Skilled Immigration: The Impact on Wages of U.S. STEM Workers

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Introduction

The United States experienced a dramatic increase in high-skilled immigration from the early 1990s though the mid-2000s. Many of these immigrants study or work in science, technology, engineering, or mathematics (STEM) fields. The fear of skilled immigrants will provide cheaper labor and lower wages for all workers are longstanding concerns.

Last year, a landmark immigration reform bill was introduced in the U.S. Senate that has the potential to expand the current temporary visa programs by increasing the H-1B visa cap and providing permanent residency to nonresident foreign students who graduate from a U.S. college in a STEM field.

This paper examines the effect of the increasing share of skilled immigrants on relative wage level and tries to use empirical results to contribute to immigration debate.

Research Question

Does the increasing share of immigrant workers decrease the wage within occupation level?

Is the effect statistically significant?

Theoretical Framework

Initially, the supply curve is represented by the curve labeled S1 in on the right. The equilibrium occurs at the intersection of S1 and D1 is represented by point A. At that point, the total employment equals E1 and the equilibrium wage is W1.

The entering of immigrant workers to the labor market will shift the supply curve outwards (to the right), which is represented by S2. If everything else is held constant, since there are more workers willing to work for the employers, the equilibrium wage will drop to W2, with the total employment expands to E2. The total size of immigrant workers in this scenario is E2-E1, and the number of native workers stay in this market will reduce to E1-E3.

This model assumes that labor is homogenous, native workers and immigrant workers are imperfect substitutes, and in the short run the demand curve will not be affected by skilled immigration.

Methodology

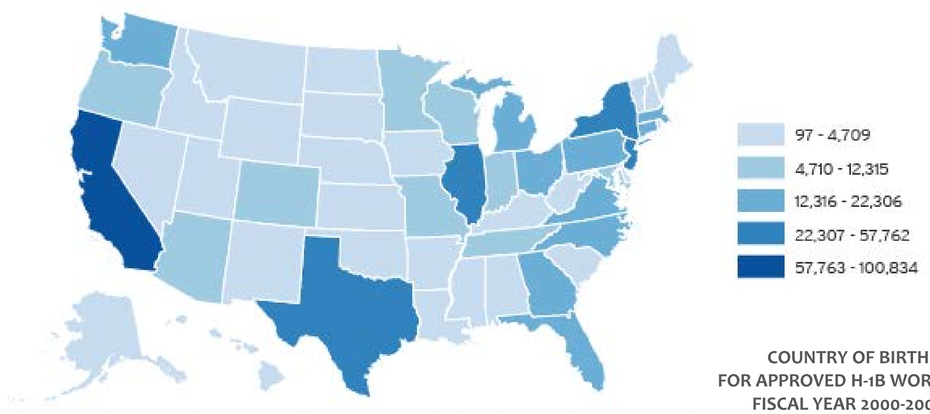
I use linear regressions to examine the relationship between the annual salary of an occupation and the various measures of the employees' characteristics. Let i and t index the occupation and time, respectively.

$$(Median\ Salary)_{it} = \alpha + \beta_1(Foreigner\ Share)_{it} + \beta_2(BSc\ Share)_{it} + \beta_3(Female\ Share)_{it} + \beta_4(White\ Share)_{it} + s_i + \pi_t + \mu_{it}$$

Where s_i is the vector of fixed effects indicating the occupation, controls for any unobservable factors that are specific to an occupation but are constant over time, such as productivity, skill premium, and competitors. The period fixed effects π_t will absorb any time-specific factors that determine the wage at a particular point in time, such as changes in the government policy, employment situation and inflation rate.

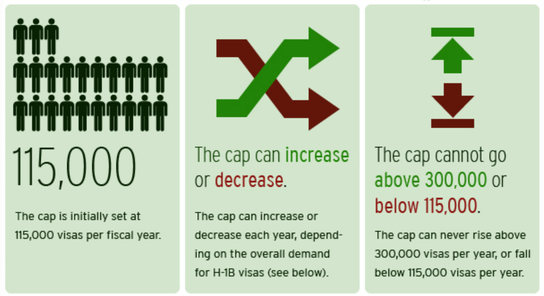
Graphs and Charts

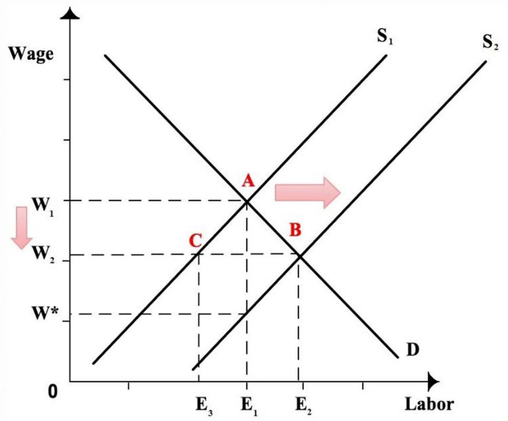
H-1B Workers Requested by State, 2010-2011 Average



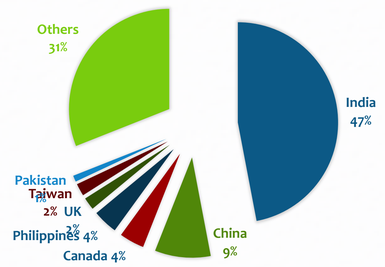
Proposed Changes Under the Immigration and Innovation Act of 2013

= 5,000 visas

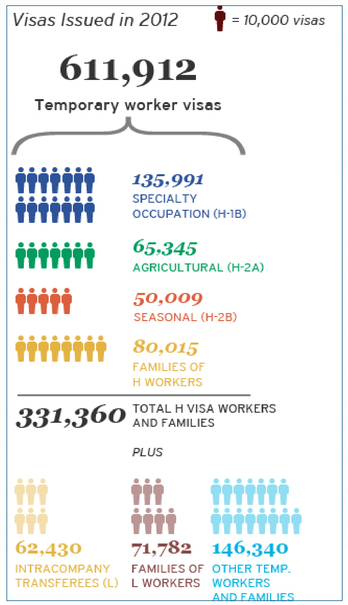




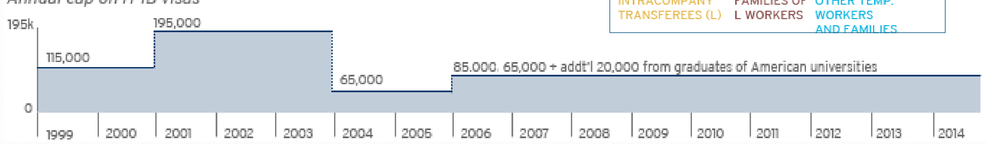
COUNTRY OF BIRTH FOR APPROVED H-1B WORKERS, FISCAL YEAR 2000-2009



Visas Issued in 2012 = 10,000 visas



Annual cap on H-1B visas



Data

This analysis uses population samples from the Scientists and Engineers Statistical Data System (SESTAT). I use the latest three years' data (2003, 2006, and 2008 SESTAT surveys). The sample is restricted to any person who has ever received a bachelor's or higher degree in a science or engineering (S&E) or S&E-related field, plus any person holding a non-S&E bachelor's or higher degree who was employed in a S&E or S&E-related occupation during the SESTAT surveys.

Hypothesis

The empirical objective is to estimate whether the increasing of immigrant worker share in one occupation will lower the annual salary for all workers within that field significantly.

$H_N: \beta_1 = 0$

$H_A: \beta_1 < 0$

Numerical Result

Results of Regressions of Annual Salaries on the Immigrant Share and Employee Characteristic Control Variables

Dependent variable: median annual salary of each occupation

Regressor	(1)	(2)	(3)	(4)	(5)	(6)
Immigrant Share (X_1)	-13.11 (344.24)	-72.72 (328.32)	-124.32 (321.89)	-185.80 (343.26)	-194.28 (339.74)	-220.50 (333.76)
BSc Share (X_2)		-705.12** (267.24)	-555.40** (272.54)		-704.71*** (265.67)	-566.13** (272.36)
Female Share (X_3)			-627.12* (327.38)	-778.839** (325.12)		-580.76* (329.80)
White Share (X_4)				-390.102 (403.53)	-510.69 (396.11)	-420.08 (392.143)
Intercept	61040.51*** (1175.57)	107152.5*** (17512.1)	117891.9*** (18004.24)	117425.8*** (32398.93)	147561.5*** (35852.9)	150337.5*** (35222.42)
Summary Statistics						
Root MSE	2743.80	2610.67	2550.59	2622.94	2595.37	2547.17
Adjusted R^2	0.9674	0.9705	0.9719	0.9703	0.9709	0.9719
n	90	90	90	90	90	90

* 10% significance
** 5% significance
*** 1% significance

Conclusion

My evaluation of the evidence finds that immigrants and natives are imperfect substitutes. Controlling for education, gender and race characteristics, the estimate of β1 is negative, but not big or statistically insignificant: -220.55 (standard error: 333.76).

This implies that an additional percent increase in immigrant share of a particular occupation decreased the annual median salary by $220.55.

In conclusion, the data fail to reject the null hypothesis that the increasing share of immigrant worker has no effect on earnings.