

Research on Estimating International Migration of the Foreign-Born Population in the Census Bureau's Population Estimates Program

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Outline

- Cohort component method
- Foreign-born immigration
- Foreign-born emigration
- Potential impact of method changes on net international migration estimates

Cohort Component Method

National, state, and county estimates are produced using the cohort-component method

$$\begin{aligned} \text{Population (Time 2)} &= \text{Census 2010 (Estimates Base)} + \text{Births (Census 2010} \rightarrow \text{Time 2)} - \text{Deaths (Census 2010} \rightarrow \text{Time 2)} \\ &+ \text{Net Migration (Census 2010} \rightarrow \text{Time 2)} \\ &\quad (\text{International Migration} + \text{Domestic Migration (subnational level)}) \end{aligned}$$

Net International Migration (NIM) =

$$\begin{aligned} \text{Foreign-Born Immigration} - \text{Foreign-Born Emigration} &+ \text{Net Puerto Rico Migration} + \text{Net Native-Born Migration} + \text{Net Armed Forces Movement} \end{aligned}$$



Foreign-Born Immigration

- We use annual data from the American Community Survey (ACS) to develop estimates of foreign-born immigration
- Indicators of foreign-born immigration in the ACS
 - Citizenship
 - Residence One Year Ago (ROYA)
 - Year of Entry (YOE)
 - Place of birth

ACS Citizenship, ROYA, YOE, & POB Questions

Place of Birth (POB) →

Citizenship →

Year of Entry (YOE) →

Residence One Year Ago (ROYA) ←

Person 1

→ Please copy the name of Person 1 from page 2, then continue answering questions below.

Last Name

First Name MI

7 Where was this person born?

In the United States – Print name of state.

Outside the United States – Print name of foreign country, or Puerto Rico, Guam, etc.

8 Is this person a citizen of the United States?

Yes, born in the United States → SKIP to 10a

Yes, born in Puerto Rico, Guam, the U.S. Virgin Islands, or Northern Marianas

Yes, born abroad of U.S. citizen parent or parents

Yes, U.S. citizen by naturalization – Print year of naturalization

No, not a U.S. citizen

9 When did this person come to live in the United States? Print numbers in boxes.

Year

10 a. At any time IN THE LAST 3 MONTHS, has this person attended school or college? Include only nursery or preschool, kindergarten, elementary school, home school, and schooling which leads to a high school diploma or a college degree.

No, has not attended in the last 3 months → SKIP to question 11

Yes, public school, public college

Yes, private school, private college, home school

b. What grade or level was this person attending? Mark (X) ONE box.

Nursery school, preschool

Kindergarten

Grade 1 through 12 – Specify grade 1 – 12

College undergraduate years (freshman to senior)

Graduate or professional school beyond a bachelor's degree (for example: MA or PhD program, or medical or law school)

11 What is the highest degree or level of school this person has COMPLETED? Mark (X) ONE box. If currently enrolled, mark the previous grade or highest degree received.

NO SCHOOLING COMPLETED

No schooling completed

NURSERY OR PRESCHOOL THROUGH GRADE 12

Nursery school

Kindergarten

Grade 1 through 11 – Specify grade 1 – 11

12th grade – NO DIPLOMA

HIGH SCHOOL GRADUATE

Regular high school diploma

GED or alternative credential

COLLEGE OR SOME COLLEGE

Some college credit, but less than 1 year of college credit

1 or more years of college credit, no degree

Associate's degree (for example: AA, AS)

Bachelor's degree (for example: BA, BS)

AFTER BACHELOR'S DEGREE

Master's degree (for example: MA, MS, MEng, MEd, MSW, MBA)

Professional degree beyond a bachelor's degree (for example: MD, DDS, DVM, LLB, JD)

Doctorate degree (for example: PhD, EdD)

Answer question 12 if this person has a bachelor's degree or higher. Otherwise, SKIP to question 13.

12 This question focuses on this person's BACHELOR'S DEGREE. Please print below the specific major(s) of any BACHELOR'S DEGREES this person has received. (For example: chemical engineering, elementary teacher education, organizational psychology)

13 What is this person's ancestry or ethnic origin?

(For example: Italian, Jamaican, African Am., Cambodian, Cape Verdean, Norwegian, Dominican, French Canadian, Haitian, Korean, Lebanese, Polish, Nigerian, Mexican, Taiwanese, Ukrainian, and so on.)

14 a. Does this person speak a language other than English at home?

Yes

No → SKIP to question 15a

b. What is this language?

(For example: Korean, Italian, Spanish, Vietnamese)

c. How well does this person speak English?

Very well

Well

Not well

Not at all

15 a. Did this person live in this house or apartment 1 year ago?

Person is under 1 year old → SKIP to question 16

Yes, this house → SKIP to question 16

No, outside the United States and Puerto Rico – Print name of foreign country, or U.S. Virgin Islands, Guam, etc., below; then SKIP to question 16

No, different house in the United States or Puerto Rico

b. Where did this person live 1 year ago?

Address (Number and street name)

Name of city, town, or post office

Name of U.S. county or municipio in Puerto Rico

Name of U.S. state or Puerto Rico ZIP Code

Foreign-Born Immigration

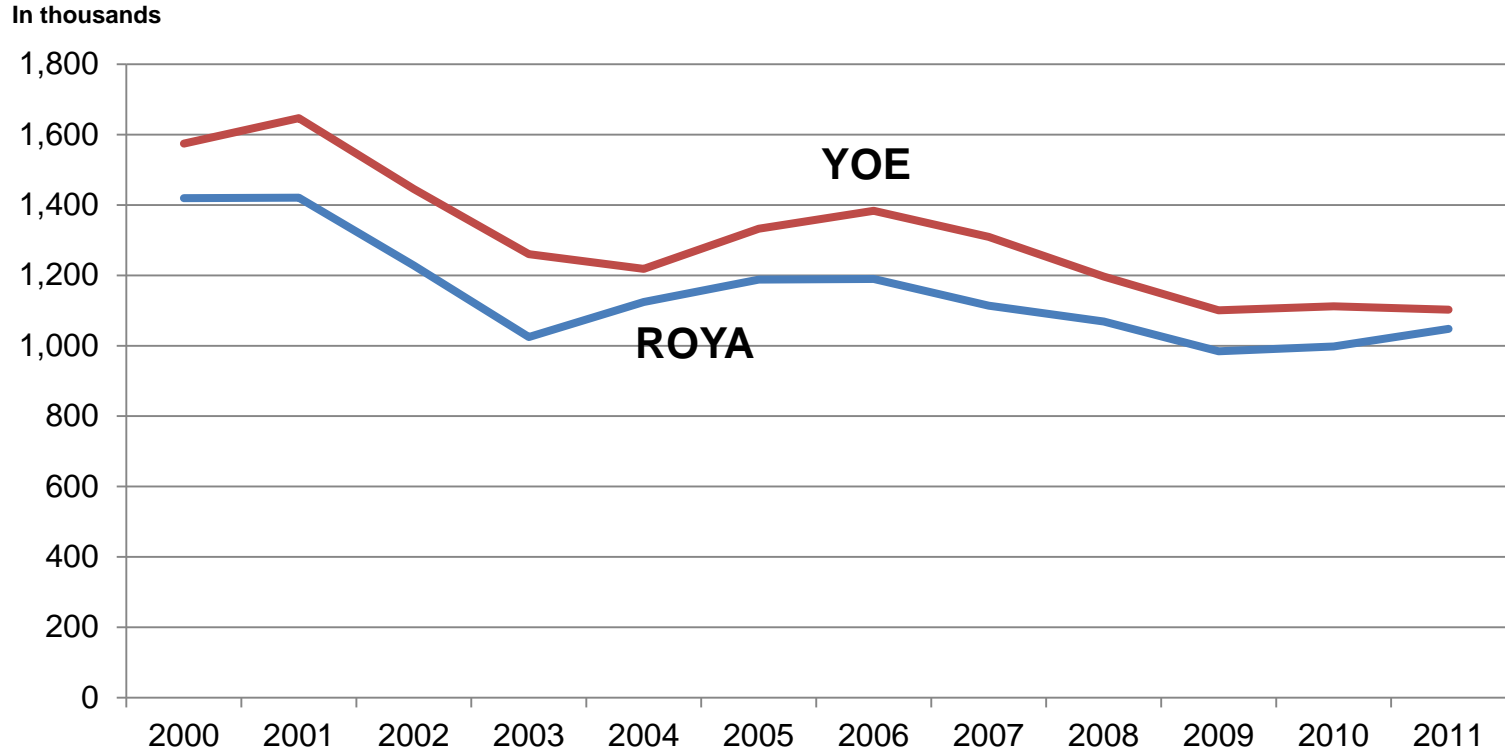
- Current Method
 - National totals
 - Residence One Year Ago (ROYA)
 - Foreign-born immigration is measured as the foreign-born population whose residence one year ago was abroad
 - 0-year old population = $\frac{1}{2}$ of the 1-year old population
 - Geographic and demographic characteristics
 - Year of Entry (YOE)
 - Foreign-born population whose year of entry was within the past 5 years
 - Age is adjusted to represent age at arrival
 - 3-year ACS file for state
 - 5-year ACS file for county



Foreign-Born Immigration

- Evaluation of the ROYA method
 - Method has been criticized for underestimating immigration
 - In our research, Year-of-Entry-based method and Change-in-Stock method produce slightly higher estimates
 - Year-of-entry based method has a different demographic composition

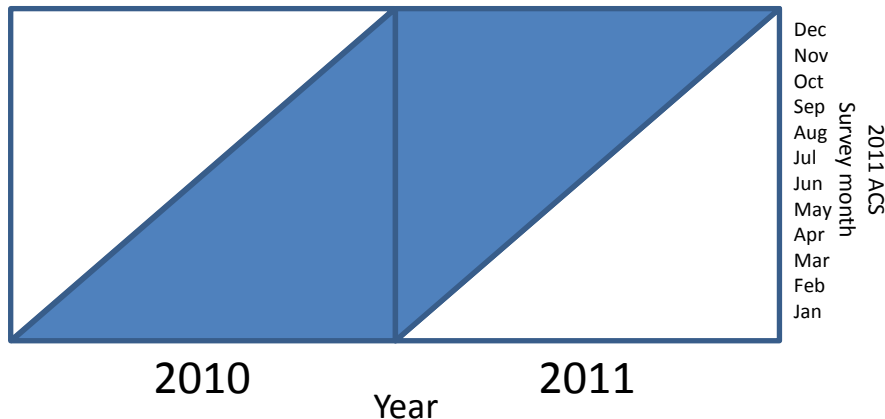
Residence One Year Ago (ROYA) and Year of Entry (YOE) Estimates of Foreign-Born Immigration: 2000-2011



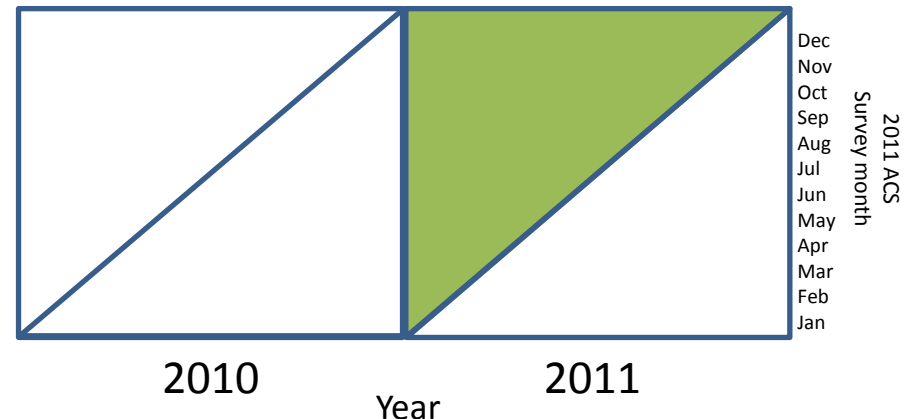
Foreign-Born Immigration

- Combining information from the ROYA and YOE questions
 - “YOE Addition”
 - **Foreign-born population whose year of entry was in the most recent survey year but their residence one year ago was in the United States**
 - Remove cases with an imputed YOE
 - Multiply the YOE Addition by 2 to create a 12-month estimate
 - Estimate of 0-year olds as half of the 1-year old population

ROYA Method



YOE Addition





Foreign-Born Immigration

- Alternative method
 - Estimate the ROYA population
 - Estimate the YOE Addition population
 - Add the ROYA and YOE Addition populations to create the final estimate of foreign-born immigration
 - Use the 3-year and 5-year ACS files to distribute characteristics



Foreign-Born Immigration

- Strengths of alternative method
 - The year of entry question provides additional information about immigration
 - Combines ROYA-based and YOE-based estimates
 - Does not double count
 - Covers the same 12-month time period



Foreign-Born Immigration

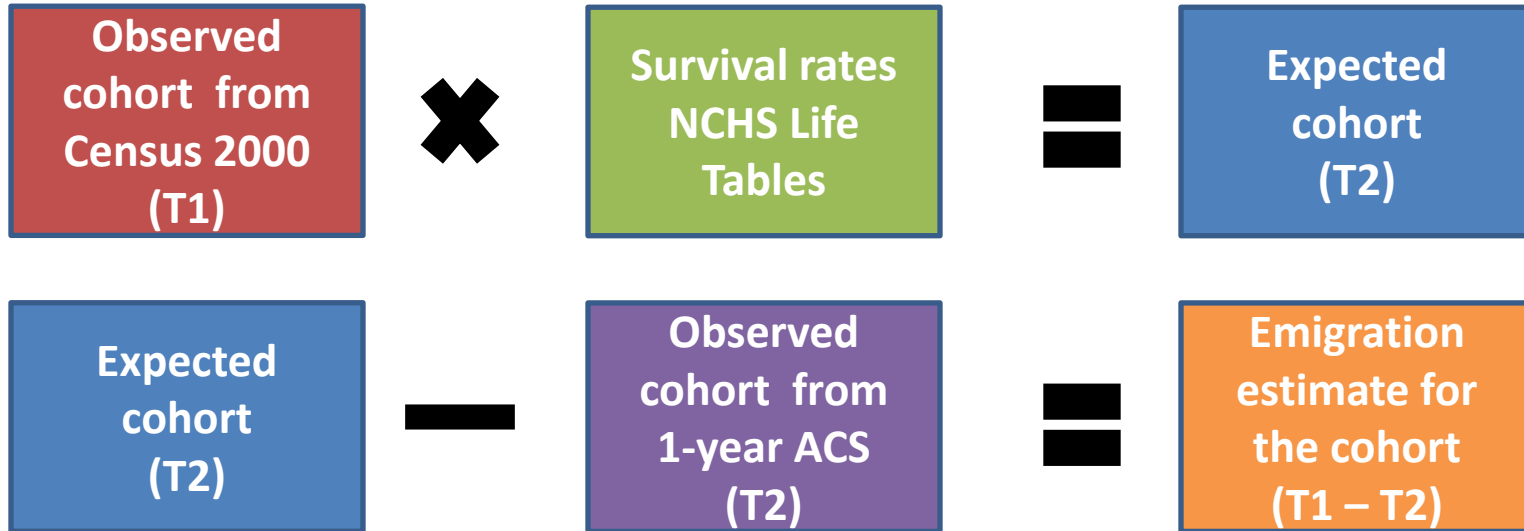
- Limitations of alternative method
 - Less certainty of what question response means for the YOE Addition population
 - Could include respondents that answer the YOE question incorrectly and answer the ROYA question correctly
 - Might not measure the flow of migrants as much as the decision to stay in the United States
 - The YOE Addition may include some migrants that we do not want in the estimate
 - Migrants already in the base population
 - High level of imputation for the year of entry question for the YOE Addition population (36%)



Foreign-Born Emigration

- Current method
 - Census-to-ACS residual method
 - Survival rates from National Center for Health Statistics (NCHS) life tables
 - Place of birth
 - Mexico and Other countries
 - Period of entry cohorts
 - 10 years or less, more than 10 years
 - Calculate 3 residual estimates
 - Develop rates which we average
 - Annualize the estimate and calculate a rate using the mid-period population
 - Apply rates to the at risk population in 1-year ACS files

Foreign-Born Emigration: Residual Method



- Emigration estimate for T1-T2 is converted into an annualized rate
- Rate applied to the population at risk of emigrating (recent 1-year ACS files) to produce emigration estimate

Foreign-Born Emigration

Developing Residual Estimates Using Census 2000 and 3 Single 1-Year ACS Files (Vintage 2012)

Residual	Census 2000		2009 ACS	2010 ACS	2011 ACS
1		→			
2		→			
3		→			



Foreign-Born Emigration

- Alternative method
 - ACS-to-ACS residual method
 - Uses a single 5-year ACS file for T1 and T2
 - Place of birth
 - Mexico and Other countries
 - Period of entry cohorts
 - 10 years or less, more than 10 years
 - Survival rates from NCHS life tables
 - Calculate 6 residual rates which we average
 - Different beginning and end points within the same 5-year ACS file
 - At risk population from a 1-year ACS file

Foreign-Born Emigration

Developing Residual Estimates Using the 2007-2011 5-Year ACS File

Residual	Survey year				
	2007	2008	2009	2010	2011
1	→				
2	→				
3	→				
4		→			
5		→			
6			→		



Foreign-Born Emigration

- Strengths of the alternative method
 - Does not use data from Census 2000
 - Includes post-2000 foreign-born arrivals
 - Estimates are more consistent with external estimates
- Limitations of the alternative method
 - Sampling and non-sampling error in the new method
 - Averaging the rates
 - May still underestimate emigration for the “Other Countries”



Impact of the Changes

- Simulated totals (April 1, 2010 – June 30, 2012)
 - Estimates of foreign-born emigration would increase ($\approx 15\%$)
 - Estimates of foreign-born immigration would increase ($\approx 20\%$)
 - NIM estimates would increase ($\approx 22\%$, but small numeric change relative to the size of the resident population)
 - Overall, very little impact on the resident population
- Characteristics
 - The proxy universes would not change
 - Mexico / Other countries
 - States and counties would see increases
 - Proportional to current state and county distribution
 - The largest increases would be for Asians and Hispanics

Summary

- The Census Bureau continues to improve international migration estimates
- Immigration: Potentially incorporate information from YOE into the existing ROYA-based estimates
- Emigration: Change from a Census-to-ACS residual to an ACS-to-ACS residual

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