

# The Education–Occupation Mismatch of International and Internal Migrants in Mexico, 2005–2012

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**Abstract** Recent studies have found international migrants from developing countries such as Mexico to be negatively selected by education; that is, they are less educated than those who stay behind. Moving beyond the question of whether migrants are negatively selected by education overall, I examine how migrants are selected compared with others in similar jobs. Using data from a nationally representative panel survey of Mexican households, I find that men who migrate abroad have significantly higher levels of education than nonmigrants in the same occupation. Because men who are overeducated for their occupation tend to receive lower wages than those employed in occupations commensurate with their education, and are also more dissatisfied with their jobs, overeducation may encourage men to emigrate. Results from the regression models, which account for differential selectivity into employment, indicate that internal migrants within Mexico also have higher educational levels than nonmigrants in the same occupation prior to migrating but comparable levels of education afterward. Migrating internally, therefore, appears to allow men to improve their occupational placement. Finally, I examine changes in migrants' education over time and find evidence that the education–occupation mismatch has increased among Mexican emigrants in the years following the 2008 U.S. recession.

**Keywords** International migration · Mexico–U.S. migration · Internal migration · Migrant selectivity · Education–occupation mismatch

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## Introduction

A long-standing debate in migration research concerns the selectivity of individuals moving from developing countries, such as Mexico, to the United States. Whether Mexican migrants are disproportionately drawn from those with lower levels of education in their communities of origin is important because it could potentially inhibit immigrants' economic mobility in the United States (Borjas 1985, 1995; Portes and Rumbaut 1996) and affect the labor market opportunities of others with a similar skill set on both sides of the border (Borjas 2003; Borjas et al. 1997; Mishra 2007; but see Card 2005). Although findings from early studies on the selectivity of Mexican migrants were mixed, recent studies appear to confirm the hypothesis that migrants have lower levels of education than their counterparts who stay behind (Fernández-Huertas Moraga 2011; Rendall and Parker 2014).

Moving beyond the question of whether Mexican migrants to the United States are negatively selected by education overall, in this article I specifically examine whether migrants are positively selected compared with others in similar jobs. Prior research has suggested that workers who are overeducated relative to their peers in the same occupation have lower earnings than do those in occupations commensurate with their education (Chevalier 2003; Quintini 2011) and tend to be more dissatisfied with their jobs (Burris 1983; Hersch 1991; Tsang et al. 1991). Workers with higher levels of education than others employed in the same occupation may therefore have a greater incentive to migrate (Quinn and Rubb 2005).

My study also examines the overeducation of internal migrants within Mexico. Just as for international emigrants, being overeducated relative to others in the same occupation may encourage individuals to leave their place of residence in search of better job prospects elsewhere in the country. Like international emigrants, internal out-migrants from Mexican communities may therefore be expected to have higher levels of education than nonmigrants in similar jobs. Moreover, in the case of internal migrants, I am also able to observe their educational attainment and occupation after migration. By comparing the level of education of in-migrants with that of out-migrants in the same occupation, I can evaluate whether migrating internally, on average, allows individuals to obtain jobs more commensurate with their education.

Finally, using longitudinal information, I also examine changes in the overeducation of migrants over time. In a recent study, I found that international emigrants from Mexico became more positively selected by education following the onset of the U.S. recession in 2008 (Villarreal 2014). I now test whether emigrants have also become more educated relative to others employed in the same occupation during the same period. This analysis allows me to assess whether the overall increase in migrant educational selectivity over the past decade is due to a change in the occupational profile of migrants—that is, migrants from occupations with higher levels of education migrating at higher rates—or to an increase in the education of migrants from each occupation.

## The Education-Occupation Mismatch of International Migrants

A large body of social science research has examined the educational selectivity of international migrants, that is, how the educational attainment of individuals who

migrate across national boundaries compares with the educational attainment of those who stay behind. In a highly influential article, Borjas (1987) posited that migrants from developing countries with greater returns to skills—and hence, greater earnings inequality compared with the United States—will tend to have lower skills than others in their country of origin because their relative payoff for migrating will be larger (but see Chiswick 1999; Jasso and Rosenzweig 1990). This negative selectivity could have important implications for immigrants' earnings assimilation and for labor markets on both sides of the border. An influx of workers with low education entering the United States could potentially depress the employment and wages of native workers with a similar skill set in the United States (Borjas 2003; Borjas et al. 1997; but see Card 2005) and raise those of workers in Mexico (Mishra 2007). However, empirical findings on the selectivity of Mexican migrants have been mixed. Some studies have found evidence that Mexican migrants to the United States indeed have lower levels of education than their nonmigrant peers (Ambrosini and Peri 2012; Hanson 2006; Ibarra and Lubotsky 2007), whereas others have found no selectivity, intermediate selectivity, or positive educational selectivity (Chiquiar and Hanson 2005; Feliciano 2005; Kaestner and Malamud 2014; McKenzie and Rapoport 2010; Orrenius and Zavodny 2005). In the most thorough analysis to date, Rendall and Parker (2014) found a strong negative educational selectivity of Mexican migrants over the span of the 1990s and 2000s. They largely attributed this negative selectivity to the lower levels of education in Mexican rural areas and small towns, where a disproportionate number of international migrants originate. In an earlier study, I found evidence of changing educational selectivity over time (Villarreal 2014). Using data from the Mexican National Occupation and Employment Survey (Encuesta Nacional de Ocupación y Empleo, ENOE), I found that the odds of migrating for Mexican men with higher education increased significantly relative to the odds of migrating for those with less education following the onset of the 2008 U.S. recession.

Another strand of economic research has examined the mismatch between individuals' own education and the level of education that is required for the particular occupation in which they are employed (for reviews, see Hartog 2000; Quintini 2011).<sup>1</sup> Researchers have generally found that workers employed in occupations for which they are overeducated earn lower wages than those employed in occupations commensurate with their education (e.g., Chevalier 2003; Quintini 2011). Overeducated workers are also more dissatisfied with their jobs (Burriss 1983; Hersch 1991; Tsang et al. 1991). Given their lower wage levels and greater job dissatisfaction, workers who are overeducated for their occupations may be more motivated to migrate in search of better opportunities (Quinn and Rubb 2005). We should, therefore, expect a positive educational selectivity for migrants when compared with others within the same occupation, in contrast to the overall negative educational selectivity of migrants found in previous studies that have not controlled for individuals' occupation.

<sup>1</sup> The level of required education for a particular occupation is frequently operationalized as the average education for all workers in that occupation. Quintini (2011) referred to this as the "statistical approach," and Hartog (2000) referred to it as one based on "realized matches." Some studies have attempted to define the required education based on an *a priori* classification by experts or by the workers themselves (McGoldrick and Robst 1996). Although using the mean educational level has several limitations, it is difficult to find expert or self-assessed measurements that are sufficiently reliable and consistent over time (Hartog 2000).

A long tradition of sociological research has also highlighted the importance of occupations as key reference points for individuals' judgments about their relative position in society. The classic status attainment model explicitly used an individual's occupation as an indicator of social status (Blau and Duncan 1967; Sewell et al. 1969). In that model and subsequent ones, education was thought to be an important predictor of occupational status. More recently, researchers (e.g., Weeden and Grusky 2005) have proposed using occupations as crucial categories for explaining behaviors, attitudes, and tastes. Occupations have also been tied to individuals' identities and self-definitions (see Grusky and Sørensen 1998:1197–1198). It would therefore not be surprising to find that individuals' failure to attain an occupation that is commensurate with their education in their communities of origin encourages them to migrate.

Research on the education-occupation mismatch of international migrants has mainly focused on the overeducation of migrants in receiving countries instead of how overeducation in the countries of origin may encourage emigration. Because education obtained in foreign countries is often not well recognized by employers in destination countries, recent migrants tend to have higher levels of education than native workers in the same occupations (Chiswick and Miller 2009). This phenomenon is reflected, for example, when a foreign-trained engineer works as a janitor or a taxi driver (Mattoo et al. 2008). Comparatively less is known about how overeducation might affect individuals' odds of migrating abroad. In one of the few studies to examine the role of overeducation as a motive for international emigration, Quinn and Rubb (2005) found partial support for the hypothesis that a mismatch between individuals' education and that required by their occupation is conducive to migration. Using data from the Mexican Migration Project (MMP), Quinn and Rubb (2005) found that undereducation is significantly associated with lower odds of migrating, while overeducation is marginally associated with higher odds of migrating.

The MMP survey used by Quinn and Rubb (2005) has many excellent attributes. Among other things, the MMP survey collects information from migrants' education in Mexico. As Rendall and Parker (2014) recently indicated, Mexican migrants' educational attainment obtained from U.S. data sources is most likely upwardly biased because of the underrepresentation of low-educated migrants. Nevertheless, one limitation of the MMP survey is that its sampling strategy is not nationally representative, which limits its potential for examining the effect of overeducation on migration decisions. Early waves of the MMP survey in particular oversample nonurban households in high-migration areas (Fernández-Huertas Moraga 2011). Including representative samples of individuals from all levels of urbanization is especially important given the large discrepancies in education in Mexican communities of different population sizes, which in turn account for a large part of the educational selectivity of migrants to the United States (Rendall and Parker 2014). A larger representation of individuals living in urban settings is also important for an analysis of the education-occupation mismatch of migrants because it allows the incorporation of a wider spectrum of occupations. The overrepresentation of agricultural workers in the MMP survey may significantly alter the association between overeducation and international migration because agricultural migrants tend to be especially overeducated compared with other agricultural workers (as I discuss later in the Descriptive Results section). Educational requirements are also less meaningful in agricultural jobs. In contrast to the MMP survey, the ENOE survey I use in the analysis is not only nationally

representative but also representative of Mexican households in communities of four sizes. The greater representation of households in urban settings allows me to examine the education-occupation mismatch in a wider spectrum of occupations and to specifically measure the overeducation of migrants employed in nonagricultural jobs.

## The Education-Occupation Mismatch of Internal Migrants

Like most other national surveys, the ENOE does not capture information from international migrants after they leave the country. It is, therefore, not possible to know whether migrating abroad actually results in a better occupational match for their education.<sup>2</sup> However, data from the ENOE do allow for examination of the effect of internal migration on the overeducation of Mexican workers. By comparing the education of migrants who leave their communities for other destinations within Mexico (out-migrants) with those who have recently arrived from other parts of the country (in-migrants) employed in the same occupation, I am able to assess whether migrating internally leads to a decrease in overeducation.

We know much less about the educational selectivity of internal migrants than international migrants from countries such as Mexico. In contrast to international migrants, internal migrants generally appear to be positively selected, or at least not negatively selected, by education. Results from descriptive studies have indicated that internal migrants have higher levels of education compared with nonmigrants in Mexico (Romo Viramontes et al. 2013; Sobrino 2010). Findings from other studies using multivariate methods and nonnationally representative samples have been mixed. Lindstrom and Lauster (2001) found no educational selectivity for internal migrants from the Mexican state of Zacatecas. Davis et al. (2002) found that nonagricultural internal migrants are positively selected by education, while agricultural migrants are negatively selected. An early study by Stark and Taylor (1991) found that internal migrants have higher levels of education compared with nonmigrants in a village in the state of Michoacán. As Stark and Taylor (1991:1176) argued, the higher internal migration rates among the better-educated villagers is likely the result of higher returns to education in Mexican destinations, which are typically larger urban centers. More recently, using a nationally representative sample, Ambrosini and Peri (2012) also found a positive educational selectivity among internal migrants in Mexico.

Although these studies have provided concrete evidence of an overall positive educational selectivity of internal migrants in Mexico, they did not specifically address whether internal migrants are overeducated for their occupation. Following a similar reasoning as that proposed for international migrants, we may expect that internal migrants who are overeducated for their occupation will be more dissatisfied with their

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<sup>2</sup> As discussed later, however, an actual reduction in the overeducation of Mexican men after migrating internationally is not strictly necessary for overeducation to increase the odds of emigration. The lower wages and frustration of being underplaced for their education may make workers less attached to their current jobs and therefore more mobile. Various factors could explain why underplaced migrants would choose to emigrate even if migration does not result in better occupational placement abroad. Migrants may have incorrect information about their prospects in the U.S. labor market. Alternatively, other factors, including the expectation of higher wages and greater occupational mobility in the United States, may compensate for the low occupational placement abroad.

job and therefore more inclined to migrate. Similarly, because migrants are likely to move to areas of the country where they can obtain better jobs, we may expect in-migrants to be less overeducated for their occupation.

## Changes in the Education-Occupation Mismatch of Migrants

Recent research has indicated that international migrants from Mexico became more positively selected by education following the onset of the U.S. recession in 2008. In a previous article (Villarreal 2014), I suggested that the increase in the educational attainment of Mexican migrants was partly due to the drop in demand for low-skilled immigrant labor in key sectors of the U.S. economy. The overall increase in the educational selectivity of Mexican emigrants that I found may be the result of a change in the occupational profile of Mexican men migrating abroad, an increase in the education of migrants from each occupation, or a combination of both. First, by reducing the demand for low-skilled workers in the United States, the recession may have selectively discouraged emigration among Mexican men employed in occupations that typically require lower levels of education (e.g., agricultural and construction workers), thereby increasing the overall educational selectivity of emigrants. Second, the increasing competition in the United States labor market during the recession may have discouraged all but the most skilled workers within each occupation from migrating to the United States, which could also raise the aggregate level of education of emigrants. In the analysis that follows, I will help clarify the relative contribution of these two processes to the increasing overall educational selectivity of Mexican migrants since the onset of the 2008 U.S. recession.

## Data and Measurements

Data for the analysis are extracted from the ENOE, which has been carried out quarterly since 2005 (Instituto Nacional de Estadística y Geografía (INEGI) 2010). The survey is not only nationally representative but also representative of each of Mexico's 32 states as well as of communities of four population sizes. Like many other employment surveys worldwide, the ENOE has a rotating panel structure in which individuals are sampled five times in consecutive quarters. Panels are staggered such that in any given quarter, 20 % of the sample is in their first, second, third, fourth, and fifth interview respectively. Each individual enters the statistical analysis only once despite having multiple observations in the survey. Information from consecutive waves is used only to determine whether an individual migrated at some point during the year of observation. All demographic and employment characteristics, such as individuals' age, education, and occupation, are extracted from the last wave in which they are interviewed.<sup>3</sup> The sample is restricted to working-aged men (aged 15–55) who are

<sup>3</sup> This measurement timing is particularly important for in-migrants because it may take individuals who recently migrated to a community some time to be incorporated into the labor market. On the other hand, international emigrants and internal out-migrants might change jobs in anticipation of moving. Results from alternative models using information from the first available wave instead of the last were consistent with those reported here.

more likely to migrate for work-related reasons.<sup>4</sup> Sampling weights are provided for the ENOE and are used throughout the statistical analysis.

I define an *international emigrant* as any individual who is listed as a household member in one wave of the survey and is reported to have moved abroad in the following wave. An *internal out-migrant* is similarly defined as any individual who lived in the household in one wave and is later reported to have moved to a different state within Mexico. Conversely, an *internal in-migrant* is an individual who lived in a different state before joining the household in any wave of the survey.<sup>5</sup>

I also identify *returning international migrants* as those who lived abroad before joining the household in any wave. It is important to identify returning international migrants in order to exclude them from the baseline category of nonmigrants when making comparisons about educational selectivity because the former have been self-selected for migration at an earlier point in time. In addition, the extent to which returning international migrants are underplaced for their education may inform us about how they are being reassimilated into the Mexican labor market, which has important social and policy implications. Finally, a comparison of the occupation-specific education level of return migrants and emigrants, both of whom are similarly selected on their departure, may also provide useful information regarding how the selection process on their return and their experience abroad affect returning migrants' placement in the labor market.

To compare the educational attainment of migrants and nonmigrants, I test linear regression models using individuals' years of education as a dependent variable. Coefficients for binary variables identifying all four types of migrants—international emigrants, returning international migrants, internal out-migrants, and internal in-migrants—capture differences in educational attainment after controlling for other characteristics thought to affect individuals' education. Men's age and their age squared are introduced as predictors. Although all men in the restricted age group are assumed to have finished their formal education, there may nevertheless be substantial differences across cohorts in educational attainment, especially given the expansion of the Mexican educational system over time (e.g., Torche 2010).

To address the central aim of this study—namely, to test whether migrants have significantly different levels of education compared with nonmigrants within the same occupation—I introduce fixed effects for all occupational categories distinguished by the ENOE. According to the hypothesis presented in the theoretical section, emigrants are expected to be significantly more educated than nonmigrants employed in the same occupation, which provides an important motive for migrating. The ENOE codes the occupation of all employed individuals based on the Mexican Classification of

<sup>4</sup> Mexican women are less likely to emigrate independently but more likely to emigrate for family reunification (Cerrutti and Massey 2001; Donato 1993; Donato and Patterson 2004). Job dissatisfaction as a result of a mismatch between their level of education and their occupation will therefore have a smaller effect on women's decisions to migrate abroad. Also, despite their increasing participation in the labor market, Mexican women continue to be employed at lower rates than men, potentially leading to an additional selection bias (see the upcoming discussion on selection into employment).

<sup>5</sup> The categories of internal in-migrants and out-migrants are not mutually exclusive because it is possible for the same individual to move into the household in one quarter and migrate out in a later quarter during the same year of observation. These repeated migrants account for 5.3 % of all out-migrants and 10.8 % of all in-migrants. The same is true among international migrants. Repeated international migrants account for 5.8 % of all emigrants and 10.8 % of all return migrants.

Occupations (CMO) (INEGI 2009a; b). In the third quarter of 2012, occupations in the ENOE began to be coded according to a different classification system, which is not backward-compatible with the CMO (INEGI 2011). For this reason, the analysis is limited to cases from waves of the ENOE conducted prior to that date. Although the ENOE classifies occupations using four-digit codes, I use occupational categories based on three-digit codes throughout the analysis because of computational limitations in testing the selection models (described later) using fixed effects for so many categories.

Additional fixed effects are introduced to account for other differences in the educational attainment of working-aged men. First, as demonstrated by Rendall and Parker (2014), large differences in education persist across Mexican communities with different levels of urbanization. I control for the level of urbanization using dummy variables for cities or towns of four sizes: less than 2,500 residents (used as the baseline); 2,500 to 14,999 residents; 15,000 to 99,999 residents; and 100,000 or more residents (including 32 metropolitan areas oversampled by the ENOE). Second, to account for the increasing trend in educational attainment in Mexico during this period, fixed effects are also introduced for the quarters in which the interviews were conducted. From 2005 to 2012, the average years of education for all working-aged men in the sample increased from 9.0 to 9.6 years (the difference is statistically significant). Finally, because the educational requirements for jobs in specific occupations may vary based on the educational distribution of the available labor force, I also introduce fixed effects for different regions of the country. Mexican states are grouped into five regions based on the classification used by the Mexican National Institute for Statistics and Geography (INEGI 2009c).<sup>6</sup>

## Selection Into Employment

One of the key objectives of this study is to compare the educational attainment of migrants with that of nonmigrants employed in the same occupation. Because only individuals who are employed will have an occupation, this comparison must be limited to those who are currently employed. However, limiting the analysis to employed individuals raises the possibility of a selection bias in my estimates of the educational disparity between migrants and nonmigrants. For example, if only migrants who have special nonobservable skills are able to obtain a job within the first year after migrating to a new place within Mexico, then my estimates of the education of internal in-migrants relative to others in the same occupation may be biased downward (the nonobservable skills of this select group of men will allow them to obtain jobs for which they are otherwise undereducated). To adjust for this selection bias, I test the differences in education between migrants and nonmigrants in the same occupation using Heckman sample selection models estimated with maximum likelihood (Greene 2012:873–880; Heckman 1976).<sup>7</sup> Selection into

<sup>6</sup> Fixed-effects models were also tested using all 32 Mexican states, leading to similar results.

<sup>7</sup> As shown by Stolzenberg and Relles (1997), under some conditions, Heckman sample selection models may lead to inaccurate estimates of regression coefficients. The main problem arises when the selection hazard is nearly indistinguishable from the predictors in the model. Under those conditions, problems associated with multicollinearity may arise. Fortunately, the extremely large sample size in the models tested as well as the use of a strong instrument help mitigate the potential for estimation problems.



employment is modeled in the first-stage equation using the full sample of working-aged men. Educational attainment is modeled in the second-stage equation. The local male unemployment rate is used as an instrument because it is assumed to affect men's odds of being employed but not their educational attainment. The male unemployment rate is calculated directly for all 32 oversampled metropolitan areas for which the ENOE contains representative samples. The unemployment rate for all other locations is approximated using the state-level average.

## Descriptive Results

Table 1 shows the difference in the average years of education between each of the four categories of migrants and nonmigrants according to the level of urbanization of the communities in which they reside, and for the top seven occupational groups in which international migrants are employed (two-digit codes are used in this table to simplify the presentation). The first column also shows the average years of education of nonmigrants against which all other groups are compared. First, international emigrants and return migrants have significantly lower levels of education compared with

**Table 1** Difference in average years of education between migrants and nonmigrants by level of urbanization and select two-digit occupational categories

	Years of Education Nonmigrants	Difference in Years of Education Compared With Nonmigrants			
		International Migrants		Internal Migrants	
		Emigrants	Return	Out-Migrants	In-Migrants
All	9.3	-1.3**	-1.6**	0.2	-0.1
By Urbanization					
Rural (population <15,000)	7.4	-0.4**	-0.6**	0.7**	0.2*
Urban (population ≥15,000)	10.2	-0.7**	-1.1**	0.5**	0.0
By Occupation					
Agricultural workers	6.0	0.7**	0.4**	1.1**	0.8**
Industrial workers	8.1	-0.4**	-0.7**	0.0	0.0
Machine operators	8.9	-0.7**	-1.2**	0.1	0.4
Low-skilled industrial workers	7.5	-0.2	-0.3	0.3*	0.1
Drivers	8.7	-0.4*	-0.7*	0.6**	0.4*
Merchants and salespersons	10.2	-0.2	-1.0**	0.1	-0.3
Personal service workers	8.6	-0.4	-0.7**	0.0	0.1
Other	12.5	-1.5**	-1.8**	-0.1	-0.5**

*Notes:* Two-digit occupational groups are based on the Mexican Classification of Occupations (CMO). Occupational groups correspond to codes 41, 52, 53, 54, 55, 71, and 81 (in order). Statistical tests shown are for difference of means compared to nonmigrants in the same category.

\* $p < .05$ ; \*\* $p < .01$  (two-tailed tests)

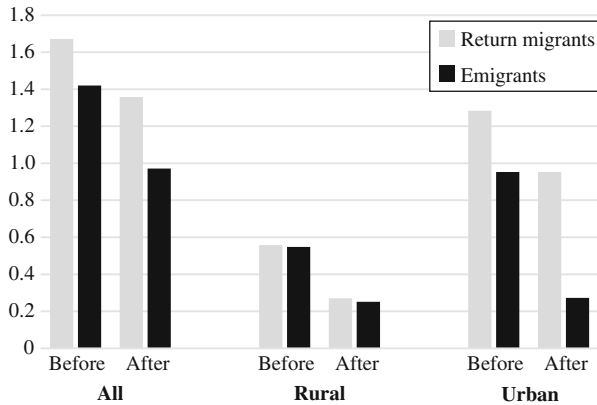
nonmigrants. On average, international emigrants have 1.3 fewer years of education than nonmigrants, and return migrants have 1.6 fewer years. Second, these disparities in education are reduced, although still statistically significant, when comparing international migrants to nonmigrants living in communities of similar levels of urbanization (with urban areas defined here as cities with 15,000 or more residents).

Most importantly, the differences in education appear to be smaller when comparing international migrants with nonmigrants in the same broad occupational categories. In every one of the top seven occupational categories, the difference in education between international emigrants and nonmigrants is smaller than the overall difference. In three of the occupational categories (low-skilled industrial workers, merchants and salespersons, and personal service workers) the difference is not statistically significant. However, in a fourth category—namely, agricultural workers—the difference in education between international migrants and nonmigrants is actually reversed: both international emigrants and return migrants employed in agriculture have significantly higher levels of education than nonmigrants.

These descriptive findings are based on very broad two-digit occupational categories. Nevertheless, they suggest that migrant selectivity varies by occupational group and that the negative selectivity of international migrants may be lower after their occupation is taken into account. To further test whether migrants are overeducated relative to nonmigrants in the same occupations, I control for other factors associated with individuals' educational attainment in the upcoming multivariate analysis. In addition, given the significantly higher levels of education of agricultural emigrants relative to nonmigrants employed in the same occupation, I test multivariate models excluding agricultural workers. The exclusion of men employed in agriculture in some models will allow me to rule out the possibility that the overeducation of Mexican migrants is entirely driven by the higher level of education of agricultural migrants relative to agricultural nonmigrants shown in Table 1. Examining the sensitivity of the regression results to the exclusion of agricultural workers is particularly important given the overrepresentation of such workers in the international migration stream: they constitute 31.9 % of all employed emigrants.

In contrast to international migrants, the descriptive statistics presented in Table 1 indicate that internal migrants on average have educational attainment levels that are not significantly different from those of nonmigrants. Moreover, internal migrants actually have higher levels of education than nonmigrants living in rural areas. They also have higher levels of education compared with nonmigrants employed in some occupational categories.

Finally, to illustrate how the educational level of international migrants relative to nonmigrants changed, Fig. 1 shows the difference in years of education between Mexican men who did not migrate and those who migrated before and after the onset of the U.S. recession. The gap in education between nonmigrants and migrants becomes smaller over time, which is consistent with a decrease in the negative educational selectivity (Villarreal 2014). The change in selectivity is particularly pronounced for international emigrants from urban areas. Before 2008, emigrants from urban areas had 0.95 fewer years of education than nonmigrants living in urban areas, compared with only 0.27 fewer years after 2008.



**Fig. 1** Difference in years of education between nonmigrants and migrants before and after the onset of recession by level of urbanization

## Multivariate Results

Table 2 shows the results of the regression models predicting Mexican men's years of education; the table presents the results from the second-stage equation.<sup>8</sup> All models include fixed effects for the quarter in which the individual was observed to control for the increasing trend in educational attainment over time. Later models also include fixed effects for the level of urbanization, region of the country, and (most importantly) for individuals' occupation. As expected, international emigrants have significantly lower levels of education compared with nonmigrants according to the baseline model (Model 1). Consistent with findings from Rendall and Parker (2014), this negative selectivity is largely attributed to the disproportionately rural origin of international migrants. After the level of urbanization is controlled in Model 2, the coefficient for emigrants becomes statistically nonsignificant. Most importantly, when men's occupation is introduced as a predictor, the coefficient for emigrants becomes positive and statistically significant (Models 3 and 4), indicating that emigrants are positively selected by education within their occupation. This finding is consistent with the education-occupation mismatch hypothesis, according to which men who are overeducated for their occupation are more likely to migrate.

The results of the models comparing the educational attainment of internal migrants with nonmigrants employed in the same occupation are also consistent with the mismatch hypothesis. Men who are overeducated for their occupation are more likely to migrate out of their communities: hence, the positive coefficient for internal out-migrants in Models 3 and 4. They also appear to be moving to locations in which they can obtain jobs commensurate with their education (hence, the nonsignificant coefficient for internal in-migrants). The comparison between the coefficients for internal in-migrants and out-migrants is very informative in that it indicates that internal migrants are improving their occupational placement for their education by moving (the difference is statistically significant).

<sup>8</sup> See Table 4 in the appendix for the complete results, including those for the first-stage equation.

**Table 2** Results of models predicting years of education for Mexican male workers

	Model 1	Model 2	Model 3	Model 4
<b>International Migration</b>				
International emigrant	-1.345** (0.072)	-0.066 (0.070)	0.388** (0.053)	0.417** (0.053)
International return migrant	-2.530** (0.100)	0.376** (0.103)	0.445** (0.076)	0.481** (0.076)
<b>Internal Migration</b>				
Internal out-migrant	-0.091 (0.066)	0.471** (0.065)	0.335** (0.048)	0.334** (0.048)
Internal in-migrant	-0.332** (0.087)	-0.061 (0.087)	0.018 (0.064)	0.016 (0.064)
Age	0.785** (0.005)	-0.201** (0.005)	-0.158** (0.004)	-0.160** (0.004)
Age Squared	-0.011** (0.000)	0.002** (0.000)	0.001** (0.000)	0.001** (0.000)
<b>Urbanization (&lt;2,500 baseline)</b>				
2,500 to 14,999		1.826** (0.031)	0.854** (0.025)	0.831** (0.025)
15,000 to 99,999		2.807** (0.035)	1.128** (0.028)	1.139** (0.028)
>100,000 and overrepresented cities		4.086** (0.022)	1.693** (0.020)	1.607** (0.020)
<b>Fixed Effects</b>				
Fixed effects for quarters	Yes	Yes	Yes	Yes
Fixed effects for occupation			Yes	Yes
Fixed effects for regions				Yes
Constant	-5.110** (0.154)	11.483** (0.159)	19.023** (0.125)	18.929** (0.126)
Pseudo- $R^2$	.0166	.0633	.4606	.4612
Uncensored Observations	597,925	597,925	597,925	597,925
$N$	757,786	757,786	757,786	757,786

*Notes:* Results from the first stage of the Heckman sample selection model are omitted to conserve space. See Table 4 in the appendix for results of the first-stage equation. Efron's pseudo- $R^2$  is computed as the square of the correlation of the observed and predicted years of education for employed men.

\*\* $p < .01$  (two-tailed tests)

The results for returning international migrants are more difficult to interpret. Because returning international migrants are doubly selected compared with nonmigrants—once upon leaving the country, and then once again upon their return—a comparison of the overeducation of returning international migrants with nonmigrants is not particularly informative. A comparison of the overeducation of returning international migrants with that of international emigrants at least allows me to account for the effect of out-migrant selectivity, to the extent that it has remained stable over time. However, any increase in the extent of overeducation of returning migrants relative to international emigrants

still captures both the selectivity of migrants returning from the United States and the effect of their work experience while living abroad.<sup>9</sup> Research by Campos-Vazquez and Lara (2012) and Reinhold and Thom (2013) suggests that migrants returning to Mexico may have gained occupation-specific skills. These skills would allow them to obtain jobs in occupations for which they would otherwise be insufficiently educated, leading to lower average levels of education compared with emigrants employed in the same occupation. On the other hand, Lindstrom (2013) found no evidence that U.S. migratory experience results in upward occupational mobility for Mexican workers. Lindstrom suggested that Mexican immigrants may not have an opportunity to acquire new skills while working in the United States because they tend to be concentrated in low-skilled jobs. Skills that they gained abroad may also not be transferable to the Mexican labor market. Although it is not possible to distinguish the contribution of return-migrant selectivity and job skills gained abroad, the difference in the coefficients in Model 4 in Table 2 indicates that they have a combined null effect.<sup>10</sup>

## Changes Over Time

As discussed earlier herein, recent research has indicated that international migrants from Mexico became more positively selected by education following the onset of the U.S. recession in 2008 (Villarreal 2014). To examine whether emigrants and return migrants also became more educated relative to nonmigrants within the same occupation, I tested regression models with interaction terms between individuals' migration status and a variable indicating the quarters after the onset of the U.S. recession. The results are presented in Table 3. The second panel in Table 3 also shows the results of similar models tested with a sample that excludes all agricultural workers. As discussed earlier, agricultural workers constitute a particularly large percentage of international migrants from Mexico (31.9 % of all employed emigrants). Because agricultural migrants are significantly more educated compared with other workers in the same occupation, the results of the previous models in which migrants were found to have higher levels of education for their occupation may be driven entirely by the inclusion of agricultural workers.

<sup>9</sup> Any inference regarding the combined effect of return migrant selectivity and work experience abroad based on a comparison of the educational attainment of return migrants and current emigrants assumes that changes in emigrant selectivity over time are either small, or that such changes are largely captured by other predictors in the model—specifically, men's age. If emigrants became more positively selected by education over time, then current emigrants will be more educated than the stock of immigrants living in the United States. The difference in the coefficients of emigrants and return migrants in Table 2 would then provide a negatively biased estimate of the combined effect of return migrant selectivity and work experience abroad.

<sup>10</sup> In a separate ancillary analysis not presented here, I used propensity score matching in an attempt to adjust for the selectivity of return migration, thereby isolating the effect of migrants' work experience abroad. The results of the treatment effects models, in which return migrants were matched as close as possible with emigrants on a standard set of covariates of migration, indicated that the experience of migrating abroad resulted in an increase of 0.2 years of education relative to other men in the same occupation. Although not definitive, this ancillary analysis suggests that the migration experience results in a slight underplacement of men based on their education net of selectivity.

**Table 3** Results of models predicting years of education for Mexican male workers with interactions for economic recession

	With Agricultural Workers		Without Agricultural Workers	
	Model 1	Model 2	Model 1	Model 2
<b>International Migration</b>				
International emigrant	0.417** (0.053)	0.136* (0.060)	0.352** (0.067)	-0.015 (0.075)
International emigrant × recession		0.521** (0.103)		0.584** (0.131)
International return migrant	0.481** (0.076)	-0.199* (0.095)	0.457** (0.098)	-0.470** (0.125)
International return migrant × recession		0.812** (0.143)		1.115** (0.184)
<b>Internal Migration</b>				
Internal out-migrant	0.334** (0.048)	0.329** (0.048)	0.270** (0.054)	0.265** (0.054)
Internal in-migrant	0.016 (0.064)	0.013 (0.064)	-0.038 (0.071)	-0.041 (0.071)
Age	-0.160** (0.004)	-0.159** (0.004)	-0.154** (0.005)	-0.154** (0.005)
Age Squared	0.001** (0.000)	0.001** (0.000)	0.001** (0.000)	0.001** (0.000)
Recession		0.821** (0.105)		0.815** (0.118)
<b>Urbanization (&lt;2,500 baseline)</b>				
2,500 to 14,999	0.831** (0.025)	0.828** (0.025)	0.443** (0.030)	0.440** (0.030)
15,000 to 99,999	1.139** (0.028)	1.136** (0.028)	0.610** (0.030)	0.605** (0.030)
>100,000 and overrepresented cities	1.607** (0.020)	1.602** (0.020)	1.063** (0.022)	1.056** (0.022)
<b>Fixed Effects</b>				
Fixed effects for quarters	Yes	Yes	Yes	Yes
Fixed effects for regions	Yes	Yes	Yes	Yes
Fixed effects for occupation	Yes	Yes	Yes	Yes
Constant	18.929** (0.126)	19.023** (0.127)	19.291** (0.145)	19.401** (0.146)
Pseudo- $R^2$	.4612	.4613	.4414	.4415
Uncensored Observations	597,925	597,925	523,780	523,780
$N$	757,786	757,786	683,641	683,641

*Notes:* Results from the first stage of the Heckman sample selection models are omitted to conserve space. Efron's pseudo- $R^2$  is computed as the square of the correlation of the observed and predicted years of education for employed men.

\* $p < .05$ ; \*\* $p < .01$  (two-tailed tests)

The results presented in Table 3 show a significant increase in the education of both international emigrants and return migrants relative to their nonmigrant peers in the same occupations. Before the recession, the educational selectivity of international

emigrants was substantially smaller; and in the case of nonagricultural migrants, nonsignificant. The changes over time are even more dramatic for returning migrants, who are found to be undereducated before 2008 and overeducated afterward. Overall, the recession seems to have accentuated the process by which Mexican men who are the most educated for their occupation seek to migrate abroad. The recession, which also adversely affected Mexican labor markets, could also have diminished returning migrants' ability to obtain jobs in occupations commensurate with their education.

Finally, the exclusion of agricultural workers appears to have a minimal effect on estimates of the mismatch between Mexican migrants' educational attainment and their occupation in the baseline models in Table 3 (Model 1 in both panels). However, after the interactions with the economic recession are introduced (Model 2), I find that nonagricultural emigrants and return migrants are less educated relative to other men in the same occupation before the onset of the recession compared with agricultural emigrants and return migrants, respectively. The lower levels of education of nonagricultural migrants compared with all migrants in the same occupation make sense given the significant overeducation of agricultural migrants found in the descriptive analysis.

## Conclusions

Recent studies have indicated that international migrants from developing countries such as Mexico are negatively selected by education, that is, that they have lower levels of education compared with those who stay behind (Fernández-Huertas Moraga 2011; Rendall and Parker 2014). The statistical analysis presented in this article confirms this general finding. However, the results of models in which migrants' education is compared with that of others working in the same occupation indicate that Mexican migrants are positively selected within their occupation. This finding is consistent with research on the education-occupation mismatch, which suggests that workers who are overeducated for their occupation have lower earnings and are more dissatisfied with their jobs. The greater dissatisfaction with their jobs appears to encourage overeducated workers to migrate in search of better opportunities.

One of the key conclusions of this study is that the negative overall educational selectivity of Mexican emigrants so well established in recent studies is largely due to the fact that migrants are disproportionately drawn from occupations with lower levels of education, such as agricultural occupations. Within each occupation, international migrants are typically drawn from the most educated among their peers. This finding may inform the debate regarding the "quality" of migrants arriving in the United States (e.g., Borjas 1987).

The positive educational selectivity within occupations was found to be particularly strong among Mexican agricultural workers. It is perhaps not surprising that agricultural work is especially frustrating for those with higher levels of education. Among other things, agricultural jobs provide few opportunities for upward social mobility. Without additional information regarding the kinds of jobs that Mexican agricultural migrants obtain after they arrive in the United States, it is difficult to say whether these more-educated workers see migration as an opportunity to move into new occupations or whether they simply see better opportunities within agriculture in the United States.

The results of the analysis of changes in educational selection over time indicate that the mismatch between emigrants' education and their occupation is larger in more

recent years. In fact, in the years before the recession, nonagricultural emigrants were no more educated than nonmigrants in the same occupation, and return migrants were actually negatively selected within their occupations. The increasing educational selectivity of international migrants within occupation is consistent with results I presented in a previous article (Villarreal 2014), showing an overall increase in educational selectivity since the onset of the 2008 U.S. recession. The fact that the increase in educational selectivity occurs not only with respect to the entire population but also within occupations indicates that the overall increase in selectivity is not simply due to a change in the occupational profile of migrants. The overall increase in educational selectivity is largely the result of migrants with more education within their occupations migrating at higher rates, rather than only migrants from occupations characterized by higher levels of education migrating at higher rates.

The findings for internal migrants within Mexico are also consistent with the education-occupation mismatch hypothesis. Men who are overeducated for their occupation are more likely to leave their communities in search of better job prospects elsewhere in Mexico. The fact that internal out-migrants are overeducated for their occupation while internal in-migrants are not suggests that internal migration results in a better occupational placement for Mexican men. Unfortunately, data limitations preclude testing whether international migration also results in better occupational placement. A direct test of whether international migrants obtain jobs more commensurate with their education by moving abroad would require information about migrants' jobs both before leaving Mexico and after they arrive in their foreign destination. The latter are not available in a single-country survey, such as the ENOE. Moreover, even if such information from the receiving country were available, the test would be complicated given that it would involve a comparison between the education of Mexican immigrant workers in the United States and that of workers in Mexico employed in similar occupations (rather than with native U.S. workers).

However, an actual reduction in the overeducation of Mexican men after migrating internationally is not strictly necessary for overeducation to increase the odds of emigration. The lower wages and frustration of being underplaced for their education may make workers less attached to their current jobs and therefore more mobile. Various other factors could explain why underplaced migrants would choose to emigrate even if migration does not in fact result in better occupational placement abroad. Migrants may have incorrect information about their prospects in the U.S. labor market. Alternatively, other factors—including the expectation of higher wages—may compensate for the low occupational placement abroad. Migrants may also be lured by the expectation of great occupational mobility later in life even if their occupation immediately upon arrival is not commensurate with their education.

The ENOE survey used in this study is well suited for an analysis of the education-occupation mismatch of Mexican migrants. Its sampling strategy, which is not only nationally representative but also representative of four levels of urbanization, allowed me to compare the educational attainment of migrants with nonmigrants employed in a wide spectrum of occupations and levels of urbanization. I was specifically able to measure the overeducation of migrants employed in nonagricultural jobs. However, one limitation of the ENOE survey is that it does not distinguish migrants according to their legal status. Massey (2012) documented a rise in temporary legal migration in recent years. Some of these temporary workers have received visas explicitly intended for investors and other professionals. An increase in the proportion of documented migrants could result in a



more positive overall educational selectivity and may also affect the extent to which international migrants are positively selected within their occupations. Future work should seek to further clarify the possible effect of documentation status on migrant selectivity.

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## Appendix

**Table 4** Full results of selection models predicting years of education for Mexican male workers

	Selection	Education
International Migration		
International emigrant	-0.171** (0.024)	0.417** (0.053)
International return migrant	-0.638** (0.030)	0.481** (0.076)
Internal Migration		
Internal out-migrant	-0.062** (0.018)	0.334** (0.048)
Internal in-migrant	-0.029 (0.025)	0.016 (0.064)
Age	0.269** (0.002)	-0.160** (0.004)
Age Squared	-0.003** (0.000)	0.001** (0.000)
Urbanization (<2,500 baseline)		
2,500 to 14,999	-0.224** (0.010)	0.831** (0.025)
15,000 to 99,999	-0.295** (0.011)	1.139** (0.028)
>100,000 and overrepresented cities	-0.368** (0.008)	1.607** (0.020)
Unemployment Rate	-0.050** (0.002)	
Fixed Effects		
Fixed effects for quarters	Yes	Yes
Fixed effects for occupation		Yes
Fixed effects for regions	Yes	Yes
Constant	-3.104** (0.049)	18.929** (0.126)
Pseudo- $R^2$		.4612
Uncensored Observations		597,925
$N$		757,786

*Notes:* Results are from full model (Model 4) in Table 2. Efron's pseudo- $R^2$  is computed as the square of the correlation of the observed and predicted years of education for employed men.

\*\* $p < .01$  (two-tailed tests)

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