and where; if a new household member appears, the interviewer asks whether he/she has moved into the household and, if so, from where. Rotation groups 2-5 are weighted separately to provide national and state data on demographic dynamics. The data in Table 1 and Figure 1 on international migration to and from Mexico arise from these ENOE data. (Detailed information on the design and operation of ENOE can be found at INEGI 2007.)

ENOE identifies international migrants but does not collect information on the country of destination for out-migrants or the country of origin of in-migrants. Mexican demographers (Galindo and Ramos 2009) have used multiple data sources—various Mexican surveys, U.S. Census data, and U.S. survey data including the CPS—to estimate what proportion of emigrants from Mexico go to the United States and what share of international migrants to Mexico come from the United States. From eight data sources, the authors estimate that 97% of international migrants leaving Mexico go to the United States; for migrants returning to Mexico, they estimate that 93-96% come from the United States.

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