RE-ASSESSING THE RELATIONSHIP BETWEEN MIGRANT KIN NETWORKS AND WAGES AMONG MEXICAN MIGRANT MEN

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ABSTRACT

The conventional wisdom is that networks matter to economic outcomes for immigrants in the U.S. In reality, though, there have been only a handful of quantitative examinations of this relationship, most of which have relatively major methodological weaknesses which bring into question the validity of their findings. My research corrects for the past weaknesses, and further advances the research by applying fixed effects methods and using more nuanced model specifications. Results show that in the aggregate migrant kin networks have a minimal positive effect on migrant wages. However, disaggregating the data reveals that migrant kin networks do positively affect Mexican men's wages in the U.S., but only for men in the lower half of the U.S. wage distribution.

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INTRODUCTION

Though the universality of the importance of social networks in immigrant economic achievement has come under fire in recent years (see work regarding gender and social networks, for instance), the conventional wisdom that networks are important facilitators of economic growth among at least some portions of the immigrant community remains quite prevalent. The quantitative evidence supporting this influential conception, however, is surprisingly sparse. To the extent that a literature does exist, it is marred by weaknesses which bring into question the direction and magnitude of the association between networks and wages, and thus the validity of the dominant conventional wisdom. This deficiency in the research has been driven largely by data limitations, and exacerbated by the inherent difficulties associated with measuring network effects.

I capitalize on the continued data collection efforts of the Mexican Migration Project (MMP), as well as methodological innovations, in order to not only correct for the problems in past work, but to advance the understanding of how migrant social networks are associated with wages earned among Mexican male immigrants, and thus to re-assess the prevailing model regarding the importance of immigrant social networks. I find that when all Mexican male immigrants are grouped together, evidence suggests that migrant kin networks are of minimal importance to U.S. wages. However, additional analyses reveal that low-earning Mexican migrant men benefit markedly from having access to migrant kin networks, while high-earning Mexican migrant men do not benefit at all.

BRIEF OUTLINE OF PAST RESEARCH, AND CONTRIBUTIONS OF THIS PAPER

The ability to examine the relationship of social networks and employment outcomes among immigrant groups has been greatly limited by the dearth of relevant data. An answer to this problem

was presented in the form of the Mexican Migration Project (MMP) which is, to my knowledge, the most comprehensive, publicly available dataset addressing social networks and immigrant outcomes.

The most recent generation of literature on wages and networks among immigrant men is comprised almost exclusively of results obtained using the MMP. There are six published works and one dissertation that deal at least tangentially with migrant networks and immigrant wages in the U.S., and five of these use Mexican Migration Project data[1]. The results using the MMP all focus on male immigrants, and seem to confirm, to varying degrees, that migrant networks are important determinants of economic well-being of immigrants in the host country.

A close examination of these past efforts, though, reveals rather major methodological weaknesses. These weaknesses, which bring into question the validity of the findings, can be broken down into two major categories <*these will be more explicitly discussed in final version*>:

- Independent variables (i.e., social network measures) are measured chronologically *after* the dependent variable (e.g., wage)
- Variables interpreted as measuring social networks are in fact measuring migrant settlement patterns (e.g., whether wife traveled with husband during U.S. trip, whether children traveled with father during U.S. trip)

So all in all, it appears that past work has incorrectly specified the causal relationship between migrant networks and migrant wages. Like most of my predecessors I also use the MMP data, but I am to overcome many of the past problems, and also build upon the work to better tease out the relationships between migrant kin networks and wages. In particular, I:

- use variables based upon total number of kin with prior U.S. experience, that can more safely be interpreted as representing migrant social networks,

[1] Aguilera and Massey 2003, Philips and Massey 1999, Massey 1987, Massey et al. 1987, Massey and Espinosa 1997, Espinosa 1997, Greenwell et al. 1997

- measure these networks at a time prior to the time when I measure U.S. wages,
- use fixed effects methods to reduce problems associated with omitted variable bias, which thus improves the ability to make judgments regarding the causal relationship between networks and wages,
- use model specifications that better represent the empirical relationship between networks and wages
- examine how the relationship of networks and wages varies for low versus high-earning male migrants.

DATA AND METHODS

Data and Sample

My analysis is based upon data obtained through the Mexican Migration Project (MMP). Between 1982 and 2003, the MMP collected interviews from randomly selected households in 93 communities concentrated in Western Mexico. Once a household was selected, information was obtained for all of its members, as well as any children of the household head who were no longer residing in the household. The dataset includes retrospective, person-level information on migration experiences in the U.S., as well as other information regarding the human capital, family structure, community characteristics, and economic profiles of all household and immediate family members, plus lifetime labor histories of household heads and spouses. The MMP also conducts supplemental interviews in the primary immigrant destinations in the U.S. This binational aspect of the survey is important because it reduces the potential problems associated with obtaining migration histories only for persons who have returned to Mexico.

I limit analyses to respondents meeting the following criteria, thus producing a sample of 1650 respondents, and 3300 respondent-trips:

- were the male head of household at the time of survey
- were born outside of the U.S., or were born in the U.S., but moved to Mexico prior to age 5,
- worked during at least two trips to the U.S.,
- provided information regarding the years of their first and last U.S. trip,
- provided wage information from their primary jobs on their first and last U.S. trip, and
- most recent U.S. job occurred within 25 years of the survey year.

Variables

The key dependent variable, hourly wage, is converted to year 2000 dollars using CPI adjustments and, for multivariate analyses, it is logged. The key independent variables measure the total number of siblings and parents who migrated to the U.S. prior to the respondent's trip (so all migrant kin network variables are person-specific and trip-specific). There are two network ties measures—one dichotomous measure for whether a respondent had any migrant kin ties, and a continuous count of the number of kin ties a respondent had.

Dummy variables for survey community are included to reduce problems associated with non-independence of observations resulting from the MMP sampling technique, as well as any unobserved characteristics associated with community membership. Since the most recent year of the most recent job varies between respondents, a control for most recent job year is included in all models, and all independent variables are measured in that year (Year T), or the year prior (Year T-1). Controls for the respondents age are included. 'Education' is a straightforward measure of the number of years of formal education each respondent reports. In order to approximate each respondent's U.S. migration experience, I include a variable summing the number of trips to the U.S. the person ever took, not including their most recent trip. To grasp the amount of time each respondent actually *lived* in the U.S., I include a variable for the total months of prior U.S. experience, and also include this as a squared term. A respondent is considered to be legally

documented if they report having a green card, being a Bracero or contract worker, having amnesty, or being a participant in the Agricultural Workers Program. Persons who report being undocumented, or having a tourist visa while working in the U.S. are considered 'illegal'.

Methods

I first run OLS regressions with wage as the dependent variable and social tie measures as the independent variables. This provides insight into the *association* between social ties and wage, but does not really allow for any *causal* judgments regarding this relationship, because any association that emerges may be the result of omitted variable bias. That is, what on the surface appears to be a *causal* relationship between the dependent and independent variables may, in fact, be a spurious one resulting from the effects of some other, unmeasured variable on both the independent and the dependent variables.

Research regarding social capital and economic outcomes is particularly vulnerable to unmeasured heterogeneity bias. It can be argued, for instance, that certain characteristics (e.g., an individual's social adeptness or family background) could independently affect both wage and social connections. If this is, indeed, the case, then any significant relationship between social ties and wage that is revealed via cross-sectional regression could actually result from each individual's unmeasured characteristics. Since my analysis focuses on kin networks with prior migration experience, concerns about omitted variable bias center on unmeasured characteristics of families that may affect both the size of migrant kin networks, and respondent wages.

In order to limit such problems, I also conduct multivariate analyses using first difference fixed effects models. As with the cross-sectional OLS models, the fixed effects models include wage and social tie information from two time points for each respondent (his first U.S. trip, and last U.S. trip). However, instead of independently processing information from each U.S. trip, the fixed effects method essentially combines information for the two trips of each respondent, and analyzes

the association of the cross-time *changes* in each variable for each individual. The advantage of using this methodology in assessing causal effects is that all non-varying characteristics are controlled for, because each person is essentially used as their own control. As such, any relationship between social ties and wage that persists in the fixed effects models can more safely be interpreted as a *causal* one, controlling for additional independent variables included in the model.

PRELIMINARY RESULTS

Sample Characteristics

Table 1 contains details regarding the characteristics of this sample, averaged across first and last U.S. trip, weighted so that results are representative of the populations in all sampled communities. Men in this sample report wages approaching $9.00 an hour, which seems surprisingly high, given their low educational level (less than 6 years on average). Looking at the migration-specific information, though, reveals that what these men lack in human capital, they make up for with experience within the U.S. Each respondent reports having spent on average four years in the U.S. during 2.3 trips. About one-third of the sample reports being documented. The proportion of respondents who report having migrant kin with prior U.S. experience is .61, and among those 61 percent of respondents, the average number of migrant kin ties is 2.7.

Multivariate Results

Table 2 simply shows the relationship of migrant kin ties and wages for Mexican men, correcting for the two major problems in the past work. In particular, these models show how ties and wages are associated when 'networks' are defined by the number of migrant kin ties (as opposed to alternate variables used in the past, which actually measure settlement patterns), and when ties are measured *prior* to wages. These models include controls for age, education, documentation status, U.S. experience, U.S. experience squared, prior U.S. trips, year of trip, and survey community. Like

past efforts, I present here models where networks are modeled either as a dichotomous variable, or as a continuous, linear variable. There is no significant relationship at all between wages and migrant kin networks when the networks are measured dichotomously in Model 1. Model 2, where networks are restricted to be linear, reveals a marginally significant positive relationship between ties and wages; each additional tie is associated with a one percent increase in wages.

Intuitively, it's reasonable to suspect that the relationship between ties and wages may be a nonlinear one, though not necessarily dichotomous. For instance, moving from zero to one tie may not produce the same effect on wages as moving from, for example, five to six ties. Table 3 shows OLS regressions on log wage allowing for this possibility, and indeed confirms that the effect of moving from zero ties to one tie produces a different (less positive) effect than moving from some ties to yet more ties. It's apparent that including the two-variable migrant kin network specification (in Table 3, Model 4) produces an increase in the magnitude and significance of the coefficients for both network variables[2].

Table 3 also includes reduced-form model specifications, showing how networks and wages are related, given various sets of controls. The first column shows that with just basic controls for trip year and non-independence, there is no effect of having some versus no network ties on wages, but a notably positive effect for each additional tie thereafter; each tie increase wages by four percent. The next model adds controls for age and education. The third column adds controls for age and migration-related variables. This reduces the positive ties coefficient a bit more than controlling for human capital—now each additional tie increases wages by two percent[3]. Finally, the last column shows that controlling for all factors simultaneously reduces the tie coefficient yet further, though it

[2] Several other non-linear specifications were tested, as well, but none fit the data better than the version shown in Table 3

[3] U.S. experience is primarily responsible for the reducing in network effects in Model 3 (results not shown)

maintains statistical significance. With all controls included, each additional tie increases wage by one and a half percent, for persons who have at least one tie to begin with.

As mentioned earlier, a common critique of work regarding networks and economic outcomes is that any seeming relationship between these two phenomena could be spurious, ie, actually caused by some other exogenous factor. In order to address this issue, Table 4 presents models analogous to those in Table 3, but uses fixed effects methods to control for omitted variable bias. Comparing results across the two tables shows that controlling for omitted variable bias generally *increases* the magnitude of the coefficients. This indicates that, in the absence of the fixed effects modeling, exogenous factors are actually *suppressing* the relationship of wages and social networks.

Comparing the network coefficients across the four models reveals that, when only omitted variable bias and the basic controls (survey community, trip year) are included, there is a marginally negative effect of having one versus no migrant kin ties, while the coefficient on number of kin ties is positive and significant. Adding in controls for age and education in Column 2 elicits absolutely no change in these tie coefficients at all. In the third column, though, it's apparent that adding in controls for migration-specific capital reduces the coefficient on number of migrant kin ties dramatically, and reduces its significance[4]. In this model, having some versus no ties *reduces* wages by seven percent, which is marginally significant. For persons with at least one migrant kin tie, each additional tie increases their wages by about two percent. Results in Model Four are similar.

The Importance of Wage Level in Affecting the Network/Wage Relationship

In preliminary descriptive runs (not shown here, but conceptualized in Figure 1), it was apparent that a migrant's wage on his first trip is inversely related to the wage increase he experiences on future U.S. trips. I also found a marginally significant positive relationship between the wages a migrant earned on his first U.S. trip, and the number of kin members who subsequently migrate to

[4] Again, most of the effect of migration-specific capital is being driven by U.S. experience (results not shown).

the U.S. These early findings led me to suspect that separating out analyses based upon first wage would reveal significant differences for respondents at different locations along the wage distribution. The results of these analyses are displayed in Table 5 and Figure 2.

Table 5 shows key coefficients for a fixed effects regression including all control variables, and also allowing for the relationship between migrant kin networks and wages to vary, depending upon each respondent's first U.S. wage (and first U.S. wage squared). It's apparent that there are a number of statistically significant coefficients here, with relatively large magnitudes. However, it's difficult to envision these complex relationships looking at the coefficients alone.

In order to better understand these coefficients, Figure 2 present a graph based upon the regression in Table 5. Using the sample of respondents, I calculated the overall wage distribution for first U.S. wage earned (standardized to year 2000$), and then substituted several of these wage values into the regression equation in Table 5 to show how the association of migrant kin networks and wages varies for low earners versus high earners. Each line in the figure represents a different location on the U.S. wage distribution for this sample. For instance, the top line represents respondents whose first U.S. wage was in the bottom 5th percentile, which translates to $2.77. At the other end of the wage distribution, persons in the 95th percentile earned on average $17.60. Figure 2 clearly shows that networks do matter for low earners, but for respondents with relatively high wages on their first U.S. trip, having access to other migrant kin with U.S. experience offers no benefits whatsoever.

BRIEF DISCUSSION AND NEXT STEPS

The fact that applying fixed effects methods dramatically alters the coefficients on migrant kin networks confirms the importance of considering omitted variable bias when looking at this type of relationship. Contrary to expectations, though, fixed effects actually lead to an increase in network

coefficients, indicating that the omitted variables are actually *suppressing* the magnitude of the relationship between networks and wages. Though education is not an especially important mediator of the relationship between networks and wages, migration-specific capital certainly is. Controlling for documentation, U.S. experience, and prior U.S. trips almost halves the association of networks and wages in the fixed effects models.

Perhaps more relevant to the larger literature is the overall finding that positive network effects on wages persist when appropriate network measures are used, networks are measured prior to wages, and controls for human capital, migration-specific capital, and omitted variable bias are simultaneously included. *However*, it's important to note that this statistically positive association of networks and wages is only in operation for persons with relatively large networks. Considering the average network for a respondent in this sample includes less than three persons, the generalizability of the benefits of networks still seem to be in doubt, statistical significance notwithstanding. Once I allowed for the relationship of networks and wages to vary by wage level, though, it became apparent that for *low-earners*, there actually is a statistically and substantively important positive association between wages and networks. Among high earners, though, there is no relationship between migrant kin networks and wages at all.

In addition to developing the conceptual and theoretical framework, and explicitly discussing the prior research more fully, I plan to:

- Check for statistical significance for the various combinations of network size and wage level (based upon the model in Table 4)
- Check for selectivity into this sample, using descriptives and t-tests, as well as a Heckman correction
- Check for differences in results for documented versus undocumented respondents

- Test if controlling for U.S. occupation or job search method (i.e., formal versus informal) mediates the overall effects of networks and wages

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Table 1. Sample Characteristics for First and Last U.S. Trip, Weighted

Hourly U.S. Wage (2000$)	**$8.96** **(16.47)**
Proportion with Any Migrant Kin Ties	**.61**
Number Migrant Kin Ties, Full Sample	**2.05** **(6.16)**
Number Migrant Kin Ties, For Those Reporting Any Migrant Kin Ties	**2.68** **(1.92)**
Trip Year	**1981** **(34.50)**
Age	**29.80** **(31.15)**
Education	**5.87** **(11.37)**
Documented?	**.32**
Number Past U.S. Trips	**2.31** **(12.91)**
Months Spent in U.S.	**48.50** **(200.58)**
N=1650 people, 3300 person-trips	

Standard deviations shown in parentheses

Table 2. OLS Regressions on U.S. lnWage,
Simple Migrant Kin Network Modelling

	Model 1	Model 2
Any Migrant Kin Ties?	**-.0070**	
Number Migrant Kin Ties		**.0098+**

Significance: ***p<.0001 **p<.01 *p<.10 +p<.10
Controls for Age, Education, Documentation, U.S. Experience, U.S. Experience Squared, Number Prior U.S. Trips, Trip Year, and Survey Community also included

Table 3. OLS Regressions on U.S. lnWage, Alternative Migrant Kin Network Modelling

	Model 1	Model 2	Model 3	Model 4
Any Migrant Kin Ties?	**-.0377**	**-.0488+**	**-.0295**	**-.0372**
	(.0264)	**(.0263)**	**(.0256)**	**(.0256)**
Number Migrant Kin Ties	**.0358*** **	**.0331*** **	**.0165** **	**.0145***
	(.0061)	**(.0061)**	**(.0059)**	**(.0059)**
Age		.0005	-.0067***	-.0044**
		(.0012)	(.0011)	(.0012)
Education		.0204***		.0180***
		(.0036)		(.0034)
Documented			.1418***	.1339***
			(.0274)	(.0273)
Months Spent in U.S.			.0040***	.0040***
			(.0006)	(.0006)
Months Spent in U.S. Squared			-.0000**	-.0000**
			(.0000)	(.0000)
Number Past U.S. Trips			-.0090**	-.0086**
			(.0030)	(.0030)

Significance: ***p<.0001 **p<.01 *p<.10 +p<.10
Controls for Trip Year and Survey Community also included

Table 4. Fixed Effects Regressions on U.S. lnWage

	Model 1	Model 2	Model 3	Model 4
Any Migrant Kin Ties?	**-.0836+**	**-.0843+**	**-.0664**	**-.0683**
	(.0437)	**(.0437)**	**(.0425)**	**(.0425)**
Number Migrant Kin Ties	**.0451*****	**.0448*****	**.0251***	**.0246***
	(.0099)	**(.0100)**	**(.0100)**	**(.0100)**
Age	---	---	---	---
Education		.0033	.1342***	-.0062
		(.0275)	(.0345)	(.0267)
Documented			.0044***	.1378***
			(.0007)	(.0347)
Months Spent in U.S.			-.0000***	.0044***
			(.0000)	(.0007)
Months Spent in U.S. Squared			-.0121**	-.0000***
			(.0034)	(.0000)
Number Past U.S. Trips				-.0126**
				(.0034)

Significance: ***p<.0001 **p<.01 *p<.10 +p<.10
Controls for Trip Year and Survey Community also included

Table 5. Fixed Effects Regression on U.S. lnWage, Interacting lnWage Earned on First U.S. Trip

Any Migrant Kin Ties?	**.3985** **(.1254)**
Number Migrant Kin Ties	**.2509*** **(.0289)**
Wage on First U.S. Trip	**---**
Any Migrant Kin Ties * Wage on First U.S. Trip	**-.0715**** **(.0215)**
Any Migrant Kin Ties * Wage on First U.S. Trip Squared	**.0016*** **(.0007)**
Number Migrant Kin Ties*Wage on First U.S. Trip	**-.0332*** **(.0053)**
Number Migrant Kin Ties* Wage on First U.S. Trip Squared	**.0005*** **(.0002)**

Significance: ***p<.0001 **p<.01 *p<.10 +p<.10

Controls for Education, Documentation, U.S. Experience, U.S. Experience Squared, Number Prior U.S. Trips, Trip Year, and Survey Community also included

Figure 1. Relationship of Migrant's First U.S. Wage, Size of Subsequent Migrant Kin Network, and Increase in Wage During Subsequent U.S. Trips

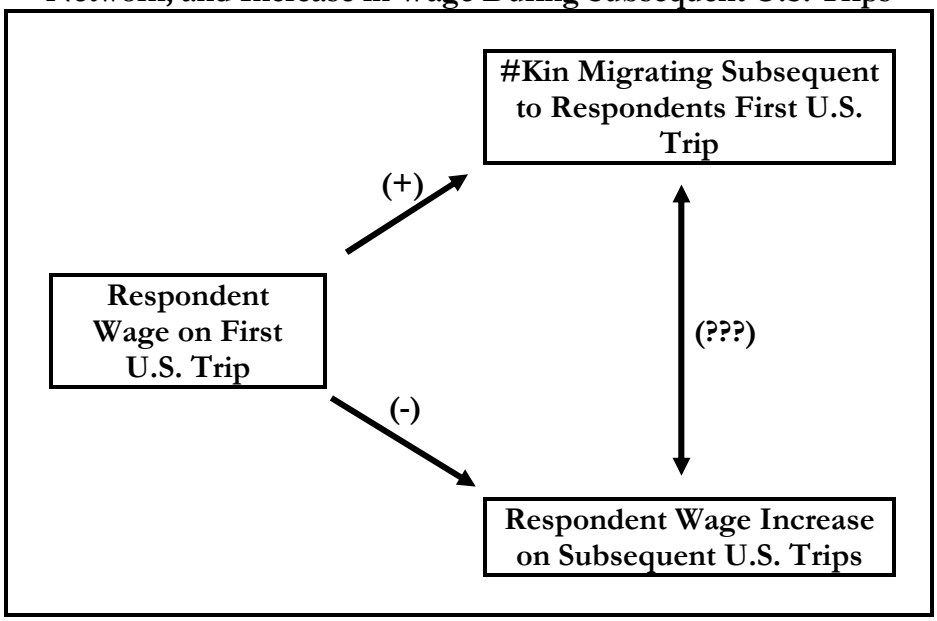
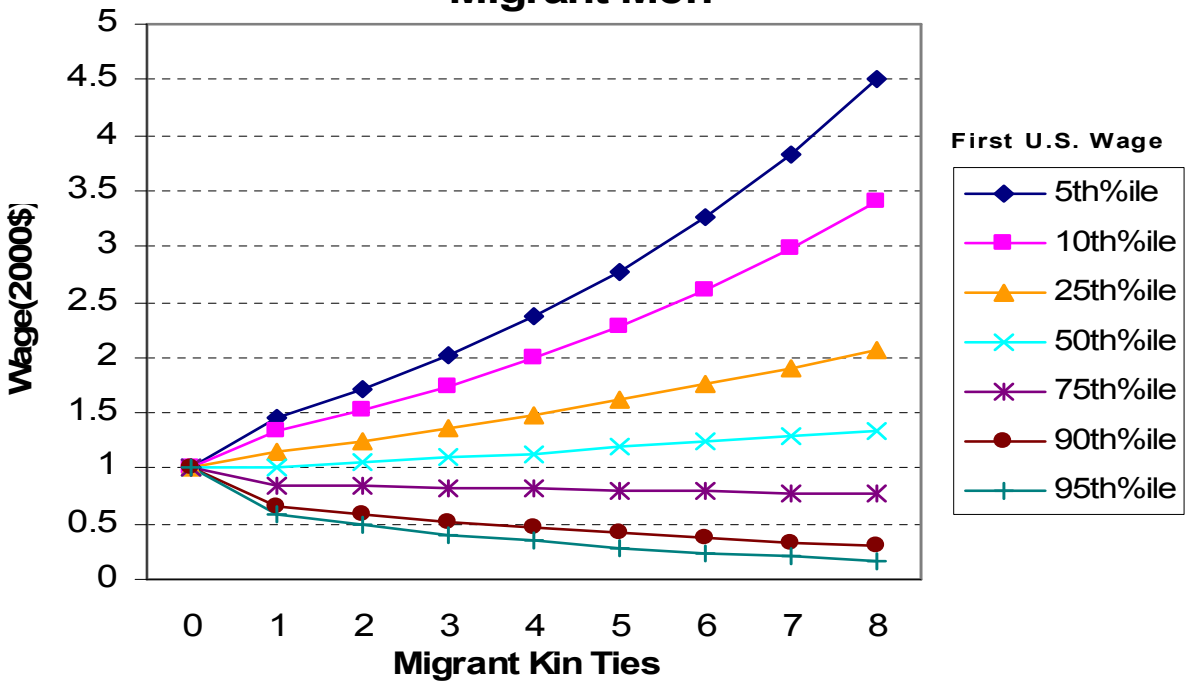


Figure 2. Relationship of U.S. Wage and Migrant Kin Ties, by First U.S. Wage, Mexican Migrant Men



Based upon fixed effects regressions on log wage w/controls. First U.S. wage: 5th%ile=$2.77, 50th%ile=$7.12, 95th%ile=$17.60