The Impact of Immigration on the U.S. Agricultural Labor Market Outcomes

Xuan Wei
Mid-Florida Research and Education Center, University of Florida
wei.xuan@ufl.edu

Hayk Khachatryan
Mid-Florida Research and Education Center, University of Florida
Food and Resource Economics Department, University of Florida
hayk@ufl.edu

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Xuan Wei[1] and Hayk Khachatryan[1, 2]

[1] Mid-Florida Research and Education Center, University of Florida

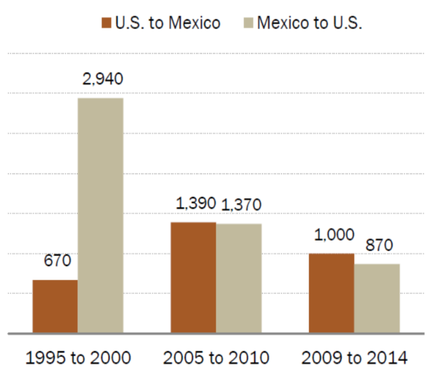
[2] Food and Resource Economics Department, University of Florida

Introduction

- U.S. agriculture heavily relies on seasonal immigrant workers in its labor force.
- 74% of the U.S. hired crop workers were born in Mexico and 53% of them were self-identified as unauthorized workers (2012 NAWS).
- Mexico has been the primary foreign country sending farm workers into the United States, but this trend is changing.
- Potential labor shortages and how immigration policies would affect labor markets are major concerns for U.S. agriculture.

Net Migration From Mexico Below Zero After the Great Recession

In thousands



Source: Pew Research Center, 2015

Theoretical Framework

Consider an *n*-sector labor market consisting of only unskilled labor. Immigrants and natives are treated as separate inputs of production. A good y_i is produced by a competitive industry according to a CES production function.

$y_i = \left(L_{iN}^{\delta} + \eta_i L_{iM}^{\delta}\right)^{\frac{1}{\delta}}$, where L_{iN} and L_{iM} represent labor inputs of native and immigrant workers to produce good y_i. η is the efficiency of native workers relative to immigrant workers in each industry i.

By solving the cost minimization problem for each industry i , we derive the factor demand functions for both native and immigrant farm workers

$$\boldsymbol{L_{iN} = y_i \left(\frac{1}{w_{iN}}\right)^{\frac{1}{1-\delta}} \left[w_{iN}^{-\frac{\delta}{1-\delta}} + \eta_i^{\frac{1}{1-\delta}} w_{iM}^{-\frac{\delta}{1-\delta}} \right]^{-\frac{1}{\delta}}} \qquad (1.1)$$

$$\boldsymbol{L_{iM} = y_i \left(\frac{\eta_i}{w_{iM}}\right)^{\frac{1}{1-\delta}} \left[w_{iN}^{-\frac{\delta}{1-\delta}} + \eta_i^{\frac{1}{1-\delta}} w_{iM}^{-\frac{\delta}{1-\delta}} \right]^{-\frac{1}{\delta}},} \qquad (1.2)$$

which are functions of real wages of native (w_{iN}) and immigrant farm workers (w_{iM}). Under the assumptions of CRS and perfect competition, combining zero-profit condition and the market clearance conditions, we can derive the following structural relationships that can be used in the empirical framework to identify the wage effect of immigrant inflows in the U.S. agricultural labor market.

$$\begin{bmatrix} \Delta \log w_{iN} \\ \Delta \log w_{iM} \end{bmatrix} = \begin{bmatrix} g_N(\Delta \log f_N, \Delta \log f_M, \Delta \log L) \\ g_M(\Delta \log f_N, \Delta \log f_M, \Delta \log L) \end{bmatrix}. \qquad (2)$$

Empirical Framework

Estimating Equations (SUR):

$$\boldsymbol{log\, w_{irtN} = Z_{irtN}\, b_N + c_N log f_{irtM} + d_N log L_{rt} + u_{irtN}} \qquad (3.1)$$

$$\boldsymbol{log\, w_{irtM} = Z_{irM}\, b_M + c_M log f_{irtM} + d_M log L_{rt} + u_{irtM}} \qquad (3.2)$$

w_{irS} (S denoting the immigrant status, which is N for native and M for immigrant farm workers) is the farm worker's hourly wage rate with immigrant status S.

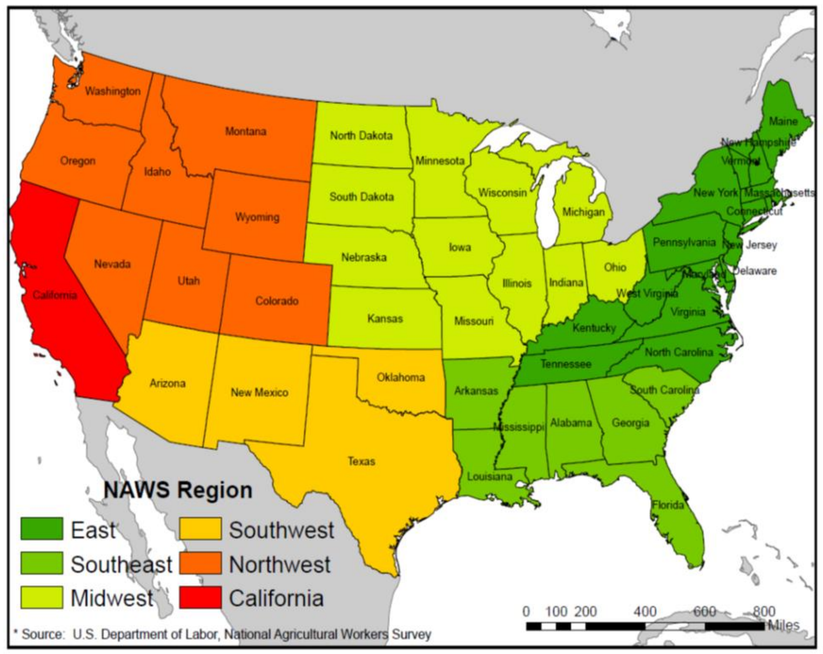
$\boldsymbol{Z}_{irt}$ is a vector controlling for worker's demographic characteristics, including gender, age, race, marital status, and educational level, which is aggregated at crop industry-region-year level. f_{rtM} denotes the fraction of immigrant farm workers working for the crop industry i in region r at year t.

L_{irt} is the total agricultural employment of both native and immigrant farm worker employment of crop industry i in region r at year t.

u_{irt} is an unobserved error term.

National Agricultural Workers Survey (NAWS) Data

- Sample period: 1989-2012
- Six broad regions: East, Southeast, Midwest, Southwest, Northwest and California
- Five major crop industries: Field Crops (15.5%), Fruits and Nuts (35.5%), Horticulture (17.8%), Vegetables (25.1%) and Miscellaneous and Multi Crops (6%)



Results

	SUR	
	Log(wage_M)	Log(wage_N)
Log immigrant fraction	-0.053**	-0.032
	(0.021)	(0.029)
Log weekly work hours	-0.087***	-0.139***
	(0.029)	(0.039)
Controls for crop industry-region characteristics	Yes	Yes
Year fixed effects	Yes	Yes
Region fixed effects	Yes	Yes
Crop industry fixed effects	Yes	Yes
R^2	0.787	0.787
Observations	642	642

Conclusion

- Self-competition among immigrant farm workers are identified. Increasing the fraction of immigrant farm workers by 10 percent reduces immigrant farm worker's hourly wage by 0.5 percent.
- Little evidence is found that the inflows of immigrants are associated with negative wage impact on native farm workers.

Next Step

- First-differenced method to eliminate potential bias introduced by region-specific and crop-industry specific fixed effects that are correlated with the fraction of immigration and the labor market outcomes of natives in a specific region and crop industry.
- 2SLS/control function approach to deal with the potential endogeneity issue of the immigration fraction variable.
  - Instrumental Variable (IV): number of illegal apprehensions
- Consider the wage effects of three legal status groups:
  - Citizens (US born and naturalized)
  - Authorized immigrants: green card and other work authorization groups
  - Unauthorized immigrants