

# Estimating Foreign-Born Emigration from the United States Using Data from the American Community Survey

Mark A. Leach  
Eric B. Jensen  
Population Division  
U.S. Census Bureau

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U.S. Department of Commerce  
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# Background

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  - Census Bureau has historically used residual method

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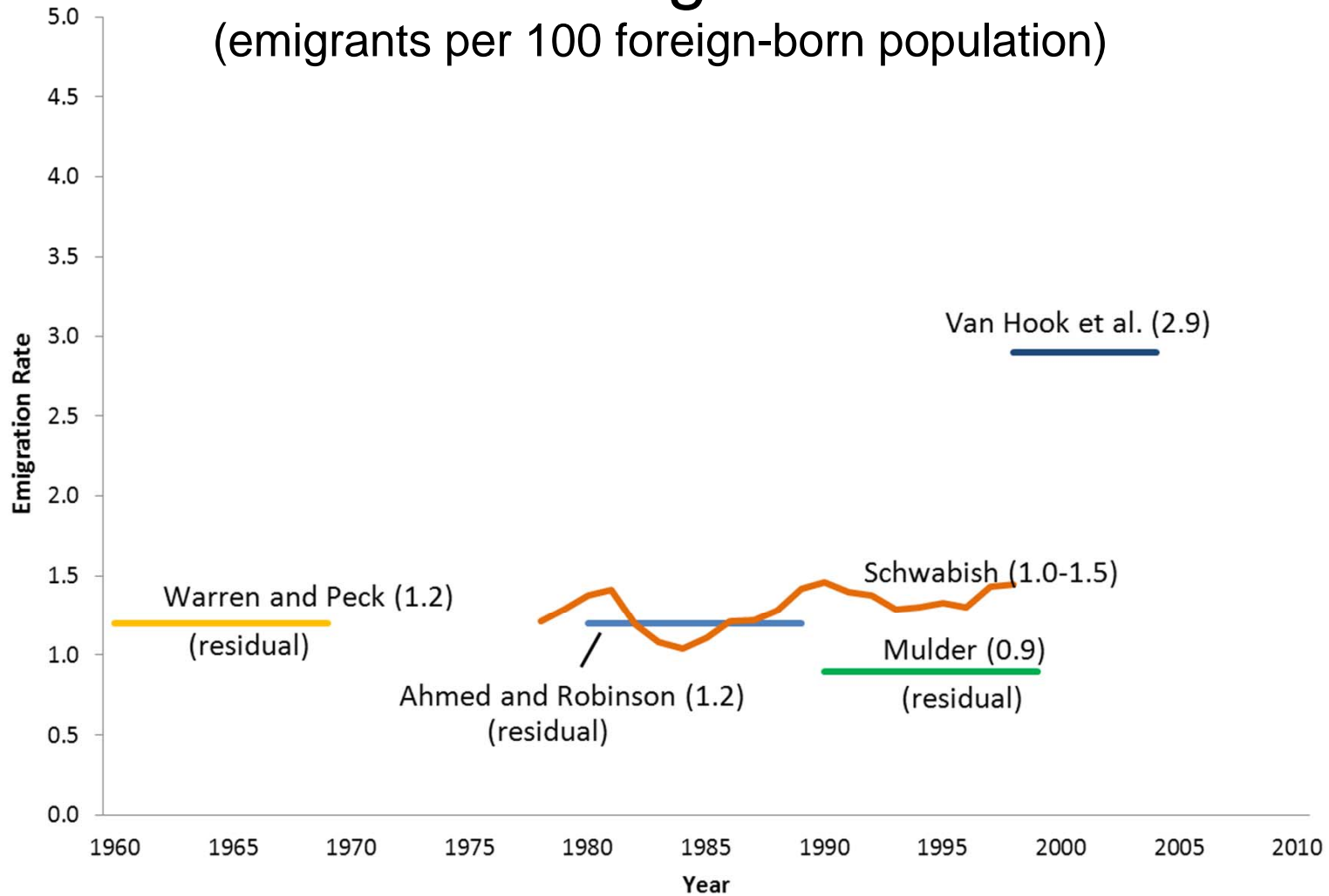
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- Emigration is one of most difficult components of population change to measure
  - Census Bureau has historically used residual method
- Other data sources and methods have led to increased scrutiny of residual method
- Annual data from American Community Survey may address some weaknesses of residual method

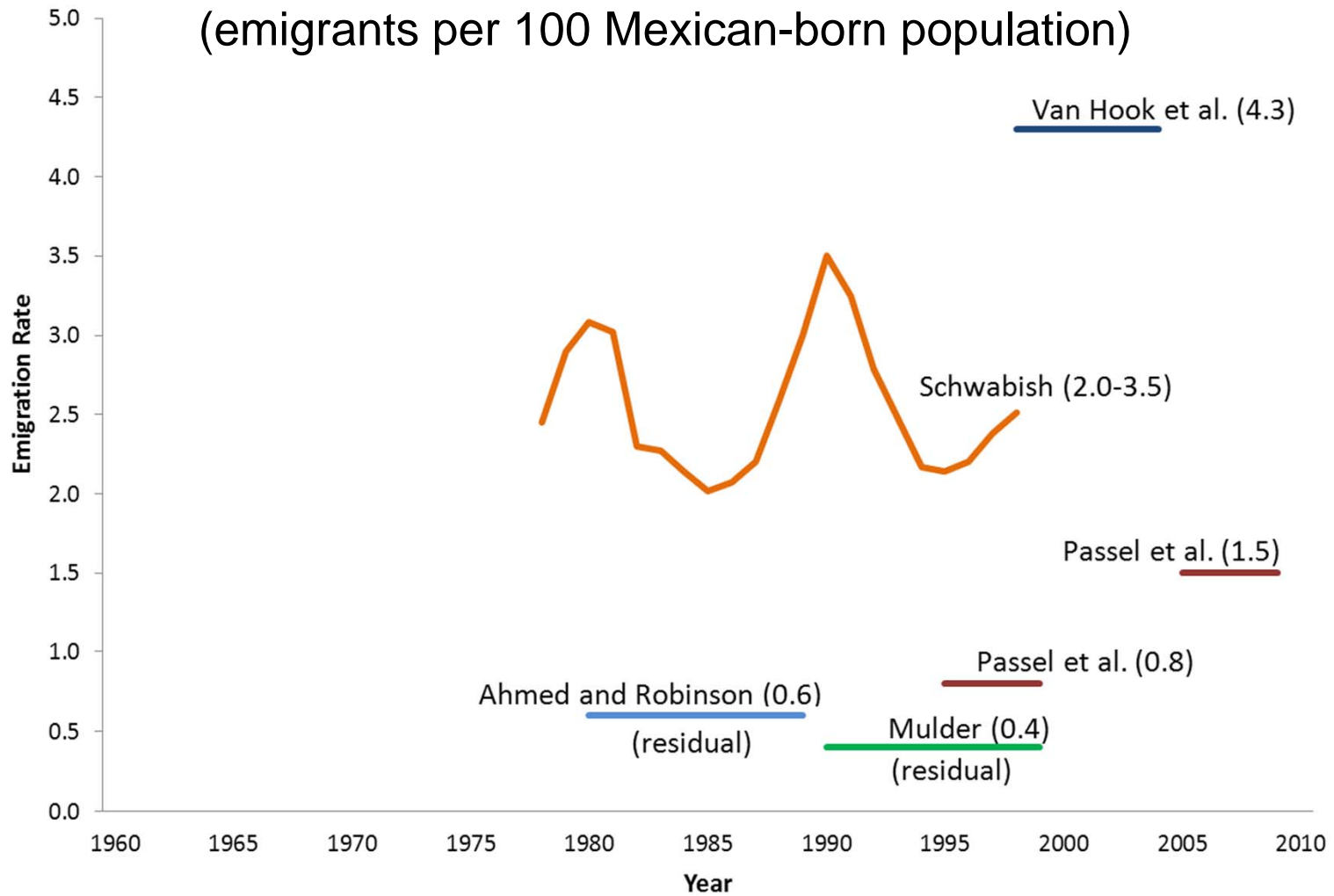
# Estimated Annual Emigration Rates All Foreign Born

(emigrants per 100 foreign-born population)



# Estimated Annual Emigration Rates Mexican Born

(emigrants per 100 Mexican-born population)



# The Residual Method

$$E_{t1-t2} = (P_{t1} - D_{t1-t2}) - P_{t2}$$

$E_{t1-t2}$  is emigration residual

$P_{t1}$  is estimated foreign-born population at time 1

$D_{t1-t2}$  is estimated deaths in foreign-born population

$P_{t2}$  is the estimated foreign-born population at time 2

- excludes immigrant arrivals after time 1

$$\text{Annual Emigration Rate} = E_{t1-t2} / PY_{t1-t2}$$

$PY_{t1-t2}$  is person-years survived in period

# Decennial-to-Decennial Residual

- Strength: most complete estimate of the foreign-born population



# Decennial-to-Decennial Residual

- Strength: most complete estimate of the foreign-born population
- Weakness: 10-year observation horizon
  - Return migration most likely 1-5 years after arrival
  - Not sensitive to variation across decade
  - Likely underestimates annual emigration rate

# The American Community Survey

- Annual survey
  - Sample includes 400,000+ foreign-born observations
- Use 2006-2010 5-year ACS microdata file
  - Person weights controlled to consistent population totals

# Emigration Residuals Using 2006 – 2010 ACS Data

One 4-Year Residual

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2006-2010

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2006

2007

2008

2009

2010

Year

# Emigration Residuals Using 2006 – 2010 ACS Data

One 4-Year Residual



2006-2010

Two 3-Year Residuals



2006-2009

2007-2010

2006

2007

2008

2009

2010

Year

# Emigration Residuals Using 2006 – 2010 ACS Data

One 4-Year Residual



2006-2010

Two 3-Year Residuals



2006-2009

2007-2010

Three 2-Year Residuals



2006-2008

2007-2009

2008-2010

2006

2007

2008

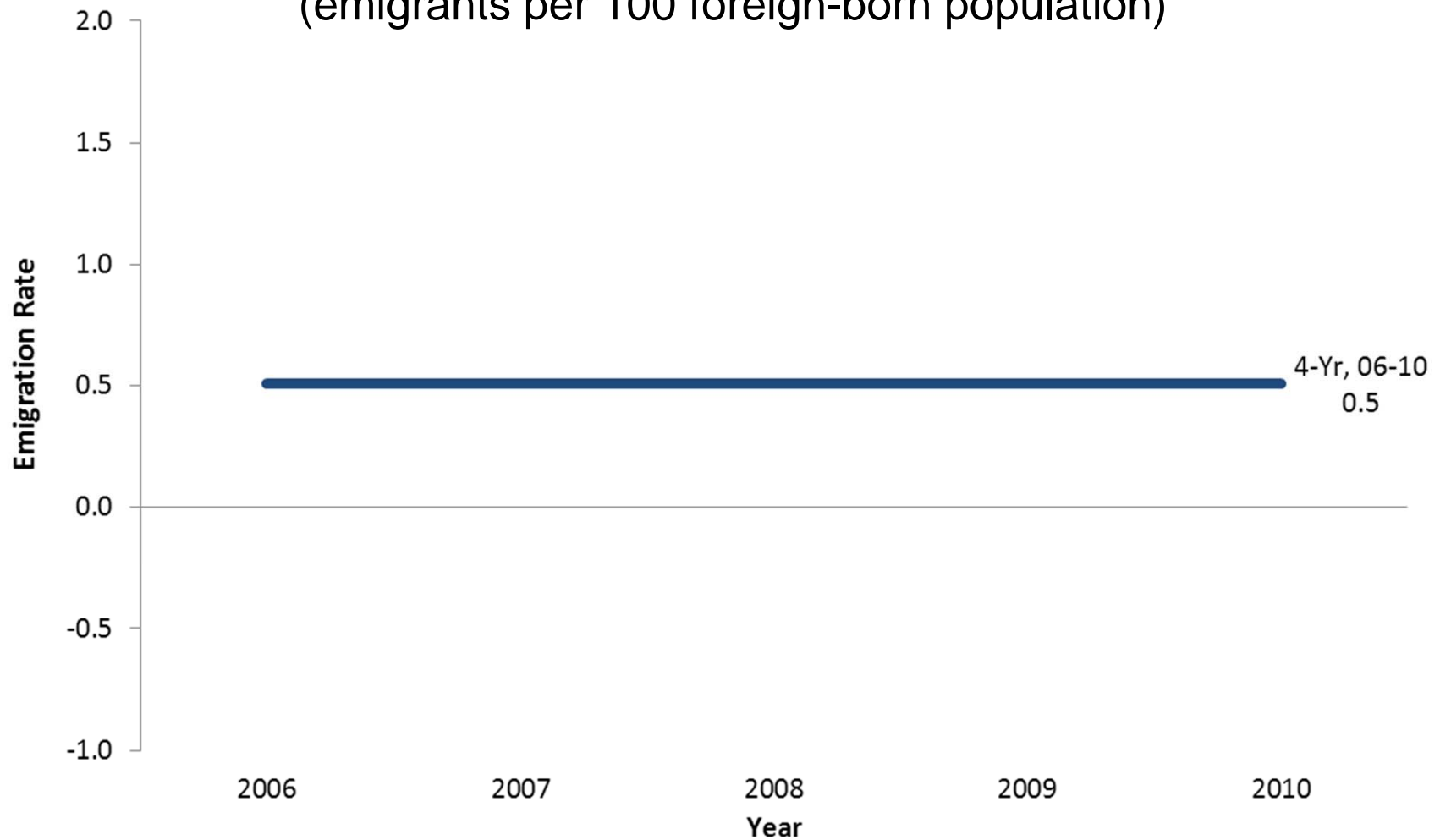
2009

2010

Year

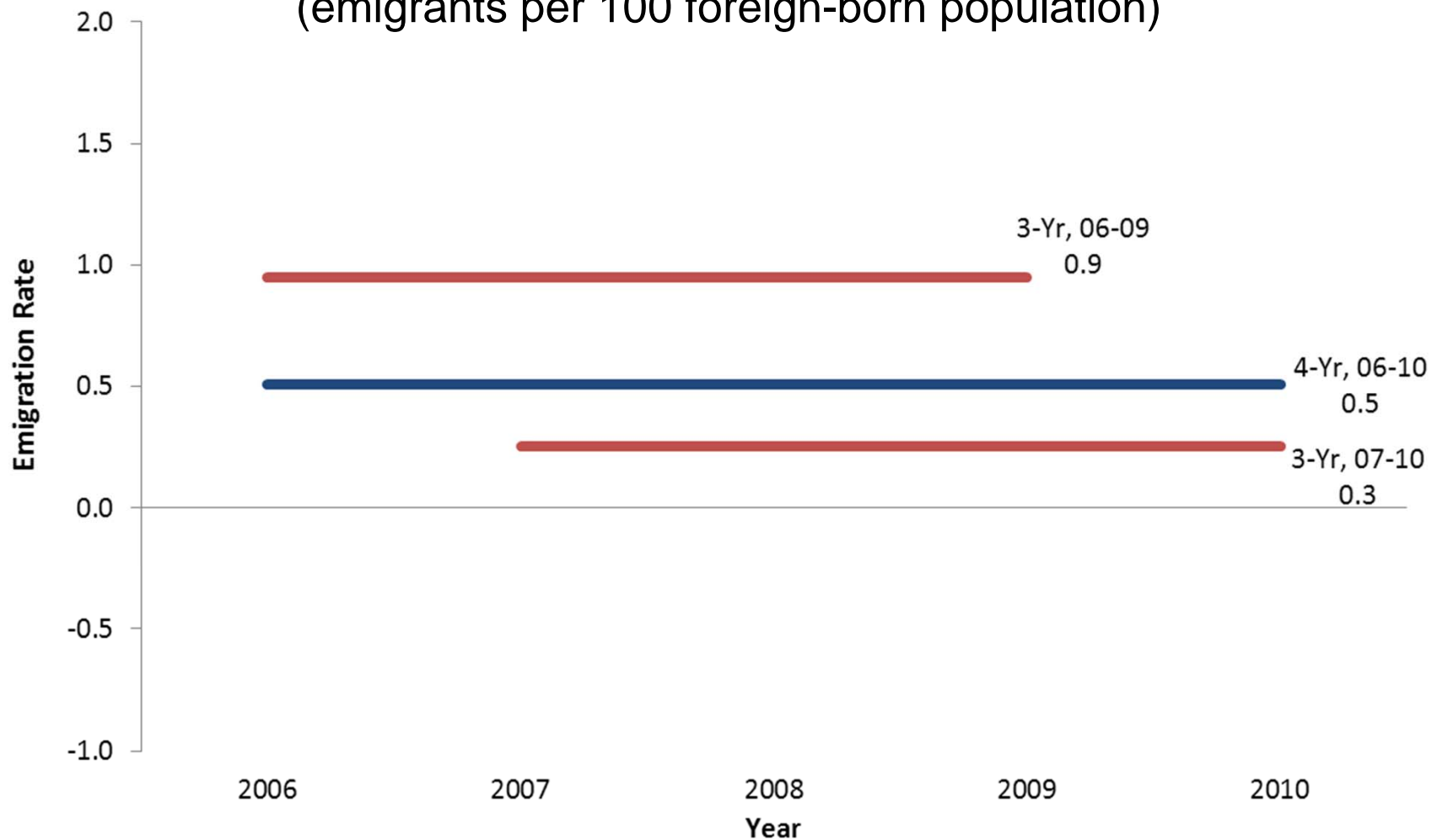
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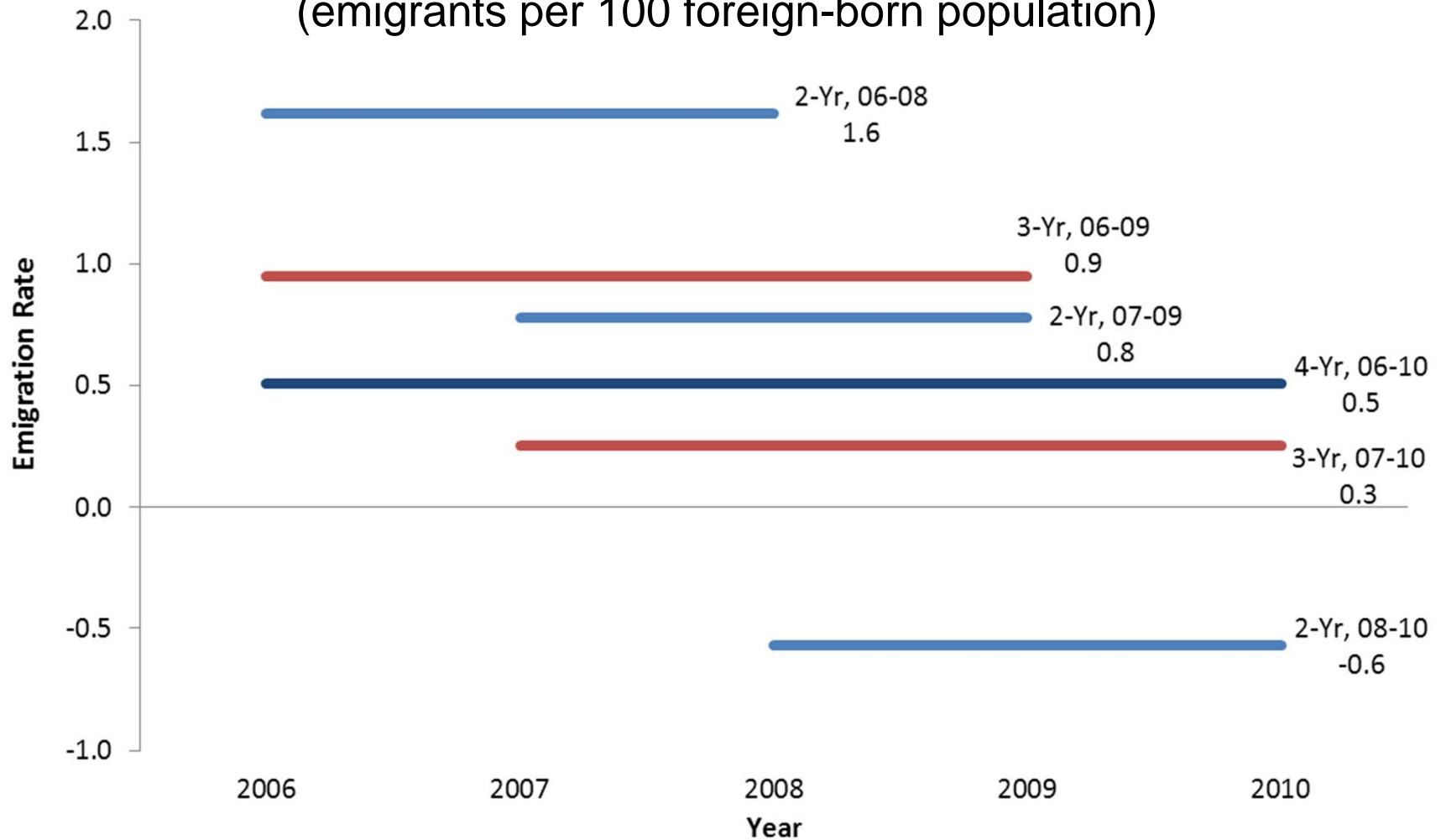
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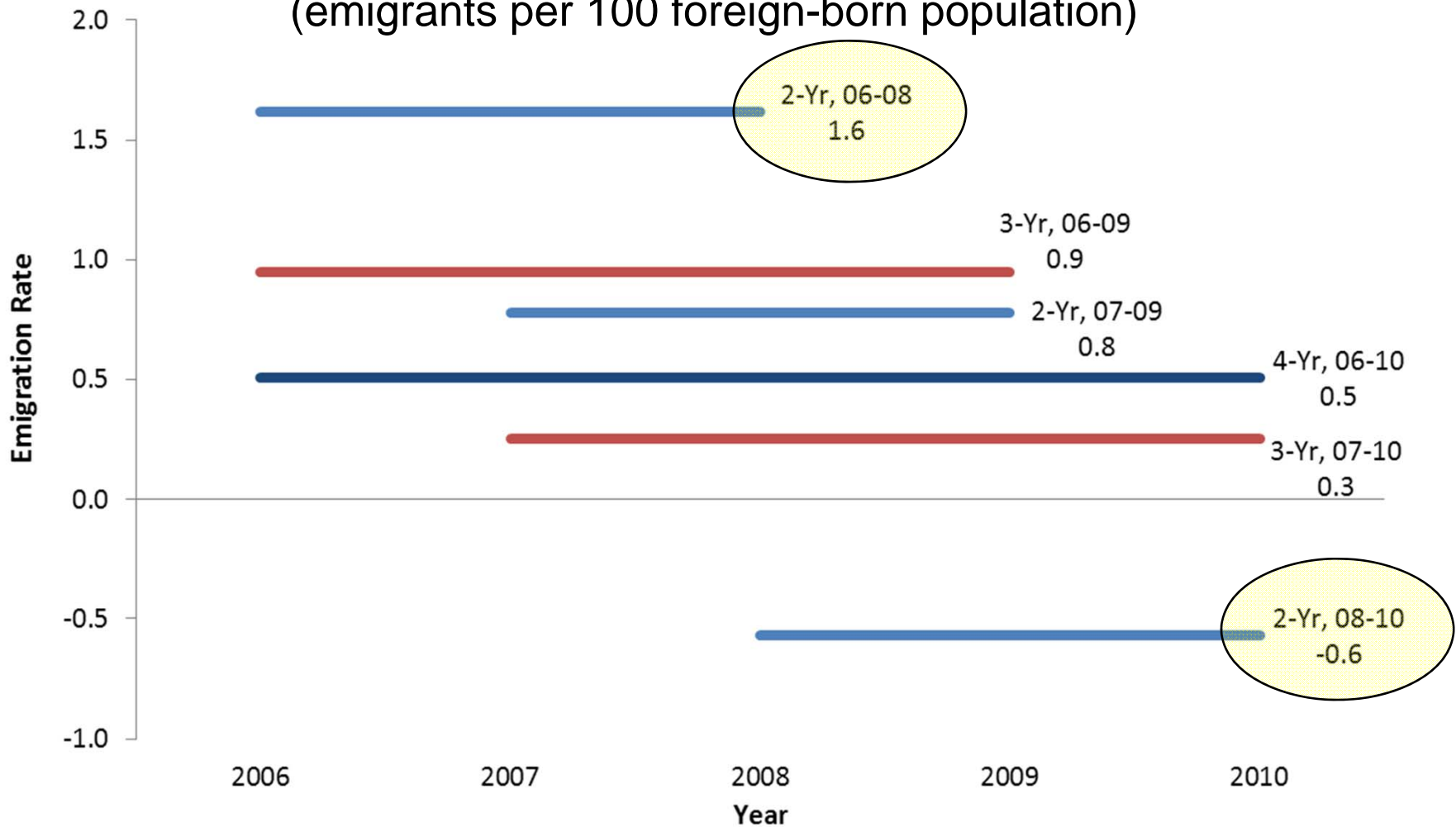
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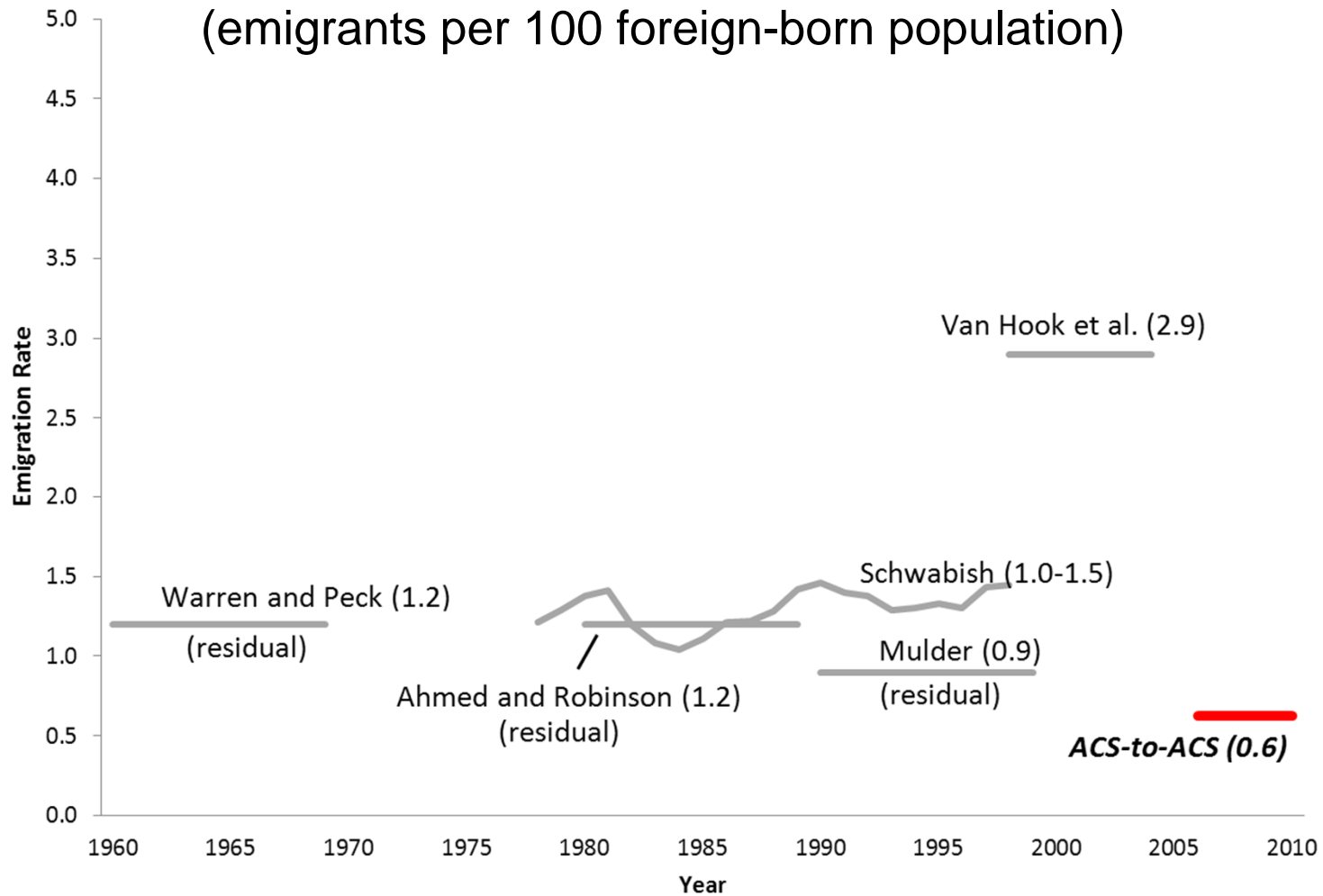


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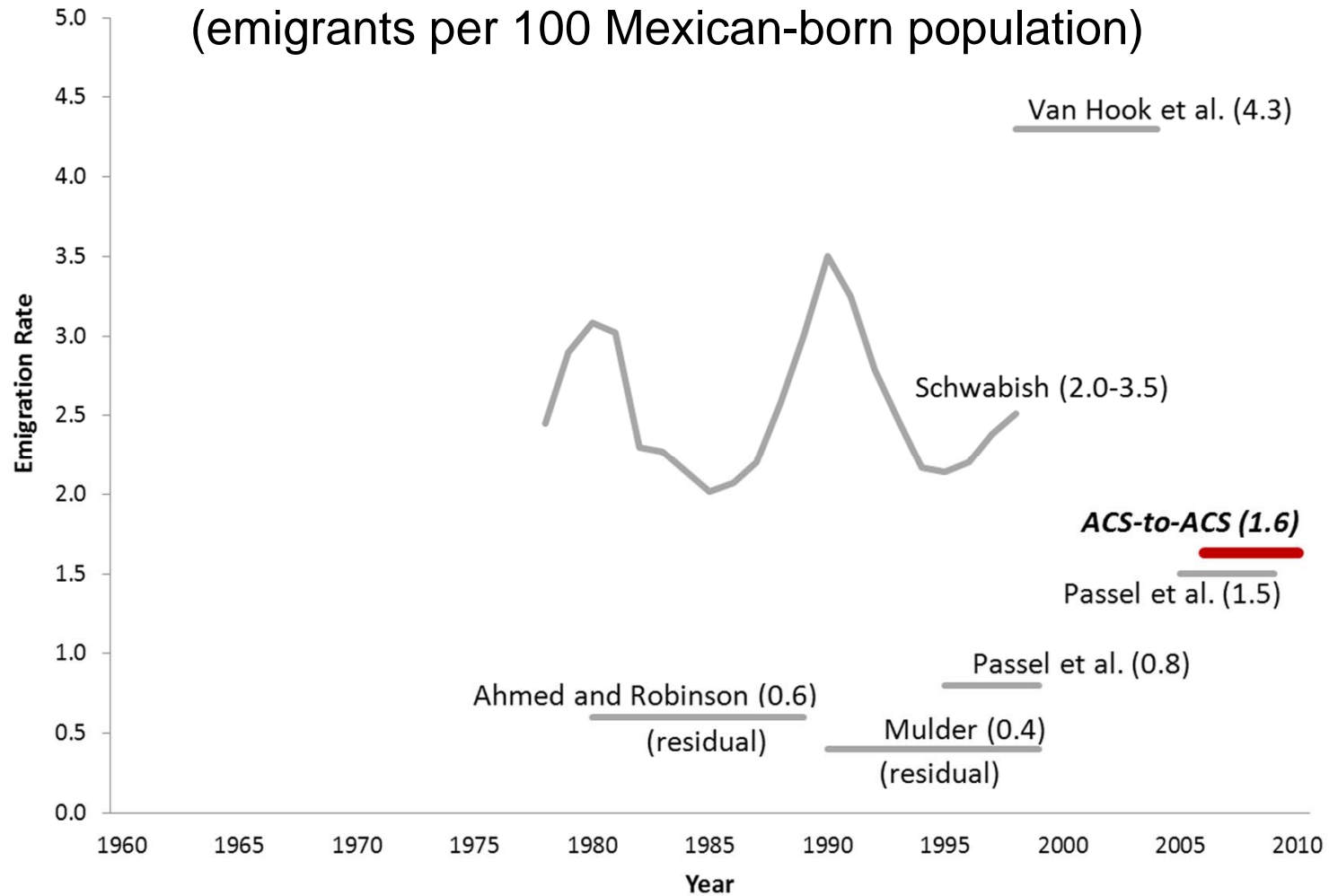
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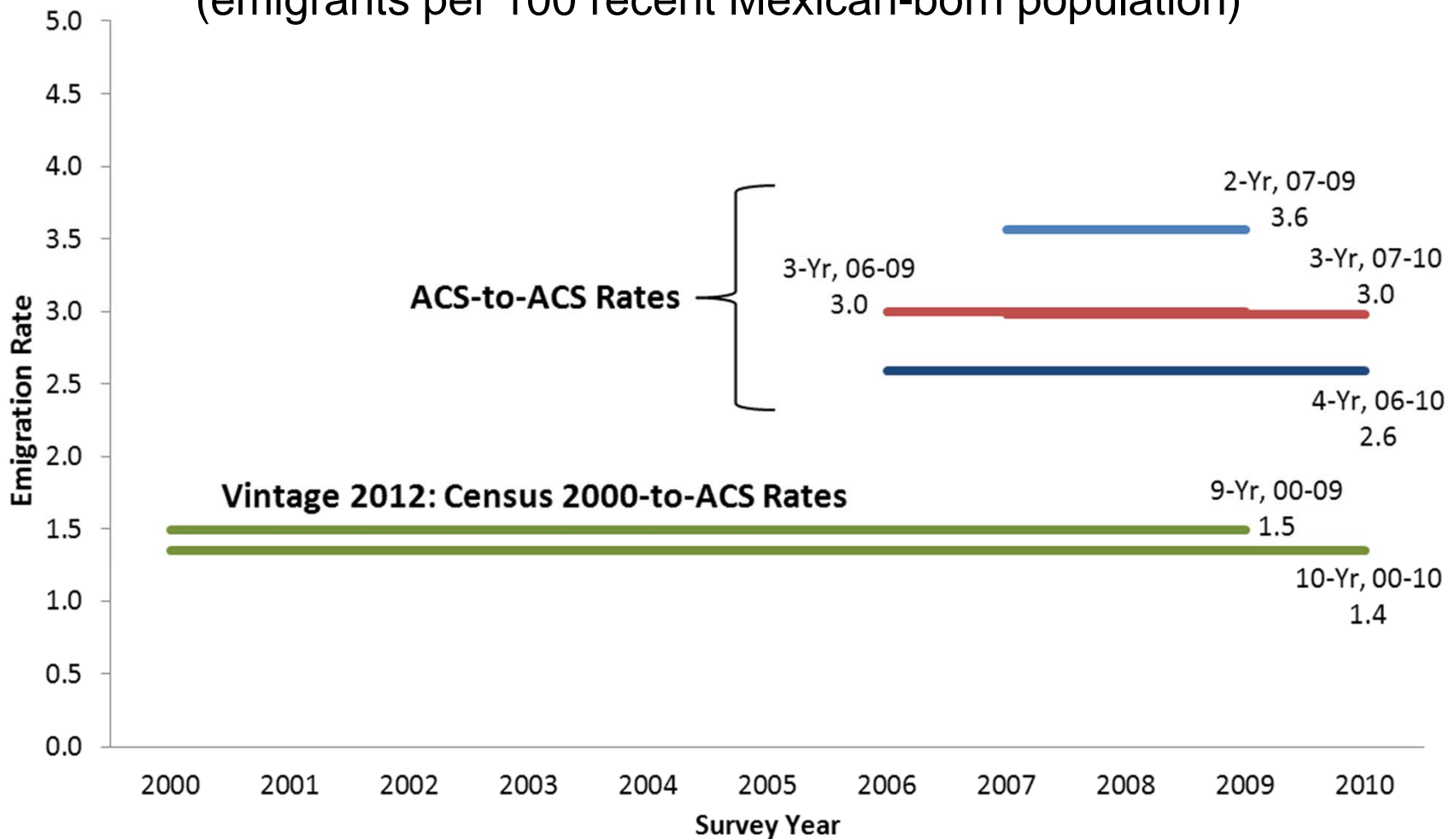


# Estimated Annual Emigration Rates Mexican Born



# Estimated Annual Emigration Rates Mexican Born, <= 10 Years in U.S.

(emigrants per 100 recent Mexican-born population)



# Summary

- Annual ACS data address main critique of residual method
  - Subject to sampling and non-sampling error
- ACS-based emigration rates for Mexican-born close to rates from other data and methods
- A shorter observation horizon appears to provide better measure of annual emigration

# Contact:

Mark A. Leach  
Population Division  
U.S. Census Bureau  
[mark.a.leach@census.gov](mailto:mark.a.leach@census.gov)  
301-763-9167