Title: Income Inequality among Legal Permanent Resident (LPR) Immigrants in the U.S: Impacts of STEM Major and Inter-state Relocation

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Abstract

There is an ongoing trend of earnings polarization among immigrants of different skills in the U.S. society. In this paper, I suggest that heterogeneous returns to higher education and internal migration could explain variations in immigrants' earnings independently. I also propose to empirically prove that the returns are different for native-born and legal immigrants. Using national representative sample data from the New Immigrant Survey (NIS 2003) and American Community Survey (2011), I test for two aspects of heterogeneous returns to higher education controlling for individual characteristics. Preliminary results from NIS suggest that (1) immigrants with STEM backgrounds enjoy substantial income premium over those with non-STEM backgrounds; (2) country of the highest degree matters, supporting several recent studies. Another key finding is that immigrants who have relocated across states are at earnings advantage than counterparts who are settled within the same states upon first arrival, suggesting migration to better returns.

Background

The labor market premium afforded high-skill workers is well established (Bekman, Bound and Machin 1998; Card and DiNardo 2002). Between 2000 and 2010, the growth in STEM jobs (7.9%) far outpaced the 2.9% growth rate of non-STEM jobs in the United States. These growth trends are forecasted to persist for at least the next decade (Department of Commerce 2012). Recent evidence suggests that labor in these new STEM positions is generated in part through migration flows into the United States. Theoretically, this may result from variation in sending and receiving country wage differentials by occupational sector—STEM positions in particular. Few studies have examined this process. Yet, examining to what extent the U.S. produces or instead imports its STEM labor force abroad would shed light on both factors underpinning migration flows and provides an alternative lens with which to view group-based income inequality.

On the one hand, there is apparent over-representation of immigrant labor force, especially Asian immigrants, in STEM-related occupations (Hira 2010; Stephan and Levin 2001) as " the Americans are not gaining STEM skills as the same rate as other developing or industrialized nations"(Department of Commerce 2012). On the other hand, the annually admitted legal permanent residents (LPRs) more than quadrupled in the last five decades (U.S. Department of Homeland Security 2012), which tends to enlarge the influence of immigrants on income disparity in the U.S. society at large.

So what have been found in immigrant incomes under North America contexts? The first array of research involved studies comparing immigrant income with that of the native. Comparative studies between immigrants and natives found little effect of immigrant inflows on relative immigrant-native wage structure (Card 1997; Friedberg and Hunt 1995). In contrast, (Borjas 1985) found that competitive pressures of immigrant income mainly came from other immigrants. Other related research examines demographic and

socioeconomic variation in income levels *among* migrants. The gender income gap observed in the U.S. population at large (Fortin and Lemieux1998; McCall 2001) was also echoed among immigrants---men earned more than women. Several studies found immigrants' earnings were positively related to their English language skills (Chiswick and Miller 2002; Dustmann 1994), particularly for women (Chiswick and Miller 1999). Several studies found clear income disadvantage for immigrants holding highest degrees from foreign countries (Arbeit and Warren 2013;Tong 2010) Other studies suggested that returns to education tended to vary with one's age at arrival because immigrants' age at arrival could indirectly affect one's percentage of total schooling received in the United States, if returns to U.S. schooling were indeed higher than returns to foreign schooling. (Gonzalez 2003; Schaafsma and Sweetman 2001) Another potential covariate for heterogeneous returns to education is immigrants' geographic mobility (such as internal migration) because more educated and younger immigrants have larger opportunity sets than the less educated ones, although previous study did not find significant earnings returns to migration (Tienda and Wilson 1992; Bartel and Koch 1991; Wilson and Tienda 1989).

Broadly, education and learned skills appear extremely influential in structuring variation in immigrants' incomes. Although heterogeneous returns to of education and its implications for income inequality are previously studied for the U.S. population in general (Grove and Hussey 2011), few have focused on immigrants; those who did for immigrants mainly found labor market devaluation of foreign education (Arbeit and Warren 2013; Schoellman 2012; Tong 2010). I take up this question in the current study. Doing so is worthwhile for multiple reasons. The estimates describe the extent of the skill-based wage premium in the contemporary period as well as the controversial skill-based immigration policy favoring STEM labor force. In the context of developing versus developed countries, "returns to 'specialty areas'" were found lower than "returns to humanities and social sciences" in developing countries where tertiary education had lower monetary returns than primary and secondary education (Psacharopoulos 1985; Psacharopoulos 1994), underscoring the potential interest of STEM workers to consider employment in the United States, where monetary premium of natural sciences over humanities was found (Arcidiacono 2004) Moreover, as internal migration is often the transition between higher education and employment, and that more educated are more capable of exploiting the labor markets nationwide, the internal migration patterns could potentially complement the findings on returns to fields of study. These would provide insightful implications for the ongoing educational reform and immigration reform.

Data and Methods

The nationally representative datasets I will be using are the New Immigrant Survey (NIS 2003 I) and the American Community Survey (ACS 2010). The reason for choosing the particular waves of two surveys is that they have sufficiently large sample sizes for regression analysis and more importantly, contain relatively good records of respondents' fields of study, income data and migration history[1] in addition to the socioeconomic and demographic variables of relevance. NIS covers new legal immigrants only, but the ACS is representative of the entire U.S. population with immigrants (regardless of permanent or temporary) included. Adopting both NIS and ACS allows me to investigate how

[1] Migration history is more comprehensive in NIS than in ACS, so ACS will be mainly used for comparing heterogeneous returns to education for the native and for the immigrants respectively.

heterogeneous returns to education are related to income disparity, both within the immigrant population (2003), as well as between the native-born and the immigrant populations (2011). The NIS facilitates within-group comparison and the ACS highlights between-group comparison. The seven-year interval of between the two surveys allows me to test whether the variation structure has changed over time.

I use log-linear regression models estimated for working-age respondents in the age range 18~65 years. The dependent variable is the log wage income denominated in US dollars; the main independent variable is the respondents' fields of study for higher education, which is a binary variable expressed by STEM majors and non-STEM majors. Main covariates and other control variables include whether respondents have a bachelor's degree or above, the country in which the highest degree was obtained, whether having moved interstate to the current residential state, age, age at arrival, gender, whether having adjusted status prior to becoming a legal permanent resident and whether they are principal migrants or trailing migrants (i.e., following another family member to the United States)[2].

Preliminary Results

Table 1 lists partial preliminary results from NIS 2003 to demonstrate the power of inter-state moves, degree fields and degree origins in explaining income inequality among legalized aliens. Based on preliminary findings, I will further examine how specific patterns in internal migration of immigrants are associated with immigrants' income disparity by looking into more detailed migration characteristics[3], including migration frequency and back-and-forth migration. Finally I will compare results for heterogeneous returns to different fields of higher education from ACS to reveal the potentially different returns gaps resulting from STEM and non-STEM majors, among the native-born and within legal permanent immigrants respectively, and how the earnings premium might have evolved.

Table 1. Regress ln (wage income) on fields of study and other control variables

Age	0.0486***
Age at Arrival	(-0.0365)***
STEM Field	0.4181***
Bachelor or above	0.8435***
US Highest Degree	0.2778***
Interstate	0.4451***
Male	0.3703***
Adjusted Status	1.1121***
Principal	(-0.3318)***
Cons	7.1454***
Adj_Rsq	0.37
N	1643.00

[2] The last two covariates are exclusively from the NIS.
[3] Mainly from the NIS

Note: *** indicates p<0.01.

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