Network Effects in Mexico-U.S. Migration: Disentangling the Underlying Social Mechanisms

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INTRODUCTION

Approximately half of the 11.7 million Mexico-born persons in the United States today are estimated to be undocumented (Passel et al. 2012).[1] This population's dramatic growth and remarkable persistence since the mid-1960s is surprising given several changes to U.S. immigration policy that have attempted to stem its flow over the last five decades (see Massey et al. 1998). Researchers attribute this pattern of increasing flows—despite increasingly-stringent efforts to control them—to a process of "cumulative causation" (Massey 1990). This process works through the expansion of migrant networks, or ties that connect migrants in destination to individuals in origin that foster more migration. Ultimately, the theory predicts, flows become self-sustaining and resilient to changes in economic or political conditions.

The empirical work that has emerged from this theoretical tradition provides support for the presumed network effects on migration, which occur when an individual's likelihood of migrating is a function of the prior adopters in his or her network.[2] While migration is thought to be likely in families or communities with already-high levels of migration (Curran et al. 2005; Davis, Stecklov and Winters 2002; Massey and Zenteno 1999), researchers disagree on the social mechanisms underlying this pattern. Some emphasize the importance of prior migrants in providing information or direct assistance to current migrants (e.g., Carrington, Detragiache and Vishwanath (1996)), while others underscore the escalating normative pressures in sending communities that make

[1] Although Passel and Gonzalez-Barrera (2012) find either a standstill or a negative flow of Mexican migrants into the United States, the report is based on data from the American Community Survey (ACS) and the Current Population Survey (CPS). Using data from the Mexican Family Life Survey, Genoni et al. (2012) estimate that ACS and CPS survey data do not count the lowest earners among the least-educated migrants, missing about 30% of recent migrants (especially those who are younger, single, and male).

[2] Economists refer to such effects as 'social interactions' or 'endogenous interactions.' See Manksi (2000) and Durlauf (2001) for reviews.

migration more likely (Kandel and Massey 2002). Empirical analyses have not resolved this ambiguity, as quantitative data alone cannot distinguish among multiple mechanisms or discard alternative explanations that may be generating the observed associations (De Haas 2010).

The disagreement about whether and which social mechanisms underlie network effects on migration emerges in part from a paucity of empirical data capable of relating large-scale trends in migration to the micro-level social forces that induce the same effect. This limitation is pervasive in studies inspired by the analytical sociology tradition (see Hedström 2005), which have often relied on computer-based simulations rather than real-world settings to unpack the black box of causality for social processes of interest (Edling 2012). In the context of Mexico-U.S. migration, the inability to link theory to multiple types of evidence leaves us with two interrelated questions that we address in this chapter: what economic, political, or social factors lead a person to migrate to the United States from Mexico and, if social factors influence the migration decision, in what ways do connections to prior migrants make future migration more likely?

This study employs a mixed-methods strategy to identify the social mechanisms underlying the network effects in Mexico-U.S. migration. First, we analyze data from more than 90,000 migrants and non-migrants surveyed by the Mexican Migration Project and establish the presence of network effects on migration. Specifically, we demonstrate that network effects matter for sustaining migration flows, above and beyond economic and political factors. We then analyze qualitative data from more than 138 in-depth interviews with migrants and their family members in Mexico to adjudicate among the different social mechanisms that lead to interdependencies in individuals' migration

choices. We adopt an exhaustive typology suggested by DiMaggio and Garip (2012a) and consider three mechanisms—social facilitation, normative influence, and network externalities—by which social ties shape migration decisions. We thus capitalize on the strength of quantitative data for establishing and generalizing the presence of network effects in migration, as well as the strength of qualitative data for identifying the generative processes for these effects. By delineating the sources for interdependent migration choices, we provide a deeper understanding of migration as a social process, which is crucial for anticipating future flows and policy responses.

A SOCIAL THEORY OF MEXICO-U.S. MIGRATION

In 1981, Mines—an anthropologist studying a rural community in Zacatecas, Mexico—noted the importance of "who you know" for migrating to, and succeeding in, the United States (Mines 1981: 14). This observation became an established pattern in later work on Mexico-U.S. migration. Using large-sample data from several Mexican communities, researchers showed how individuals who had social ties to prior U.S. migrants were more likely to migrate themselves (Massey and España 1987).

The accumulation of similar evidence from other settings (see Boyd 1989 for a comprehensive review) resulted in a new paradigm in migration research, which, until the late 1980s, had been dominated by economic and political explanations of migration. Alternative theories had connected migration to wage differentials between origin and destination countries (Harris and Todaro 1970; Sjaastad 1962), insurance and credit market failures in origin (Stark and Bloom 1985; Taylor 1987), a two-tier occupational structure—with immigrants relegated to the lower ranks—in destination (Piore 1979), exploitative capitalist labor relations between destination and origin (Wallerstein 1974),

and growing economic integration between developed and developing world regions (Castells and Laserna 1989; Sassen 1988; Sassen 1991).

Although scholars had previously recognized that migration was an increasingly path-dependent and social process, it was not until Massey's (1990) programmatic article that they began to highlight the "cumulative causation," or self-feeding character, of migration (cf. Myrdal 1957). The theory holds that each instance of migration leads to a series of changes in the origin community, and these changes make future migration from the community more likely. For example, with each new migrant, the social networks that connect individuals in origin to migrants in destination expand. More individuals can rely on these networks to migrate; with more migrants, the networks expand further. Through this feedback loop, migration flows become self-sustaining and decoupled from the economic or political conditions that initiated them.[3]

The cumulative causation theory thus systematized what anthropologists and sociologists working in the sending areas had long known: social ties matter for migration. Empirical studies found that social ties to prior migrants increased individuals' migration propensities (Durand, Massey and Zenteno 2001; Fussell and Massey 2004; Massey and Zenteno 2000; Massey and España 1987) and also decreased the effect of individual characteristics on those propensities (Garip and Curran 2010; Massey, Goldring and Durand 1994; Winters, Janvry and Sadoulet 2001). Although this scholarship assumes the network effects on migration to be "social"—that is, to reflect true interdependencies between individuals' migration choices—they often cannot

[3] Researchers identified other factors that similarly affect (and are affected by) migration in a cumulative fashion: (i) the distribution of income or land, (ii) the organization of agriculture, (iii) the distribution of human capital, (iv) culture, and (v) the social meaning of work (Massey et al. 1993).

discard an alternative explanation that these choices are in response to some common and unobserved environmental factor (Manski 1993).[4]

NETWORK EFFECTS ON MIGRATION: A TYPOLOGY

The convergence in the literature on the social character of network effects did not extend to the specific mechanisms underlying these effects, however. While some researchers treated networks as hubs of information or help from prior migrants, others viewed them as conduits for normative pressures. This lack of consensus about the mechanisms of influence—ubiquitous in the network effects literature at large—created ambiguity in the interpretation of results and prevented the synthesis of existing knowledge (DiMaggio and Garip 2012b). We resolve this ambiguity by organizing the findings in the migration literature around a typology developed by DiMaggio and Garip (2012a), which identifies three social mechanisms—social facilitation, normative influence, and network externalities—that lead to network effects.

Social Facilitation

The first mechanism, *social facilitation*, is at work when network peers (typically family or community members) provide useful information or help that reduces the costs, or increases the expected benefits, associated with a behavior.[5] This mechanism implies network effects that are typically zero until the number of peers engaging in the behavior reaches a critical threshold (so that the individual has enough evidence on the efficacy of

[4] This identification problem is common social science research (Manski 1993). Empirical analysis often cannot distinguish social effects (i.e., individuals responding to the behavior or characteristics of the group) from 'correlated' effects (i.e., individuals responding to the same environment). See Manski (1993, 1995) for a detailed discussion.

[5] Social facilitation is an umbrella term that encompasses social learning and social assistance. The former occurs when individuals infer the value of a practice of uncertain efficacy and/or limited observability from peers who engage in it. (Hedström (1998) refers to this mechanism as 'rational imitation.') The latter is at work when individuals receive direct assistance in the acquisition of a complex practice (DiMaggio and Garip 2012b).

the behavior), and increases at a declining rate with the number of peers (suggesting that, at some point, the individual has sufficient information and/or help to make a decision). Strong ties, such as close friends and family members, typically have a stronger effect on the transmission of behavior than weak ties, especially if the behavior requires thick information and active assistance.

Most research has attributed the observed network effects on migration to social facilitation. Studies have argued—often without direct evidence—that prior migrants provide useful information about or help with migration, making it a less risky endeavor for potential migrants (Carrington, Detragiache and Vishwanath 1996; Garip 2008; Kandel and Kao 2001; Mines and Janvry 1982; Moretti 1999; Tilly 2006; Winters, Janvry and Sadoulet 2001). Research also has suggested that experienced migrants help newcomers to locate better-paying jobs, increasing their returns in destination (Aguilera and Massey 2003; Amuedo-Dorantes and Mundra 2007; Drever and Hoffmeister 2008; Elliott 2001; Hagan 1998; Hanson and Pratt 1992; Hondagneu-Sotelo 1994; Munshi 2003; Portes and Rumbaut 2006; Wilson 1998). Some have speculated that the visible signs of migrants' success (e.g., newly-acquired land or a house) encourage more migration by suggesting its efficacy without any active help from past migrants (Stark and Taylor 1991; Stark, Taylor and Yitzhaki 1988). Studies also have found that more proximate ties exert more influence on migration decisions that involve dangerous border crossing or uncertain prospects in destination (Curran et al. 2005; Curran and Rivero-Fuentes 2003; Davis, Stecklov and Winters 2002; DiMaggio and Garip 2011; Palloni et al. 2001).

While the majority of work has observed positive effects of migrant networks on individuals' migration, a nascent body of work has examined the "dark side" of these same networks. Researchers have found that migrant networks, by facilitating migration, may lead young adults to give up potential opportunities in origin (e.g., acquiring education) (Winters, Janvry and Sadoulet 2001). Certain groups (e.g., women in patriarchal societies) may be denied access to the resources from these networks (Paul 2011) or face negative normative pressures related to migration (Curran and Rivero-Fuentes 2003). Researchers have also argued that migrant networks may impose non-consensual social obligations on prior migrants, requiring them to serve as useful resources to potential migrants (Portes 1993). Failure to do so may result in the withholding of community resources and, ultimately, alienation from the migrant network.

Normative Influence

The second mechanism, *normative influence*, is at work if network peers offer social rewards to encourage, or impose sanctions to discourage, a behavior.[6] (Unlike social facilitation, normative influence does not alter the intrinsic cost or benefit associated with a behavior.) Network peers may disagree about the behavior, where some urge and others oppose its adoption.[7] The mechanism generates network effects that are a function of the relative proportion of supporters versus opponents of the behavior among peers. The effects also depend on the relative density of ties within each group, which determines the group's ability to exert persuasive pressure (DiMaggio and Garip 2012a).

[6] See Elster (2009) for a detailed discussion of how social norms shape individual actions.
[7] DiMaggio and Garip (2012b) regard this mechanism a special case of normative influence that involves dissensus. The alternative case, normative influence with consensus, applies to largely legitimate behaviors, such as quitting smoking, which network peers either support, or are neutral to. We consider the former more applicable to migration.

Several studies have suggested normative influence as the generative mechanism for network effects on migration. In a variety of settings, researchers have observed a "culture of migration" (Cohen 2004; Kandel and Massey 2002; Mines 1981; Reichert 1981; Wiest 1973), whereby individuals value migration as a rite of passage (Piore 1979) or an affirmation of identity (Hernandez-Leon 1999; Levitt 1998). In the Mexican setting, Kandel and Massey (2002: 982) noted the social sanctions exacted on young men who did not attempt migration: they were seen as "lazy, unenterprising, and undesirable as potential mates." Researchers also have connected the increasing mobility of women to wider acceptability of egalitarian gender norms due, in large part, to earlier female migrants (Grasmuck and Pessar 1991; Hirsch 2000; Hondagneu-Sotelo 1994; Kanaiaupuni 2000).

Network Externalities

The third mechanism, *network externalities*, operates if prior adopters of a behavior generate a pool of common resources that increase the value or reduce the cost of the behavior to potential adopters. Different from social facilitation, network externalities do not depend on an interpersonal exchange of information or help between prior and potential adopters; rather, they rely on the development of institutionalized resources that facilitate the adoption of the behavior.[8] The mechanism leads to network effects that increase linearly or exponentially as a function of the number of prior adopters (and typically not at a declining rate). Because the maintenance of the common resources depends on size of the adopter population, the network effects decline proportionately if the adopters cease the practice.

[8] Network externalities typically apply to the diffusion of communications media, such as telephone, where a large adopter base increases the value of the medium to new users (DiMaggio and Garip 2011, 2012a).

Studies have connected migration behavior to network externalities in two contexts, although they have not referred to the mechanism as such. First, researchers have described how undocumented migrants use smugglers (*coyotes*) for crossing the Mexico-U.S. border, whose existence, in turn, depends on a steady flow of migrants (Cornelius 2001; Singer 1998; Smith 2006). Second, studies have shown how new migrants often rely on migrant enclaves (Korinek, Entwisle and Jampaklay 2005; Portes 1993) and hometown associations (Goldring 2004; Smith 2006) for employment or support in destination, both of which are institutions sustained by a large concentration of co-ethnics in the receiving context (see Waters, Kasinitz and Asad 2014).[9]

This tripartite typology allows us to map out the arguments in the migration literature about the mechanisms driving the network effects on migration.[10] This exercise also reveals two substantial shortcomings in our understanding of these effects. First, the majority of empirical work on migration—and all that relies on quantitative data and analysis—assumes rather than shows the mechanisms of social influence. Second, most

[9] We recognize that smugglers emerged as a response to the increased severity of border enforcement. Indeed, this greater enforcement created the conditions opportune for a smuggling business to become institutionalized. But, the survival of these businesses still relied on the presence of a steady stream of undocumented migrants from Mexico to the United States.

[10] Hedstrom (2005) and Aberg and Hedstrom (2011) offer an alternative typology where network effects can work through individuals' desires (D), beliefs (B), or opportunities (O). In this so-called 'DBO theory,' network peers influence an individual's behavior (i) by altering his or her desires (e.g., through stigmatization of a behavior), (ii) by changing individual's beliefs about the efficacy of the behavior (e.g., through new information), or (iii) by constraining his or her opportunities. This categorization bears close affinity to the three channels for network effects – or social interactions as economists call them – identified in Manski (2000): (i) preference interactions, (ii) expectation interactions, and (iii) constraint interactions. The three groups respectively correspond to the desire-mediated, belief-mediated and opportunity-mediated network effects in the DBO theory. We prefer DiMaggio and Garip's (2012) typology because we focus on different types of network effects rather than on the different types of channels (desires, beliefs or opportunities) through which these effects reach the individual. We see some correspondence between the DiMaggio-Garip typology and those of Hedstrom and Manski: normative influence works through desires; network externalities are typically opportunity-mediated; and social facilitation is likely to change both beliefs and opportunities.

studies consider a single social mechanism, and the few studies that distinguish among different mechanisms (e.g., Garip 2008) do so exhaustively.

This study addresses both issues. We first employ large-sample survey data to establish the presence of network effects and then use qualitative data to identify the social mechanisms underlying these network effects. We distinguish among social facilitation, normative influence, and network externalities; observe the prevalence of each in our data; and discuss the implications of these mechanisms for Mexico-U.S. migration flows.

SETTING

We study the migrants from Mexico to the United States, who continue to make up the largest international migrant stream in the world today. This stream started in the 1900s when U.S. labor recruiters followed the railroads to central-western Mexico in search of workers (Durand, Massey and Zenteno 2001). The stream gained momentum with the Bracero program, which recruited 4.6 million Mexican laborers to the U.S. for short-term farm work between 1942 and 1964 (Cornelius 2001). An additional 3 million Mexicans entered the U.S. without documents during this period (Passel and Woodrow 1987).

After the Bracero program, a number of changes to U.S. immigration policy restricted the paths to legal migration for Mexicans. The amendments to the Immigration and Nationality Act in 1965 and 1976 reduced the number of visas available to Mexicans and imposed constraints on family migration. These restrictions, combined with the grim economic climate of Mexico following the peso devaluations in 1976 and 1982, gave rise to a wave of undocumented migrants to the U.S. Between 1965 and 1986, an estimated

4.5 million Mexicans entered the country without documents (Massey, Durand and Malone 2003).

The 1986 Immigration Reform and Control Act (IRCA) aimed to restrain undocumented migration. It imposed stricter border enforcement and sanctions on employers hiring undocumented migrants, while also granting amnesty to 2.3 million undocumented Mexicans (INS 1990). As an unintended consequence, the amnesty incentivized the newly-legalized migrants' extended relatives to migrate without documents (Massey and Espinosa 1997). These incentives, combined with the declining wages and increasing inflation rates in Mexico, ensured sustained undocumented migration flows to the United States through the 1980s (Meza 2006).

The Immigration Acts in 1990 and 1996 sought to deter undocumented flows by further tightening border control and increasing employer sanctions. The latter legislation also prohibited the use of public benefits by undocumented migrants, a change that unintentionally led to higher naturalization rates among legal Mexicans, who obtained citizenship in order to sponsor the entry of their immediate relatives (Massey et al. 2003).

In January 1994, Mexico signed the North American Free Trade Agreement with Canada and the United States. In December of the same year, the country experienced another peso devaluation. Both events contributed to increasing numbers of Mexican migrants to the United States. The former displaced rural farmers through deregulation in agriculture (Fernández-Kelly and Massey 2007) and devalued the skills of working-class individuals by transforming the industrial composition (Hernández-León 2008). The latter led to the worst economic crisis in Mexico in decades. Within a year, the country defaulted on its foreign debt, the GDP shrank by six percent, and the unemployment rate

doubled (Meza 2006). As a result, U.S. border apprehensions increased from 1.1 million in 1994 to 1.7 million in 1998 (Martin 2003). By 2000, the Mexican-born population in the United States had reached 8.4 million in 2000, about 45 percent of whom were estimated to be undocumented (Bean and Stevens 2003).

ANALYTICAL STRATEGY

We use a mixed-methods approach. We first employ regression analysis on a large-sample representative data set to establish the plausibility of network effects in individuals' decisions to migrate from Mexico to the United States. We then illuminate the social mechanisms underlying these effects with qualitative data from in-depth interviews. We thus verify our findings with two types of data and capitalize on the complementarity between the two types—the quantitative data for observing large-scale patterns and the qualitative data for identifying mechanisms—to arrive at a more comprehensive understanding of individuals' migration choices.

Quantitative Data/Analysis

The quantitative data come from the 124 Mexican communities surveyed by the Mexican Migration Project (MMP). The data, although not nationally representative, provide an accurate profile of the U.S. migrants in Mexico (Zenteno and Massey 1999). The MMP researchers surveyed each community once between 1982 and 2008 in the winter months when the U.S. migrants typically visit their families in Mexico. In each community, the researchers asked individuals residing in one of the 200 randomly-selected households to provide demographic information and to state the timing of their first and last trip to the United States.

We construct a panel data set with retrospective reports from 92,527 individuals, of whom 16,026 have migrated at least once. We focus on the demographic, economic, political, and social factors that are associated with an individual's likelihood of taking a first migration trip to the United States. We do not study subsequent trips to avoid the endogeneity problem, that is, the fact that many factors related to migration may change as a result of prior migration trips making it difficult to estimate their effects. In each year, we reconstruct individual, household, and community attributes by back-projecting from the survey year until the age of 15 (e.g., for education) or by using the data on the timing of various events (e.g., marriage and asset purchases).

Because each community is surveyed in a specific year, and because the data are collected retrospectively, we observe a larger number of communities as we go back in time (e.g., 48 in 2000 versus 124 in 1970) but a smaller number of individuals (due to age restrictions to be included in the sample). We confine the analysis to the 1970-2000 period, as the sample size drops sharply outside this range.

We estimate a logistic regression model of first U.S. migration. We include controls for individuals' demographic characteristics (age, whether they are household heads and/or male), education (primary, some secondary or completed secondary schooling), occupation (agriculture, manufacturing or service sector) and domestic migration experience (whether they have migrated in Mexico), as well as household wealth (number of rooms in properties, value of land owned, whether household owns a business) and community type (rural or metropolitan).

Four variables capture the economic and political conditions relevant to migration decisions: the average hourly wage in the United States (in constant US$ in year 2000),

the inflation rate in Mexico, the ratio of available visas to Mexican migrants, and the logarithm of Mexico-U.S. trade (converted to constant US$ in 2000). Three variables capture the social context of migration: the number of U.S. legal residents and of U.S. migrants (non-residents) in the household and the migration prevalence (proportion of people who have ever migrated) in the community.

Qualitative Data/Analysis

The qualitative data focus on the social determinants of migration. The growing literature on network effects suggests three mechanisms for the social transmission of behavior. With the qualitative data, we seek to assess the relevance of these mechanisms for the migration choices of Mexico-U.S. migrants.

The qualitative data are based on in-depth interviews conducted in 120 households in Jalisco, Mexico in the summer months of 2011 and 2013. Jalisco, a state in central-western Mexico and a major sender of migrants to the United States historically, provided a manageable and safe study site, where the local support from the MMP researchers at the University of Guadalajara facilitated our access to the migrant communities.[11]

We selected four study sites from among the communities previously surveyed by the MMP with the objective of maximizing the diversity of migrant characteristics.[12] Each site was distinct in containing a large concentration of different "migrant types"

[11] Both the survey data and interviews capture migrants with at least one household member in Mexico. Thus, our data do not include migrants whose entire household has moved to the United States. (The survey data actually has a component that was administered to migrants in the United States, but respondents were not sampled randomly. We do not include this component in our analysis.) Such migrants, however, are of less interest to our study, since, by virtue of having no ties to Mexico, they are less likely to contribute to the network effects on migration.

[12] The MMP data do not contain any identifying information; thus it was not possible to seek and interview the original respondents. Even if it were, we would not choose to do so. The goal of the study is to capture the various reasons underlying migration behavior. It is preferable to obtain information from a diverse set of individuals rather than observe the same individuals in multiple periods.

identified in prior analysis of the MMP data (Garip 2012). The first community, a rural village of only 1,000 residents, was home to a large share (about 30 percent according to the MMP data) of older migrants, typically male household heads with little education and wealth, who started migrating in the 1970s and early 1980s to fill the farm jobs in the United States. (These jobs had become socially undesirable to American citizens following the Bracero program.) The second community, a rural town of about 3,000 residents, contained a majority of male migrants, often the adult sons from relatively wealthy households, who started to migrate in the mid-1980s. (This was a period of economic volatility in Mexico due to the peso devaluations in 1976 and 1982.) The third community, an industrial town of about 9,000 inhabitants in central Jalisco, distinctly included a significant share of women among its migrants. (These women migrated to join their husbands in the United States after the Immigration Reform and Control Act in 1986 granted citizenship to undocumented migrants in the United States and allowed for family reunification.) The fourth community, a poor urban neighborhood in Guadalajara, contained mostly educated male migrants working in manufacturing. (They first migrated to the United States in the mid-1990s, around the period of economic restructuring in Mexico after the signing of the North American Free Trade Agreement in 1994.)

Our team, led by the senior author, included six students (four women and two men) from the University of Guadalajara, all of whom had previously worked for the MMP, and thus had experience in the study communities. As locals with credentials from the University of Guadalajara, the students easily established rapport with the respondents. (Despite the sensitivity of the research topic, the rejection rate was less than five percent.) We spent about a week in each community and interviewed around 35

households with at least one current or return migrant. In some cases, group interviews were conducted when more than one previous migrant was present in the household. Of the total 138 interviews, 49 were with migrants themselves, 49 were with parents of a migrant, and 34 were with spouses of a migrant. The remaining 34 were conducted with siblings, children, or nieces of migrants.[13]

The semi-structured interviews lasted from about five to 90 minutes and averaged around 20 minutes. The questions were open-ended and inquired about the circumstances surrounding the first migration decision, which, for some respondents, required a recollection of events in the distant past. To minimize recall bias, we elicited information on landmark events, such as marriage or birth of a child, and then asked the respondent to relate the migration decision to those events.[14] We asked about the goals in migrating, as well as whether and when they achieved that goal. This strategy allowed us to see if respondents' reports of the first migration trip were influenced by the actual outcome of that or subsequent trips (Barclay 1986). (For example, if migrants were able to buy a house with their earnings in the United States, they may now report their initial motivations as saving for future investments.[15]) We also asked about the family and

[13] Although about two-thirds of our respondents are relatives who reported on the migrants (that is, proxies for migrants), we are confident that their reports accurately captured the social mechanisms motivating migration decisions. First, proxies remained in close contact with migrants, which made them privy to the circumstances surrounding the migration decision. Second, proxies were especially likely to provide useful insights on the specific mechanisms – social facilitation, normative influence or network externalities, which, by definition, describe how migrants' interactions with their social ties shape migration choices.

[14] Recall bias is problematic for event-dating because the date of an event is unlikely to be part of its representation in memory. As a result, in retrospective reports, respondents often exclude events that actually occurred from the reference period, or include those that did not (Barclay 1986). Such errors - which are especially prevalent in reports of ordinary events that occur at a high frequency - are unlikely in our case because (i) first international migration trip is a major life event, and (ii) we use bounded-recall techniques, such as connecting migration to other life events, that reduce the respondents' uncertainty about the event dates.

[15] We thank Anthony Chen for this insight.

community circumstances around the time of first migration as factual information is better recalled than attitudes (Berney 1997).

The interviewers transcribed the interview recordings themselves. A team of Mexican research assistants then translated the transcriptions into English. Two bilingual research assistants checked the translations to ensure accuracy and coded the data in Atlas.ti.

FINDINGS

Figure 1 utilizes a dot plot with error bars to present the standardized odds ratio estimates for seven variables from the logistic regression of first U.S. migration (Kastellec and Leoni 2007).[16] (Table A1 lists the estimates for all variables included in the model.)

[FIGURE 1 ABOUT HERE]

The odds of first U.S. migration increase with the hourly wage in the United States but decline with the inflation rate in Mexico. The odds of migration do not change significantly with the ratio of available visas to Mexican migrants but increase with the amount of Mexico-U.S. trade. The odds of migrating are higher in households with prior U.S. migrants (residents or non-residents) and in communities with high migration prevalence. These findings are in line with the various theories that connect migration to higher expected earnings in destination, economic uncertainty in origin, economic and political connections between origin and destination, and social ties between individuals in origin and destination.

Similar to the results from the quantitative analysis, the interviews suggest the salience of both economic and social factors for respondents' migration decisions. For

[16] The estimates adjust for multiple observations from the same individual. The estimates remain substantively similar if we fit a continuous-time hazard model instead of the logistic model.

many respondents—whose first trips occurred between 1950 and 2010—the higher wages in the United States constituted their main motivating factor for migration. A recurrent migrant in his 50s, who first migrated when he was just 21, made this claim explicitly as he described how wage differentials compelled him to make repeated trips: "Once you go there and come back here, you say, 'No, well, no. You don't earn in a week [here] what you can earn there [U.S.] in a day.' So I went back there again." For others, difficult economic conditions in Mexico provide the impetus for short-term migration in order to accumulate savings. One former migrant described almost destitute conditions following the 1994 economic crisis as the reason for his decision to migrate: "In 1996, Salinas [Mexico's President] left. He left us on the street; there were no jobs. We lasted two or three months without jobs... So, I left [to the U.S.]. And I did well—I built my house." Some migrants were more specific in justifying their migration decision, referring to rising property prices and/or interest rates as their motivation. One respondent, who first migrated in 2003, highlighted how high lending costs prevented him from starting his own business and resulted in his decision to migrate: "[Sometimes] you want to start a business, but there's no money. And when there is money, they lend it at a very high price. That's when one says, 'I'd better leave.'" The father of a migrant reinforced these views by similarly complaining about the high prices in his town: "Here everything is expensive…I'm telling you, here we pay the same [prices] as the tourists." In his view, migration was a good opportunity for his son to earn more than he could in Mexico and ultimately build his own house: "I tell him, 'Save [money], my son, so you can build your house.' Because that's what matters—the house." For many of our respondents, then, economic rationales continue to factor into their migration decisions.

While almost all respondents referred to economic goals or conditions as the main drivers of migration, several of them also recognized migration as a chain process, whereby a few initial migrants in a family or community trigger others to migrate as well. For example, for a father of six migrants, it all started with the migration of his eldest daughter, who left in 1989 at the age of 18: "They [relatives in the U.S.] invited her and said, 'Let's go!' And so the girl decided to go and they took her... And then, you know the story, the husband arrived—the boyfriend—and they married (laughs). And that's life. You see?" Soon, the daughter helped her siblings—four sisters and a brother—to migrate as well. A former migrant in his 50s described a similar process in communities: "People go where their family is, where their friends are, where their relatives are, and where any acquaintance is. People get stuck at that, like, from this town in Jalisco, everybody goes to Oregon. People from [another town] go to Chicago because three or four people [from that town] went there, so, well, those people helped another five, and those five bring ten." Indeed, the presence of network effects is not lost on our respondents.

[FIGURE 2 ABOUT HERE]

In fact, almost all the interviews (133 out of 138) suggested similar network effects on migration, although, in some of these cases, the respondents were not fully aware of the imprint of social ties on migration decisions. We coded each interview according to the mechanism(s) underlying the suggested network effects. We considered the three mechanisms—social facilitation, normative influence and network externalities—identified by the DiMaggio-Garip typology, which are exhaustive but not mutually exclusive. The Venn diagram in Figure 2 shows the distribution of interviews ($N = 133$) that mentioned these mechanisms.

Social Facilitation and Migration

In 129 of the 133 interviews, we observed the first mechanism, *social facilitation*, which works through the information or help social contacts provide that decreases the costs or increases the benefits of migration. In describing their migration decisions, most respondents mentioned the availability of help from others, typically prior migrants in the family or community, especially when crossing the border or looking for a job or a place to stay in the United States. As one migrant explained, these tasks involved considerable risks: "You risk a lot to go make another peso because you're not sure if you'll come back or if you will actually do OK over there."

Consequently, individuals often relied on strong ties—family members or close friends—who could be trusted. The presence of such ties, in most cases, became a major determinant of migration decisions as the father of four migrant daughters explained:

> I knew, more or less, that they [his daughters] were on a good path, because the people who took the first girl, they were [established] there and they had, more or less, a good life. So, I felt better. They [daughters] didn't go for an adventure, to try their luck by themselves, no. They had the support of those there [U.S.] and the family.

In the above example, the father was put at ease when his daughters left for the United States, as well-established prior migrants could assist them in settling. Likewise, another respondent emphasized the importance of social ties to her husband's decision to migrate: "An opportunity came up so that my siblings could help him—because nobody from his family was there—only my family. His cousins said they'd go with him, but they didn't, so we called my sisters, and they said he could go with them. That's why he left." In this case, the respondent's husband did not view migration as an option because he had no relatives in the United States to support him. Indeed, the "opportunity" to migrate only became possible when it was determined that relatives would migrate as well.

For some respondents, the presence of other migrants in the family or community provides sufficient information to inspire migration decisions because it proves migration to be a worthwhile undertaking and thus increases its perceived benefits. The wife of a migrant, for example, described how her own family's success inspired her husband's move: "My mother lived with the same things [as us]… Like, at the beginning, we only had a little room and a tiny kitchen. And as soon as my brother left [for the U.S.], they built her a house. And because of that, I say, it's because they [migrants like my husband] do observe, more than anything, they say, 'You can see the results.'" Another respondent, who left in 1993, concurred that observing other migrants' successes encouraged him, and other first-timers, to travel to the United States: "Back then, everyone that left did well. Many acquaintances, neighbors, and friends did fine. They started their own businesses and bought land here." The ability of prospective migrants to witness the successes of prior migrants thus allowed the former group to determine how efficacious their migration to the United States could potentially be for them.

The responses coded as examples of social facilitation often suggested the importance of having a certain number of social ties to help with different tasks, or to establish the efficacy of migration beyond a doubt, for undertaking migration. Such was the case for many of our respondents, including one who borrowed papers from her sister and crossed with her son-in-law. Another decided to migrate only after his friend corroborated what his sisters in the United States were telling him about the opportunities there. The presence of such thresholds, beyond which the network effects are realized, is deemed as a fingerprint of the social facilitation mechanism (DiMaggio and Garip 2012a).

Normative Influence and Migration

We coded 79 out of 133 interviews as cases of *normative influence*, which is at work if social ties encourage or oppose migration by offering rewards or imposing sanctions. In 51 of these cases, migrants' social ties were in consensus about the positive value of migrating and tried to persuade the migrant to go by voicing their approval. One respondent, for example, described how the whole family came together to discuss whether his 20-year-old son should migrate: "We talked about our situation here [in our community] and told him, 'If you want to go, you decide. You're still young and so you have to think about it. We support you if you want to go to [the United States].' And yes, everyone agreed—nobody said no." A return migrant told us that he was encouraged to go in 2003 at the age of 37 by friends who had prodded him to, "Come, work hard, [and] you can make it." Another migrant was convinced that "he would do great there and make a lot of money," which according to his sister, "is what allured him" to the United States. A mother similarly recalled her migrant son's excitement after talking to his migrant friends: "He said, 'Look, Ma, I want to go because I can't do a thing [here], and from what I heard, they say that our lives are about to change.'[17] As demonstrated by the above examples, direct encouragement from family, friends, and previous migrants can serve as the impetus for some migrants to leave for the United States.

In some of these cases, prior migrants exaggerated life prospects in the United States, or "sweetened the truth," as the mother of a migrant put it, and thus sustained the widespread belief in the value of migrating in sending communities. Several migrants described a rude awakening when they realized the discrepancy between what others had

[17] These examples also constitute cases of social facilitation because prior migrants provide information that increases the perceived benefits of migration. As Figure 2 shows, 66 out of 69 interviews coded as normative influence were also categorized as social facilitation.

told them about the United States and what they actually experienced. A male respondent, who first migrated in 1974 at the age of 29, explained:

> *Interviewer:* Do you have any friends from your village who migrated before you?
> *Respondent:* Oh, yeah, well, many. I repeat to you, I saw a friend that came back two or three years after leaving, and I tell you that appearances always have you mistaken.
> *I:* And how did your friends do?
> *R:* No, well, they all did OK, but normally they came and told stories that weren't real. Really! "No, no, over there I have," "Over there I am," and they were all lies… When I left, I went with friends who had [spent] years over there and noticed that they hardly had anything to eat. They've been there for years, and the ones here thought they were millionaires over there, but it was all a lie.

Another respondent, who first migrated in 2007 at the age of 17, described a similar case of deception:

> People promise a lot, but unfortunately, when we arrive to the United States, everything is so different. Because here they say, "Everything is a bed of roses," that the North [U.S.] gives you a lot of things, but what I mean is that when you get there, the whole world changes. Because, here, they don't tell you that you have to pay [for] bills or food…. They don't say anything. And sometimes we feel very bad in that sense. I, for instance, I didn't want to come back [to Mexico], but the crisis [in the U.S. in 2008] was very hard. I decided to come back, and I came back ashamed because I promised [my family] to buy a house, and well, I couldn't do anything. I came back as I left—with nothing.

Other respondents also mentioned the shame that migrants feel when their experiences do not match the expectations of their family or community. A return migrant in his late 40s told us:

> People there [in the U.S.] struggle. There are many people who have been living there for 15 or 20 years who never come back because they are ashamed since they have nothing. They live worse there than some of the very poor here, in a room with tattered rags [of clothing]…. But many don't come back out of shame. They don't want to return here as failures.

In most cases, then, because migrants with negative experiences in the United States choose not to share those experiences upon return, or do not return at all, individuals in the sending communities retain a glorified view of migration. A respondent described how his children, a daughter and a son, subscribed to this view and migrated against his wishes:

> My children don't like this place [the tortilla bakery I own]…. They don't want to raise pigs, goats, cows, farm, or sell…. They want to go to a better place, to the North. But they are worthless there. It's only pride. They got raised like that, [thinking] that they are going to make it there, that "I'm going to make it to the North."

Another respondent similarly described an ingrained culture of migration, when he told us of his son, who migrated at the age of 16:

> I think, most of all, it was the idea [of migrating]. As I was telling you, I told him to do something, but no, he surely didn't understand it like that…. He was curious to go and learn how the U.S. was, because his friend came and told him. So I think that his idea was to get to know that place [the U.S.], and as one says over there, "for people not to say you were wrong."

In fact, in 40 of the 79 interviews coded as normative influence, migrants heard dissenting views on migration but chose to disregard them, as in the case of a 21-year-old male migrant, who told us: "[My parents] never agreed, and never will agree, that we go there." Nevertheless, he still migrated "as all Mexicans do … to achieve the American Dream."

Network Externalities and Migration

In 97 out of 133 interviews, respondents referred to *network externalities*, or institutionalized resources like smugglers or labor recruiters as facilitating migration. These resources owe their existence to a steady flow of earlier migrants. A former migrant, for example, told us how his father, after helping several relatives, "became a smuggler, and started to move people. Because it [crossing the border] was easier before, it was very easy, so he did take lots of people there [the U.S.]." Migrants often cannot trust smugglers, and express fears of being robbed, left behind, or killed. A female respondent, who migrated in the 1970s, described the dangerous situation in which her siblings, two brothers, and a young sister found themselves:

> They crossed [the border] and the coyote [smuggler] arrives and says, "You are going to pay me for all of them [two siblings]," and we didn't have money.... What do you do?

> You can get into a problem—they can even kill you if you don't pay. Then one of my brothers talked to the coyote and said, "I can pay you next week for one and the following week for the other," and the coyote said, "If you don't do what you say, you will pay the consequences." […] They [coyotes] are people that you get on the border, you don't know who they are."

Many migrants rely on their social ties to find a trustworthy and competent smuggler in order to avoid such situations. A respondent explained how the process worked: "Everybody around [a nearby city] knows who the coyotes are. 'Go with Jose. Go with that guy, look for him,' and then they [coyotes] ask, 'Who sent you?' 'Herbierto's brother.' 'Oh, OK. Let me talk to him.' 'Luis, you sent such and such?' 'Oh, OK, look after them.' So, trust… Even for finding a coyote you need to know people."

As a result, in 93 out of the 97 cases, network externalities worked in tandem with social facilitation, where migrants relied both on smugglers, and friends or family to make it to the United States. In 59 of these cases, normative influences, that is, persuasion efforts from social ties, were also in effect. Such was the case of a male migrant, who first went to the U.S. in 1961 as a 26-year-old and whose friend convinced his dissenting mother to let him migrate (normative influence), then helped him (social facilitation) go to Tijuana and find a smuggler to cross the border (network externalities).

Taken together, the results from the quantitative and qualitative data establish the presence of network effects in Mexico-U.S. migration: individuals are more likely to migrate if there are prior migrants among their family or community members. Once migrant flows are initiated—largely due to economic or political factors—network effects sustain these migration streams. The effects work through three mechanisms: First, prior migrants provide information or help that reduces the risks, or increases the benefits—both actual and perceived—of migrating to the individual. Second, prior migrants often communicate positive rather than negative experiences in the United States, and thus

nourish the idea of migration as a path to success. Third, prior migrants generate a common pool of resources, such as smugglers, that facilitate migration. In the Mexico-U.S. setting, the first mechanism, social facilitation, is the most prevalent, but it often works in combination with the remaining two mechanisms, normative influence and network externalities.

CONCLUSION

Scholars have long noted how migration streams, once initiated, obtain a self-feeding character. Studies have attributed this phenomenon, called the cumulative causation of migration, to expanding social networks that connect migrants in destination to individuals in origin. Studies have often disagreed, however, on *how* social networks influence migration decisions.

To address this issue, we adopted a typology developed by DiMaggio and Garip (2012a) and considered three mechanisms by which social ties may influence individuals' migration choices. In the first mechanism, *social facilitation*, social ties reduce the risks and increase the expected benefits of migration by providing information or help to potential migrants. In the second mechanism, *normative influence*, social ties provide pressure to migrate (or not to migrate) through rewards or sanctions. In the third, and final, mechanism, *network externalities,* social ties help sustain institutionalized resources, such as smuggling networks or migrant enclaves in destination, which fosters more migration.

We studied the prevalence of these mechanisms in the Mexico-U.S. migration context with mixed methods. We first analyzed the migration choices of more than 90,000 individuals observed between 1970 and 2000 in 124 Mexican communities

surveyed by the Mexican Migration Project. Similar to prior work, we found that having prior migrants in the household or community increases individuals' likelihood of migrating net of economic and political context effects.

Second, we relied on qualitative data from 138 in-depth interviews with migrants and their household members in Mexico to determine the mechanisms underlying the pattern we identified using survey data. Our analysis suggested social facilitation to be the predominant mechanism underlying the social transmission of migration behavior, with more than 90% of migrants obtaining information or direct help from previous migrants while crossing into, or settling in, the U.S. More than half of the migrants we interviewed suggested normative influence as an important social mechanism, having been encouraged to migrate by family or friends. These same ties often exaggerated potential migrants' prospects in the U.S., however, and maintained the widespread belief that one can "make it in the North," as one respondent put it. In about half of these cases (one-fourth of all interviews), potential migrants also heard dissenting voices, typically of friends citing their negative experiences as migrants. Though this discouragement challenged the normative aspect of migration, most chose to make the journey across the border anyway. Finally, for about two-thirds of all migrants, network externalities facilitated migration acts. In almost all of these cases, potential migrants relied on past migrants to access these resources, as finding a reliable and competent smuggler—one who "doesn't fail," in one respondent's words—was a major concern. For about 90 percent of the migrants in our sample, at least two mechanisms worked at the same time; in more than one-third of the cases, all three mechanisms worked together.

Our mixed-method approach is a major strength of our study on the mechanisms underlying network effects on migration. Past work suspecting network influences has been unable to distinguish between social (i.e., individuals responding to the behavior or characteristics of the group) and correlated effects (i.e., individuals responding to the same environment) (Manski 1993), a problem shared by all social science disciplines. In the context of Mexico-U.S. migration, the inability to identify network effects has led to a disconnection between findings offered by large-scale survey data and micro-level qualitative work. While many studies have established a positive association between individuals' ties to prior migrants and their migration propensities, only a few acknowledged that multiple social mechanisms—as well as exposure to common environmental factors—might have accounted for these interdependencies. Combining both methods into a single study, an increasingly prevalent trend in the social sciences (see Lamont 2008 for reviews of this approach in different fields; Lieberman 2005; Manski 1993; Small 2011), allows us to bypass these limitations by capitalizing on the complementarity of both methods—large-sample quantitative data to establish the presence of social effects and in-depth qualitative data to reveal the mechanisms underlying those effects—to study the social mechanisms of transmission.

By focusing on the social mechanisms underlying the network effects on migration, we can anticipate whether and how these effects may decline in size, or be reversed. In particular, the mechanisms we have identified—social facilitation, normative influence, and network externalities—generate a positive feedback loop as long as migration remains a successful enterprise, or at least is perceived as such, in sending communities (Timmerman 2006). But many of our respondents complained about the

false impression they got from other migrants who "say wonderful things about being there… and…come showing something that is not true." These migrants came to realize the difficulties with living in the United States only after completing their journey but often felt ashamed to share their negative experiences with others, thus sustaining the lopsided representation of migration. If such experiences become more commonplace, an increasing number of migrants may feel compelled to share them, ultimately challenging the normative aspect of migration, and breaking—or even reversing—the cumulative causation of migration. Our data are only suggestive on this point, which we identify as a fruitful direction for future work.

By understanding the interdependencies between individuals' migration choices at a deeper level, we can also design more effective policy interventions. In the Mexico-U.S. case, for example, migration flows have persisted through the 1970s, 1980s, and 1990s despite the increased border enforcement and sanctions on employers hiring undocumented migrants in the United States. The qualitative data in this study suggest a plausible explanation for why these policies have not created the desired effects. By making it more difficult for migrants in the United States to travel back to Mexico, the border control, on the one hand, may have partially cut off the interpersonal exchange of help between prior and potential migrants (what we called social facilitation). But, on the other hand, the border control may have made it more difficult for migrants to share their negative experiences in the United States (for example, the hardships they face in finding a job under increased employer sanctions). The combined effect of the longer time spent by migrants in the United States, and the lack of access to information about the altered opportunity structure there, may have been to reinforce the normative influence

mechanism, and to perpetuate, as one migrant put it, the "Mexican illusion [of what life is like in the United States]."

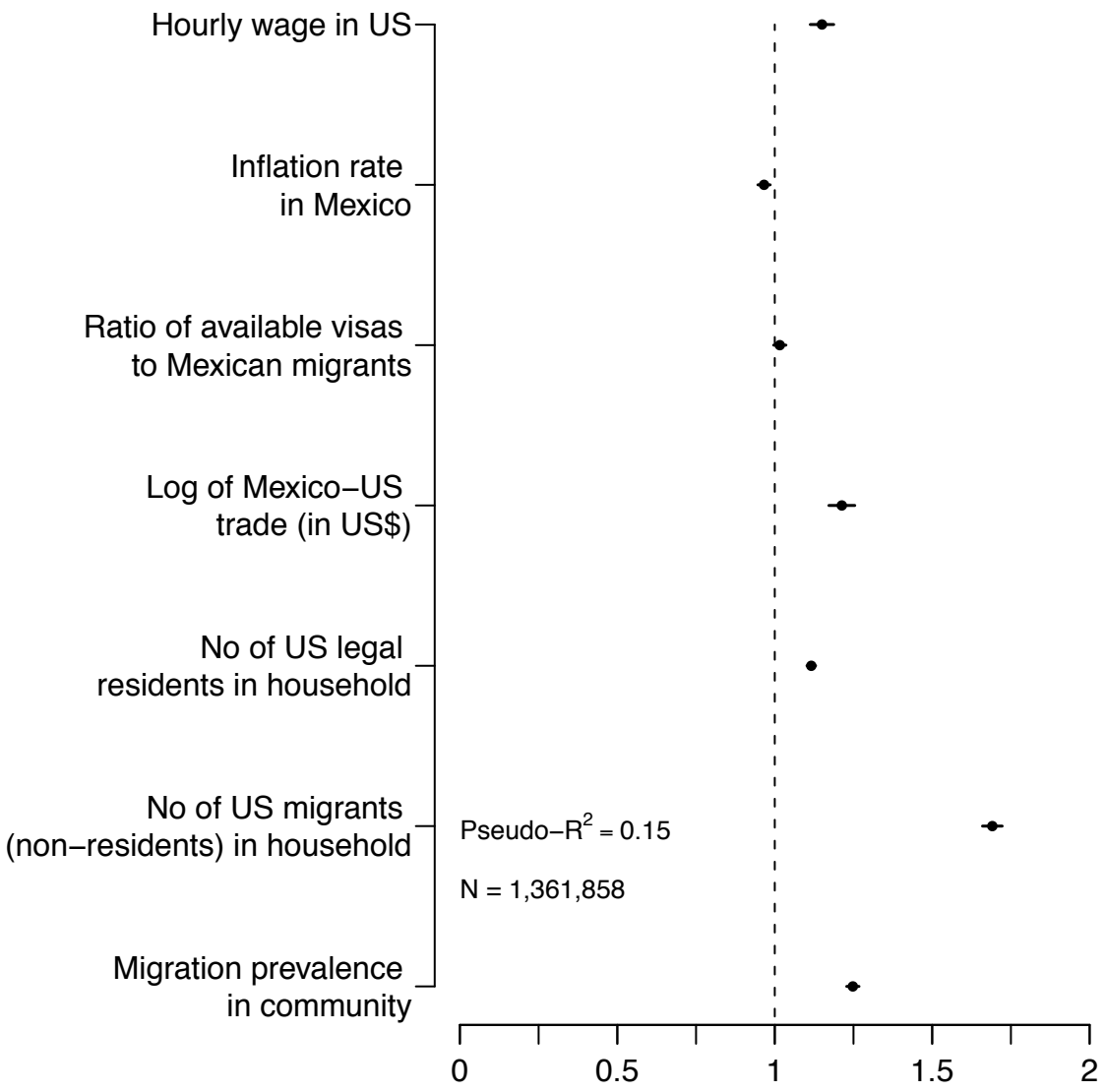

Figure 1. The odds ratio estimates from a logistic regression model of first U.S. migration on the Mexican Migration Project data from 124 communities. The x-axis displays the odds ratio estimates. The y-axis lists the variable names. A vertical dashed line marks the odds ratio of one (i.e., the coefficient of zero) for each variable. The dots represent the point estimates and the horizontal lines indicate 95% confidence intervals. All models include controls for demographic characteristics, education, occupation, household wealth and community type. The standard errors are adjusted for clustering at the individual-level.

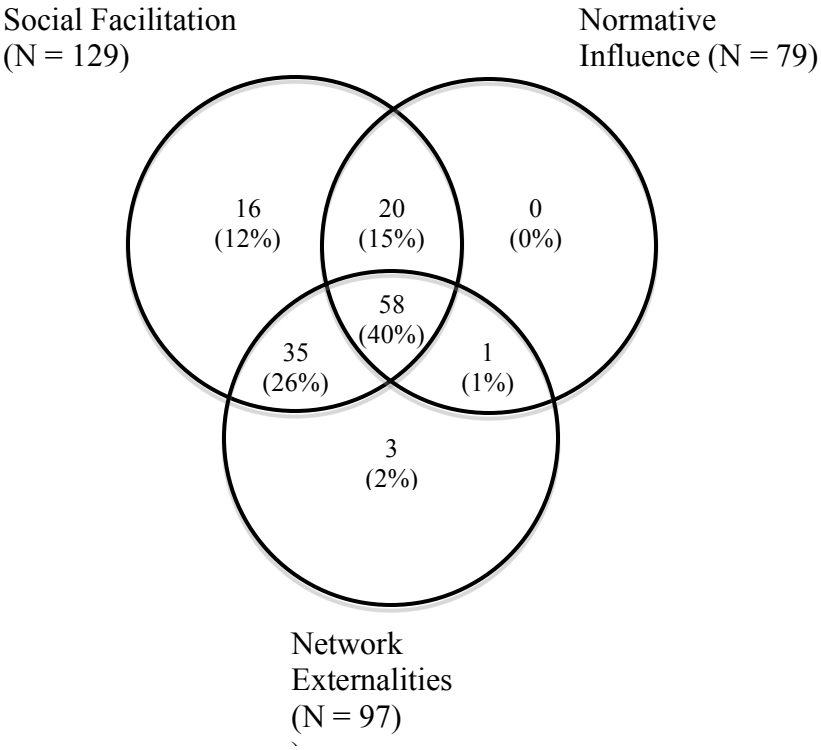

Figure 2. Venn diagram showing the distribution of interviews (N = 133) across three social mechanisms underlying migration (excludes 5 interviews where no social mechanism is mentioned).

Appendix
Estimates from Logistic Regression Models of First U.S. Migration

Table A1. Standardized odds ratios from a logistic regression model of first U.S. migration, Mexican Migration Project data from 124 communities

	coef.	std. error	
Age	0.51	0.01	**
Household head	1.27	0.01	**
Male	1.68	0.02	**
Primary education	1.03	0.01	*
Some secondary education	1.00	0.01	
Complete secondary education	0.94	0.01	**
Manufacturing occupation	1.22	0.01	**
Service or other occupation	1.13	0.01	**
Migrated in Mexico?	1.06	0.01	**
Number of rooms in properties	0.95	0.01	**
Log of value of land (US$ in 2000)	1.02	0.01	
Own business	0.95	0.01	**
Community in metropolitan area	0.75	0.01	**
Hourly U.S. wages (US$ in 2000)	1.15	0.02	**
Inflation rate [0,1]	0.97	0.01	**
Availability of visas [0,1]	1.02	0.01	
Log of total Mexico-U.S. trade (US$ in 2000)	1.21	0.02	**
No of U.S. legal residents in household	1.12	0.01	**
No of U.S. migrants (non-residents) in household	1.69	0.02	**
Migration prevalence in community	1.25	0.01	**
Intercept	0.01	0.00	**
Pseudo-R^2	0.15		
N (person-years)	1,361,858		
(unique persons)	92,527		
(community-years)	3,346		
(unique communities)	124		

*p<0.05; **p<0.01 (two-tailed tests). Standard errors are corrected for clustering at the individual level. The reference group for education is individuals with no education; the reference group for occupation is individuals who work in agriculture or are unemployed.

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