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Migrant Networks and International migration: Testing Weak Ties*

Mao-Mei LIU, Departament de Ciències Polítiques i Socials.
Universitat Pompeu Fabra. Barcelona, Spain. Contact: maomei.liu@upf.edu

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Short Abstract

This article examines the dynamic role of migrant social networks in international migration and extends prior research by focusing on the weak ties in individuals' personal networks, decomposing the networks by resources and sources, and disentangling network effects from alternative explanations. Prior research has traditionally neglected friends and family ties beyond parents, siblings, spouses and children. Using the longitudinal MAFE-Senegal data (2008) collected in both Africa (Senegal) and Europe (France, Italy and Spain), this article tests the robustness of network theory, and in particular the role of weak ties, on an individual's first migration between Senegal and Europe. Discrete-time hazard model results confirm the importance of weak ties and that network impacts appear to be gendered, but do not uphold previous literature's contention that strong ties (inside or outside the household) are more important than weak ties in explaining male migration while confirming this for female migration. In terms of network resources, male migration is especially sensitive to the amount of resources proceeding from weaker ties. Finally, the diversity of resources from strong ties increases the likelihood of migration by both women and men.

INTRODUCTION

Migrant networks contribute to continued migration flows and the changing characteristics of these flows.[1] It is thought that, once migration flows are established, the size and breadth of migrant social networks themselves lead to continued international migration flow, independent of the economic and labor market factors that may have first started it (Massey and García España 1987). By providing information and resources, migrant networks lower migration costs and lead to more people migrating, which results in even broader migrant networks and further reduced migration costs. They are also a mechanism by which migration flows change: leading to less positive or even negative self-selection of migrants (Beine et al 2011; McKenzie and Rapoport 2010). Nevertheless, there remain questions about exactly how networks – especially their composition – impact migration. This article seeks to contribute analysis on how networks work.

The literature demonstrates that migrant networks play an important role in determining whether an individual migrates, and that this role varies depending on characteristics of the individual and the network (for examples, see: Curran and Rivero-Fuentes 2003; Davis, Stecklov and Winters 2002; Garip 2008; Kanaiaupuni 2000; Massey and Espinosa 1997; Palloni et al 2001) especially gender. The impacts of migrant networks depend both on their gender composition and the gender of the potential migrant (Curran and Rivero-Fuentes 2003; Curran et al 2005; Davis et al 2001; Kanaiaupuni 2000; Stecklov et al 2010; Toma and Vause 2011).

However, the literature has largely neglected important alternative explanations (for exception, see Palloni et al 2001) and, the preponderance of evidence is limited to the U.S.-Mexico case (exceptions include Parrado and Cerrutti 2003 for Paraguay-Argentina; Stecklov et al 2010 for Albania; Entwisle et al 2007, Curran et al 2005, Garip 2008 for Thai internal migration). Two important alternative explanations, those related to household decision-making and legal family reunification, have also been largely neglected. This study tests new data from Senegal and Europe and investigate the viability of the migrant network hypothesis, accounting for the competing explanations.

Furthermore, studies have primarily focused on close family networks (parents and siblings) or household networks on one hand; and aggregate levels of community migration at the village or regional level on the other (for examples, see: Chort 2010; Davis and Winters 2001; Davis et al 2002; Fussell and Massey 2004; Massey and Espinosa 1997). Largely missing is analysis of family networks beyond parents and siblings, and definitely missing from the literature is a methodical analysis of friendship networks. Although Palloni et al write that "network based on kinship are not necessary the most efficient or most salient in shaping migration decisions…weaker ties or friendship or acquaintance may be equally or more important than kinship ties" (2001: 1295-1296), friendship ties have been systematically excluded from analysis of the act of migration itself.[2]

[1] The characteristics of migration flows are influenced by other factors as well. The self-selection hypothesis is prominent in the literature and proposes that the migration decision is based on the potential income gains that individuals can achieve by moving themselves and their human capital to a different place. Assuming that direct migration costs are constant, individuals whose potential gains are larger will be more likely to migrate. Usually, positive self-selection is expected: the migration of the young and well-educated (e.g. Chiswick 1978, 1999). In certain contexts, for example where there is high return to skill at origin and low return to skill at destination, Borjas (1987) proposes the possibility of negative self-selection.

[2] In some studies about immigrant labor market integration, distinction is made between familial and friendship ties (for example, see Amuedo-Dorantes and Mundra 2007; Munshi 2003).

Finally, there exists a sizeable gap between "strength of ties" theory (originally proposed by Granovetter for the job search process in 1973 and later developed by others for various contexts) and the international migration literature. Indeed, a systematic rendering of how a theory developed in a specific context (that of a local job search) can or cannot apply to international migration does not appear to exist. I intend to do so here. Furthermore, due in part to data limitations, the international migration literature has utilized close family or household networks to represent strong ties and has then aggregated these at the community level to represent weak ties. Data limitations remain and no known data set can provide a fully congruent way to distinguish tie strength for the migration context. Nevertheless, this paper aims to extend prior work both theoretically and empirically with an improved theoretical framework, indicators and rigorous testing of the theory.

My research aim is several-fold. First, I exploit the nature of new data for migration between Senegal and Europe to investigate whether close family networks (parents and siblings) are important in explaining migration, net of what alternative hypotheses for household networks (Palloni et al 2001) and legal family reunification can explain. Second, I analyze ties outside close family, including friendship networks, and the impact of tie strength on international migration. Third, I extend Garip's framework (2008) to distinguish among resources (amount and diversity) and sources (strength of ties) of the migrant network. Throughout the analysis, I distinguish migrant network effects from the alternative explanations of household migration and legal family reunification and, wherever possible, correct for potential sources of endogeneity.

SOCIAL CAPITAL THEORY AND THE MIGRANT NETWORK HYPOTHESIS

First formalized by the economist Glenn Loury in 1976, social capital theory has been further developed by Pierre Bourdieu and James S. Coleman. Bourdieu (1986) identified social capital as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance and recognition" (1986, p.248). Coleman (1988) argued that social capital "inheres in the structure of relations between actors and among actors" and thus can be specific to different activities (1988, p.S98).

In the context of international migration, the migrant network hypothesis predicts that the migration of a person directly impacts the likelihood of migration of those in their social network.[3] The literature predicts that these personal ties lower costs to migration and may increase its benefits and ease (by facilitating helpful information and/or resources), and are thus expected to increase the likelihood of migration for those who have them. Together, these ties compose networks of relationships. The general idea is that the more migrants there are in a person's social network and the more migration experience each of these migrants has, the greater access one has to migrant social capital. Nevertheless, not all networks are equal. Garip (2008) has deconstructed migrant social capital into different aspects (resource-amount, accessibility and diversity; source – weak or strong tie; recipient) and has found evidence that migrant social capital is not an undifferentiated resource. She found that while migration propensity rose with greater, more accessible and diverse (occupation) resources, it fell with greater diversity in terms of destination. Also, weak (village) ties appeared to have a larger effect than strong (household) ties.

[3] Although migrant social capital and migrant networks are sometimes used interchangeably, I choose the term migrant networks since it carries more specific connotations.

Another important deconstruction of migrant networks is through gender. Much of migration literature has been indifferent to gender: either focusing exclusively on men or, as in household decision-making strategies, lumping together the experience of women with that of the group or "household" (Boyd 1989). Yet, gender differences impact how migration decisions are made (Gregorio Gil 1998; Hondagneu-Sotelo 1994) and even how household decision-making is understood (Boyd 1989). In this light, a wealth of recent research finds that the influence of migrant networks is gendered and depends on: the gender of the potential migrant (Kanaiaupuni 2000); the gender composition of family or household migrant networks (Cerrutti and Massey 2001; Curran and Rivero-Fuentes 2003; Toma and Vause 2011); and the gender compositions of both household and community migrant networks (Chort 2010; Curran et al 2005; Davis and Winters 2001; Stecklov et al 2010).

ALTERNATIVE EXPLANATIONS

The migrant network hypothesis proposes that an individual's migration directly influences the likelihood of migration by others within their social network. Nevertheless, a correlation of migration of one's social network with one's own migration is not necessarily proof of the social network hypothesis. Indeed, household strategies for a group of rival explanations. These, in addition to the social network hypothesis, can explain the correlation of household migration with one's own migration. Palloni et al (2001) provide a concise list: a concerted family strategy to maximize household income (the neoclassical economic model); a concerted family strategy to diversify risk by sending some of its members abroad (the new economic model of labor migration); selection into networks by the same factors that influence the likelihood of migration (selection); or that individuals in the same networks share certain unobserved characteristics that influence migration (unobserved heterogeneity). In this article, in order to control for the alternative explanation of household strategies, I include an indicator of household migration in every single model.

In order to test for migrant network effects, it is also important to distinguish another explanation, which although related to household strategies, has distinct characteristics: spousal reunification. Having a spouse abroad affects one's migration differently than if that person were a sibling, a friend or, simply, another member of the household.[4] Besides participating in household decision-making, such a spouse can (if requirements, like legal status, are met) potentially process paperwork for legal family reunification to facilitate one's migration – in each of the destination countries studied; there are specific and special policies for reunifying spouses, children and sometimes parents.[5] Legal family reunification is very

[4] Distinguishing between the spousal reunification explanation and household decision-making explanations is important for two other reasons. First, the household strategies approach (as Palloni et al. 2001 propose) does not account for how the possibility of legal family reunification can transform the context of migration – for example, pushing the balance towards settlement, as opposed to circular migration - and how this reflects the "maturation" of migration flows and affects the influence of migrant networks. I believe doing so is essential in a dynamic analysis of migrant networks and their influences. Second, in the Senegalese context, the extended family has traditionally played a very important role, and the concept of household is still broader than in most destination countries (including those in Europe), and many origin countries (Mexico, for example). Yet, both urbanization and international migration have led to the rising influence of the nuclear family - spouses and children - in part through the mechanisms of remittances and legal family reunification. It is important to deal with both concepts of family and household, and contrast them both to the migrant network hypothesis.

[5] The distinct situation of family reunification may be found expressed in two different international human rights treaties: the 1989 UN Convention on the Rights of the Child and the 1990 International Convention on the Protection of the Rights of All Migrant Workers and Members of Their Families.

important for migration to Europe (Boyd 1989; Castles 1986) and the U.S.[6] (Jasso and Rosenzweig 1986), and it is essential to account for it. This process involves different barriers and incurs different costs than other processes of international migration.[7]

I am not aware of any study to-date which has explicitly controlled for spousal reunification in their study of migrant networks. A few studies have severely limited their scope for robustness' sake, thus largely averting the issue: Palloni et al (2001) studied brother pairs, and Curran and Rivero-Fuentes (2003) focused on never-married individuals, while Fussell and Massey (2004) studied only sibling and parent networks. Unfortunately, it is not possible to generalize these results to the full range of potential migrants nor know whether migrant network effects exist beyond legal family reunification, especially for potential female migrants. Here, I analyze migrants of all genders and marital status.

In this article, migrant networks do not include spouses and children, although I do include migrant spouse as an explicit control for spousal reunification. Information about type of visa (student, work, family reunification) and sponsor is not available; and I cannot precisely identify legal family reunification. Instead, a proxy (migrant spouse) and network restrictions (excluding spouses and children) are used to identify the influence of migrant networks beyond 'legal' family reunification.

In summary, I expect that close family migrant networks will have a positive effect on international migration, even beyond what household strategies or 'legal' family reunification can explain.

STRENGTH OF TIES THEORY

In Granovetter's ground-breaking work on weak ties (1973), he distinguished between the value of having friends and acquaintances: the former representing strong ties and the latter weak ties in gaining knowledge about appropriate job openings. He expected that one's friends knew one another, while one's acquaintances were less likely to. Groups of friends were dense, while distinct groups of friends were connected by the occasional weak tie, a link between acquaintances. He hypothesized that individuals with many weak ties would benefit from news beyond the "provincial news and views of their close friends" (Granovetter 1983: 202). Burt (1995) further developed ideas related to tie strength and stressed the necessity of lack of ties or 'structural holes' to encourage mobility and innovation and proposed that network density or coverage actually dissuades information flow and provides redundant information. More recently, Lin conceived of social capital as "resources embedded in social relations" (quantity/quality) and "locations in a network or network characteristics" (tie strength) (2000: 786). In this article, we account for both of these aspects.

Granovetter also defined tie strength as the "(probably linear) combination of the amount of time, the emotional intensity, the intimacy (mutual confiding), and the reciprocal services which characterize the tie" (Granovetter 1973: 1361). Due to the limitations of the survey data, I cannot account for variation in most of these dimensions. What I do know is that all friends and family beyond siblings and parents listed in the migrant networks fulfill some aspect of the fourth dimension (i.e. reciprocal services). More details in this regard are given in the data section.

[6] Legal family reunification may play a relatively minor role in certain contexts, such as that of Mexico-U.S. Here, Kanaiaupuni (2000) found that married women were much less likely to migrate than single or separated and divorced women.

[7] In general, this does not tend to be an issue for internal migration, although internal residence permits do exist in some countries (like the People's Republic of China), and influence movement.

SOURCES OF MIGRANT SOCIAL CAPITAL

The costs and barriers of international migration are high and migrant networks can play a key role in making migration possible. Relevant and ready resources, trustworthy information, including that which is outside the "provincial news and views" are all important. The role of strong ties (siblings, parents) in international migration is well-documented (e.g. Palloni et al 2001, Fussell and Massey 2004), while the role of weak ties is not. I expect that weaker ties are important in predicting international migration, but this needs a rigorous empirical test. Neither is it clear whether the migrant network hypothesis can be extended beyond parents and siblings. If the evidence does not systematically include other personal links, the migrant network hypothesis is quite vulnerable – it is possible that previous literature has, for the most part, simply captured evidence of household strategies and mislabeled these as products of social capital.[8]

Although the original theories of tie strength hypothesize about a variety of personal ties, the prevailing definition of tie strength in migration literature captures only household migrant networks (for strong ties) and an aggregate of these measures at the village level (for weak ties). No distinction is made between village members who are close friends of the potential migrant and those to whom they have never spoken. Also, extended family members living outside the household are treated the same as acquaintances and strangers, although their influence is likely to be quite different.

Using this definition, studies find that strong ties (household migrant networks) have a strong and consistent effect while similar effects are not found for village ties (Cerrutti and Massey 2001; Espinoza and Massey 1999; Kanaiaupuni 2000). Of these, only two (Curran et al 2005; Garip 2008) have investigated the role of strong and weak ties, beyond dummy and count indicators. Curran et al (2005) found that household migrant social capital consistently increases the propensity to migrate, while village migrant social capital may even dissuade it. Frequency (trips) was a more consistent predictor than duration. In a study which also analyzed the diversity, accessibility and amount of social capital resources, Garip (2008) named strong (household) and weak (village) ties, different sources of migrant social capital; and found that, while both village and household trips have a positive effect on migration, the effect of each village trip is larger. Despite these improvements, no study has yet tested the impact of personal migrant networks outside close family, nor controlled for the two major alternative explanations. I expect that having personal migrant networks outside close family will increase the propensity to migrate internationally, even beyond what household strategies and 'legal' family reunification can explain.

Furthermore, I propose testing the strength of ties in personal migrant networks. Nearly all existing studies of personal networks beyond close family use dummy or count indicators, rather than a more theoretically-based approach. The one exception is Espinosa and Massey (1999)'s "closeness of tie" measure. Based on anthropology's kinship diagram, it includes some questionable propositions: including spouses (which may confound migrant network effects with household strategies); failing to distinguish among generations (an aunt or uncle is categorized as a closer tie than a cousin, whereas just the opposite could be expected); and excluding friends. I improve on this by incorporating friendship networks and accounting for generation. I expect that the impact of personal migrant networks will vary depending on tie strength, but the direction is not clear. Indeed, two contrary and competing hypotheses follow: I expect (A) stronger ties to contribute more dependable help and resources and thus lead to a

[8] Even Palloni et al's strategy (2001) of controlling for household strategies via paternal (father) migration and utilizing sibling (brother) migration to capture migrant network effects is troublesome in this regard.

greater likelihood of migration; and (B) weaker ties to contribute more wide-ranging information, help and resources and thus lead to a greater likelihood of migration.

RESOURCES OF MIGRANT SOCIAL CAPITAL (AMOUNT AND DIVERSITY)

Using Garip's migrant social capital framework (2008), I distinguish migrant networks between two kinds of resources: amount and diversity. I extend the framework by accounting for alternative explanations and modeling male and female migration separately. Previous studies have shown that an individual's likelihood to migrate increases with the experience of migrants in their household or village (Curran et al 2005; Garip 2008; Massey and Zenteno 1999). Only a couple studies have incorporated diversity into their studies of networks (Garip 2008; Massey and Espinosa 1999). A more diverse network (information about many destinations) will provide individuals with more choices and thus increase migration likelihood. I also expect that the greater the amount and diversity of resources available, the greater the individual's likelihood will be to migrate.

THE CONTEXT

Migration between Senegal and Europe

Senegal is both a country of origin and destination in terms of international migration. Senegal has received migration from other African countries throughout history and from France and Lebanon during colonization (Gerdes 2007). Senegalese migration to Europe started when Senegalese members of the French army found work in the port of Marseille in the early to mid 20th century (Gerdes 2007). Later, with a domestic labor shortage on their hands during the prosperous 1960's, French automobile companies deliberately recruited healthy well-educated workers from Senegal, mostly of the soninkés and pulaars ethnicities (Jabardo 2006: 37). However, these workers especially suffered repercussions during the recessions of 1967 and 1968; and, with the oil crisis of 1973, France essentially halted labor migration (Jabardo 2006: 37).

In the late 1970's and early 1980's, as France became increasingly less hospitable and as agriculture in Spain and Italy shifted to a more labor-intensive model, a few Senegalese migrants (of the same soninkés and pulaars ethnicities as the original autoworkers in France) arrived and worked in southern Italy and Spain (initially Catalunya)[9], with hopes to move to France in the not-so-distant future (Jabardo 2006: 39). About the same time, responding to the groundnut crisis and faltering prospects in their home region, members of the Mouride Sufi brotherhood branched out their religious and commercial networks from their strongholds in Paris and Marseille to Italy (and the U.S) first, and later to Spain (and elsewhere in Europe) (Lacomba and Moncusi 2006: 74). The Mouride diaspora in Europe almost exclusively works as wholesalers, hawkers in fairs and markets, and as street peddlers.

Throughout the 1980's and 1990's, Spain's need for labor grew, and Senegalese of varying ethnicities and origin went to work. Meanwhile, France's establishment of mandatory visa requirements for Senegalese in 1985 encouraged potential Senegalese migrants to look to other destinations in Europe. In the 1990's, there were greater pressures to migrate out due to the intensification of Senegal's economic crisis (Gerdes 2007), which included the devaluation of the Western Africa CFA (Communauté financière d'Afrique) currency on

[9] Many of the first-wave Senegalese migrants to Spain did so with a Gambian passport due to porous borders and shared cultures between Gambia and Senegal, and restrictions placed on worker out-migration by the Senegalese government (Jabardo 2006, 25).

January 1, 1994. While some identify 1989 as the peak year of Senegalese migration to Italy, Senegalese internal migration to northern Italy and subsequent employment in stable well-paid industrial jobs have maintained Italy as an attractive destination, especially for the better-educated (Grillo and Riccio 2004).

In both Spain and Italy, regularization campaigns of undocumented migrants have provided a mechanism for legalization for undocumented Senegalese, while possibly increasing their attractiveness as destinations.[10]

Senegalese household and family structure

In addition to the different push and pull factors influencing migration between Senegal and Europe, there are different particularities of Senegalese culture, especially those pertaining to household decision-making and gender roles, which are relevant when analyzing migrant networks and migration. According to Schmidt di Friedberg (1993, 135), Senegalese solidarity has at least three characteristics that distinguishes it from that of other groups of migrants: a hierarchy based on age (the oldest is considered responsible for younger migrants); organization (sharing of household tasks and bills); and underlying philosophy (the group is the important element and individual goals and ambitions only "make sense" within it). She argues that this form of solidarity is not a response to migration; but rather a way of life that preceded it.

Indeed, according to Gabrielli (2010), the traditional family or household structure in Senegal is patrilineal; when the situation allows, a group of brothers live together in the same compound with their wives and children. If a brother leaves the village for work, his wife becomes the charge of his mother or brother, and is usually given additional tasks in the fields or with livestock (Barou 2001: 17). However in recent decades, greater urbanization has led to a nuclearization of the family (Gabrielli 2010: 83). International migration also alters household dynamics. Barou (2001) documents this process for migration between rural Sahel and France. The prospect of family reunification of the nuclear family at destination disrupts the traditional hierarchy, altering the nature of subordination of the not-yet-migrating wife to her in-laws (Barou 2001: 17-18). It also alarms the traditional power hierarchy in the extended family and village, who fear the loss of remittances (Barou 2001: 17).

Another peculiarity of Senegal is its high incidence of polygamy (or polygyny). Found throughout sub-Saharan Africa, polygamy has also been institutionalized through Islam which permits men to marry up to four wives, with successive marriages theoretically contingent on the consent of existing wives (Bass and Sow 2006). Senegal has one of the highest levels of polygamy in sub-Saharan Africa: 48.6% of women aged 15-49 were in polygamous marriages in 1997 (Westoff 2003: 9). Although polygamy has traditionally implied co-residence of wives and children, migration introduces the possibility of multi-site families, institutionalized through marriage (Locoh 1995: 30). Polygamy becomes less likely as women gain decision-making power: for example, educated women are less likely to participate in polygamous marriages (Hayase and Liaw 1997). International migration also may lessen the likelihood of polygamy, via: legal restrictions on legal family reunification of only one spouse; legal restrictions on documentation so that settlement rather than transnational-living becomes prominent, despite original preferences; increased decision-making power of women as they earn income and rise in status; and changing cultural norms and ideals in general.

[10] In both Spain and Italy, there have been five extraordinary regularization programs of undocumented migrants. In Spain, these happened in 1986, 1991, 1996, 2000-2001 and 2005 (Arango et al 2005). In Italy, the campaigns took place in 1986, 1990, 1995, 1998, 2002 (Levinson, 2005).

Furthermore, Senegalese society is strongly stratified by a caste system, based on a history of slavery, migration, and division of professions (Gabrielli 2010: 78). The act of contemporary migration to Europe alters the caste system, with individuals of different castes now working in same or similar professions (street peddling, for example) and with revenues transforming the status of individuals and families through consumption and religious donations (Evers Rosander 2002). Since these changes are experienced both at origin and destination, they can also influence future migration. This is especially true for independent female migration: women's own reputation is at risk (as promiscuous or "prostitutes") and, if married, that of their spouses at origin (who are thought of as incapable of controlling their wives) (Evers Rosander 2002). To overcome such barriers to migration, information and resources provided by migrant networks may prove to be essential.

Overall, the power of the household or family structure appears to be extremely strong in Senegal, and it is difficult for an individual to pursue a goal (migration, for example) without the explicit approval of the larger social structure. This is especially true for women. Nevertheless, international migration is also changing these traditional structures and expectations, allowing both men and women to step out (at least some) from the roles ascribed to them by class, caste and culture.

DATA & EMPIRICAL ANALYSIS

Data

This article utilizes the recent longitudinal biographical survey data (2008) collected in the framework of the MAFE (Migration between Africa and Europe) Project. [11] It is based on a retrospective biographical questionnaire with housing, union, children, work and migration histories documented. Detailed information is recorded for each union, child, and period (housing, work). While individuals are asked to provide general information about each work period, they are asked to specify much of the housing information to the beginning of each housing period (including who lived in the household). There is additional information about migrant networks, documentation status, remittances and properties. About 600 current Senegalese migrants in France, Italy and Spain and nearly 1100 residents of the region of Dakar were interviewed in 2008.[12]

This article employs discrete-time event history model techniques to analyze how the likelihood of first-time migration to Europe is related to origin (urban origin, religious affiliation, father's education, if father was deceased or unknown, if Ego was a firstborn child, number of siblings, Ego's highest level of education) and year-by-year changes in the individual life course (marital status, polygamous, number of children, labor force status, property ownership, etc.)[13], period effects[14] and particularly changes in an individual's

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[12] I do not expect the sampling strategy of urban Dakar to upward bias my results. Indeed, I might even expect the opposite. For the Mexican case, Fussell and Massey (1994) find that community-level social capital is less influential in urban areas than in rural areas.

[13] Specifically, the origin indicators are religious affiliation (Muslim brotherhoods of Khadre, Layène, Mourise, Tidiane and a category for "other Muslim"; Catholic and other Christian), father's education (no school, primary, secondary and above), if father was deceased or unknown, if Ego was firstborn child, number of siblings, Ego's highest level of education (no school or pre-school, primary, lower secondary, and higher secondary or higher).

migrant network. Since my interest is adult migration, I start the clock at age 17, with the first possible migration to Europe at age 18. All individuals in the sample were born in Senegal.

The primary limitation of this data source is its retrospective nature. The data is thus vulnerable to recall bias and error, and this has consequences for the sample and information captured. First, the origin sample is especially vulnerable: households where all members have migrated (either to Europe, another country or another region) will not be included nor represented by the sample. Second, there may be inaccuracies in the information. It is possible that it is harder to recall accurately information in the distant past, in comparison to more recent years. Nevertheless, analyses of the MAFE-Senegal destination samples suggest they are largely free of selection bias (Beauchemin and Gonzalez Ferrer 2011). A specific discussion of the impact of data limitations on the analysis of migrant networks is in the next section.

Operational Measures

The dependent variable 'First-time migration to Europe' is a binary indicator that is 1 the year when Ego first moves to France, Italy or Spain.[15] Moves from Senegal to other destinations, including those in Europe, were censored at the year of migration. For all previous years, the dependent variable is coded 0.

Measuring Networks[16]

Respondents were first asked to name all close family members (parents, siblings, partners and children) who had lived at least one year abroad, and construct a year-by-year itinerary of the countries where they had lived since. Subsequently, they were asked to list the other relatives and friends on whom they could count on (or could have counted on) to receive or help them to migrate out of Senegal, who had also lived at least one year abroad. For the sake of precision, I restrict migrant network indicators to years lived in Europe. Years when migrant network members lived elsewhere are excluded, in order to avoid capturing general imitation behavior and thus overestimating the impact of the migrant networks. All migrant network indicators are captured at year (t-1).

There are, however, a few potential sources of bias in measuring the other relatives and friends migrant network. First, it is a selected category: a comprehensive list of friends and other relatives was not solicited, only those "close" enough that Ego could have counted on them for migration help. Also excluded are those who migrated but were not available to help. Bias is introduced only if migrants and non-migrants respond to the question differently. In

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The time-varying indicators are marital status, children (number of), occupational status (working, unemployed, studying, working at home, inactive) and whether, in a given year, the individual owned land, housing or a business.

[14] The periods are before 1985, 1985-1993, 1994-1998, 1999-2003, after 2004. In 1985, France introduced a compulsory visa policy for Senegalese. In 1994, Senegal experienced a grave economic crisis when its currency, the CFA franc, was unlinked from the French franc and devalued by half. The rest of the periods were made to be of approximately equal length.

[15] First migration to Europe was chosen rather than the first international migration since the costs and barriers to migration are quite different across the Africa-Europe border, in comparison to borders between African countries, or those between Africa and North America for example.

[16] Unique in international migration, the data used (MAFE-Senegal), has year-by-year information of network migration (including country of residence) and various other individual indicators, but may also suffer from certain sources of bias: those inherent to retrospective surveys, and those related to the distinctly urban nature of the origin sample (from the Dakar region). However, I would expect the latter to downward bias network effects (Fussell and Massey 2004).

any case, I expect any bias to run against the hypotheses.[17] Second, due to the retrospective nature of the questionnaire and recall bias, relationships still active at the time of the survey are more likely to be included. If this is related to its quality and likelihood to help, it introduces bias in favor of the hypotheses, and the impact of migrant networks would be overestimated. This is an issue especially for friendships. Below, I detail my attempts to downward bias the friendship network indicators. Finally, migrants who actually received help may be more likely to list these people, while those who did not receive help may not list people who could have potentially helped. I expect that this issue was mostly preempted by rigorous training of interviewers to list all extended family, friends and acquaintances the respondent could have counted on – whether or not they did help. In cases that it was not, this could lead to an overestimation of the impact of migrant networks.

Analysis of friendship ties is especially troublesome. Friendships may be endogenous to migration: individuals may seek out friendships which help them migrate. My approach to controlling endogeneity is two-fold. First, I include only friendships formed in Senegal before either individual had ever lived abroad. While it is possible that one (or both) individuals already intend to migrate, neither has personal migration experience from which to draw advice and resources. Second, I distinguish between short-term (less than 3 years) and long-term friends (3 years or more). Only long-term friends, less likely to be a source of endogeneity, are included in the models. This excludes all spur-of-the-moment friendships. For example, for a potential 18 year-old migrant, we will only include friendships formed before the age of 15. Friendships lacking duration information are also excluded. This two-pronged approach helps make the friendship network analysis more robust.

Migrant Social Capital Sources: Tie Strength

Although it is difficult to capture the quality or nature of relationships with the data available, the data analyzed in this study has one clear advantage: its dynamic (time-varying) nature. Few theorists recognize that networks are ever-changing, and network indicators rarely, if ever, capture the dynamism of time – how relationships (and networks of relationships) change over time, growing stronger or weaker, and end – and how this dynamism affects the networks' impact on the phenomenon of interest. Here, I account for important year-by-year changes in the migrant network (country of residence and death), essential constant network information (link to Ego, gender, whether Ego thought the migrant could help, year met), all in conjunction with the plethora of dynamic data available about the survey respondent (family/household situation, housing situation, legal document status, labor market situation, property-ownership, etc.).

The data essentially includes two lists of network members (an exhaustive list of migrants in the close family, and a selected list of other family and friends), and my analysis of weak ties reflects this dichotomy. The exhaustive list of close family ties allows me: to test the network hypothesis net of the alternative explanations; and to establish a baseline from which to test the effect of weak ties. Developing weak tie indicators from only the second list adds

[17] For example, since migrants (especially in retrospect) have a clearer idea of what "help to migrate" looked like and who provided it, they may list very few people in this category. In comparison, non-migrants (being more idealistic) may list more people (even an exhaustive list of migrants they know). The network effect for migration would then be biased down. The problem is if the opposite is true: if migrants tend to list more other family and friends than non-migrants. This may be a problem if non-migrants are less aware of the migration experience of their extended family than migrants. However, since network measures are restricted to Europe, and migration to Europe is still rather remarkable, I argue that the second scenario should be much outweighed by the first: migrants screening their potential lists for would-be help and non-migrants euphorically listing everybody they know.

robustness to my argument. Respondents were asked to evaluate two different dimensions of their weak ties network: first, whether a person was able to help them; and second, whether a person was willing (and available) to do so. Thus, I know that the "reciprocal services" dimension (or the possibility thereof) characterizes the weak ties network.

Of the four dimensions of Granovetter's definition for tie strength (amount of time, emotional intensity, mutual confiding and reciprocal services), I can account directly (and partially) for only two: amount of time and reciprocal services. As mentioned before, all networks outside close family (weak ties) fulfill some aspect of reciprocal services (or the possibility thereof) due to the wording of the survey question. Also, in the case of friendship, I can account for the amount of time – or in this case duration of the friendship – and do so to restrict the analysis to longer-term friendships.

Since I cannot directly capture variation in other dimensions of tie strength, I resort to exploiting a consequence (or predictor) of tie strength: the source of relationship.[18] The theory proposes that more relationships exist among one's strong ties than among weak ties. Likewise, it is intuitive to expect more overlap and connection between networks of siblings in general, than between networks of cousins. Friendship, initially, does not seem to have the same gradient of overlap and connection found in many blood ties.[19] My proposal for a tie strength indicator is based on both blood proximity and generation. The first (blood proximity) is justified in that the more closely related family members are, the more their relationships can be expected to be governed by common expectations of trust and reciprocity. This dimension was used in Espinosa and Massey (1999). I justify the second dimension (generation) for primarily cultural reasons: the Senegalese family structure is generally characterized by strong vertical (between generations) solidarity within the extended family (e.g. Bass and Sow 2006, Gabrielli 2010). Indeed, while teranga or hospitality is likely to be extended to strangers in Senegalese culture, its most costly commitments are usually between different generations of the same extended family: for example, an aunt fostering her nieces and nephews while their parents are away (Gasparetti 2011). Horizontal solidarity (among the same generation) is important as well, but does not seem to carry the same responsibilities and obligations. Finally, since friendships are less likely to be governed by mutual obligation, I label these relationships as most weak. Here, I propose a gradient of weak ties based on these two elements: stronger tie (different generation: uncle/aunt, niece/nephew), medium tie (same generation: cousin) and weaker tie (friends).

Migrant Social Capital Resources: Amount and Diversity

Measures of whether a migrant received information or help from network members, and how this influenced their decision to migrate, are not available in this data. According to Garip (2008: 597-8), this leads to an identification problem: it is not possible to distinguish between imitation or contagion effects and true migrant network effects (information, assistance or resources provided). My analysis is not immune to this critique. However, I argue that

[18] According to Marsden and Campbell (1984), literature about the strength of ties has confounded indicators ("actual components of tie strength", 485) and predictors of tie strength ("aspects of relationships that are related to, but not components of tie strength", 488). Granovetter's four dimensions of strength of tie are indicators, while many of the tie strength "indicators" are, in reality, predictors: source of the relationship, number of ties, directness of tie. The networks and migration literature is thus guilty for systematically substituting tie strength predictors (source, number of ties) for indicators.

[19] This may be especially true given the nature of the Senegalese family structure. Besides the traditional residence of brothers, their wives and offspring in the same compound, a large proportion of marriages are endogamous, or of extended family members. In an analysis of the 1996 Demographic and Health Survey, Antoine and Nanitelamio (1996) find that 42% of marriages are endogamous.

imitation effects are less a problem here: given the nature of the survey (network members are only included when Ego remembers their exact migration itineraries); and the nature of weak-tied personal networks compared to village-level networks (in the first, useful information is more likely to be communicated without Ego actively seeking it, and resources or assistance available).

Instead, we capture the amount and diversity of migrant social capital resources. First, I argue that, with each year a migrant spends at destination, the more information and resources they can make available to potential migrants. I use the cumulative network experience in Europe, as measured in years, in order to capture amount of migrant social capital. Second, we expect that a migrant network with more diverse resources (information about different destinations) will have a greater breadth of information and resources, and expand the potential migrant's choices. I model my diversity index after Garip's 2008 diversity index (based on Shannon's 1948 entropy index):

$$Diversity = \frac{-\sum_{i=1}^{n} p_i \times \log(p_i)}{\log(n)} \times 10 \,,$$

where n is the number of possible destinations, and p is the proportion of migration experience to each destination i. The index varies between a minimum diversity of 0 (all migration experience concentrated in one destination) and 10 (migration experience equally distributed among all destinations). I use four different categories for destinations, which exhaust the possibilities for all Senegalese would-be migrants: France, Italy, Spain and other (including the rest of the world).

Macro Indicators

In order to capture some of the macro-level push and pull factors, I include a series of period indicators (before 1984, 1984-1993, 1994-1998, 1999-2003, since 2004) and, for Senegal, two time-varying macro-economic indicators: GDP % growth per capita (based on constant local currency) and urban population growth (% of total). The macro-economic indicators were collected by the World Bank's World Development Indicators, and are available from 1961 through the time of the survey. Other potentially important indicators at destination, such as rates of inflation, unemployment and schooling, were not available for the entire time frame.

THE ALTERNATIVE EXPLANATIONS

Alternative Explanation #1: Household decision-making (Household migrant network)

The household migrant network indicator was constructed to weigh it against the migrant network hypothesis and towards the alternative explanations involving households. It was constructed with time-varying information from both the housing module (Ego's ties to other household members) and the migrant network module (Ego's link to migrants abroad). In the housing module, at the start of each housing spell, the survey includes Ego's links to all other household members (sister, for example), but not the exact identity (the sister's name). In the network module, there is a year-by-year accounting of network members who have lived abroad, where they have lived and their link to Ego. Accordingly, a very generous measure was used: if a household included any sister, all sisters in the migrant networks were considered household members during the entire housing spell. This was repeated for migrant brothers, mother, father and friends. Furthermore, if the household included any "other

relative", all cousins, aunts/uncles, nieces/nephews and grandparents were categorized as household members during the entire housing spell. All household migrant network indicators were lagged by one year, in order to avoid capturing simultaneous migration by household members.

There are two important limitations. First, the household membership information is only available at the beginning of each housing spell, so the longer the housing spell lasts; the less accurate the information. Second, despite the possible multi-local nature of Senegalese families at origin (in some cases of polygamy or rural-urban migration, for example) and the influence of family members and elders outside the physical household, I can only account for Ego's current physical household.[20] I do, however, include polygamy as a control in all models.

Alternative Explanation #2: Spousal reunification (Migrant Spouse)

Since specific visa and residency permit information is not available, I proxied for the legal family reunification process21 through whether Ego's spouse lived abroad in Europe. This proxy is again weighed against the migrant network hypotheses, by including all spouses in Europe, independent of their legal status and ability/desire to embark on the legal family reunification process. I lag the variable in order to avoid capturing simultaneous migration by the spouses.

ANALYTIC APPROACH

Modeling individual migration propensity

Since my dependent variable is dichotomous, I utilize a logistic regression model:

$$Yij \sim B(1, \pi i) \quad (1)$$

$$\text{logit}(\pi ij) = \beta 0 + \beta 1\ xi + \beta 2\ xij \quad (2)$$

Yij represents the dichotomous migration outcome for observation i for individual j. The conditional probability πij represents the probability of migration to France, Italy or Spain over the probability of staying in Senegal in a given person-year observation. In Equation (2), x's represent observed time-varying (and non-time-varying) individual characteristics, β's represent coefficients. Time and duration are controlled for with the inclusion of age and ln(age) in all models. All migrant network variables, indicators for the alternative explanations (household membership and migrant spouse), labor force status, and property ownership are captured in year (t-1), or, in other words, lagged by one year. In order to ease interpretation, I have represented the results in odds ratio (exp(β)) in the tables.

[20] This is limited: Bass (2006) documents that the concept of the Senegalese family is rather fluid and can depend on a number of factors: sharing the same rite of passage and community; living and eating together and contributing to its social and economic life. Also, in a context of rural-urban migration, there may be members who contribute socially and economically but do not live in the physical household (Bass 2006: 90-91). However, I expect that the time-varying and super-generous nature of the household indicator will help reduce bias when testing it against the migrant network hypothesis.

[21] Since my interest is adult migration, I have not included possible family reunification of children into the models. Also, incidence of elderly migration (as a proxy for possible family reunification of elderly parents) appears to be negligible in my sample.

RESULTS

Table 1 displays descriptive statistics of non-migrants and migrants at the time of the survey. On one hand, migrants and non-migrants appear to be similar: in terms of household of origin and certain current household characteristics (marital status, whether the individual has children, certain occupational statuses). On the other hand, there are certain differences ($p<0.01$). More migrants are male (0.710), compared to non-migrants (0.449). At the time of the survey, migrants had fewer children (2.342 vs. 2.968) and higher education (0.631 vs. 0.320 had lower secondary education or higher) than non-migrants, while more migrants were landowners (0.287 vs. 0.088) and homeowners (0.381 vs. 0.104) than non-migrants. Finally, a larger proportion of migrants than non-migrants were employed (0.805 vs. 0.619), and fewer were working only at home (0.048 vs. 0.230).

Migrants are more likely to have migrant network ties than non-migrants (Table 1). At the time of the survey, more migrants than non-migrants had only strong ties (0.302 vs. 0.157) and both ties (0.208 vs. 0.0755), while fewer had no ties at all (0.288 vs. 0.509). Also, among the strength of ties measures, migrants are only different from non-migrants in one of the three categories. More migrants than non-migrants (0.227 vs. 0.142) had a weaker weak tie (friends) at the time of the survey. There were no significant ($p<0.01$) differences between those with "stronger" (aunts/uncles, nieces/nephews, grandparents) and "middle" (cousins) weak tie links.

The Migrant Network Hypothesis and Alternative Explanations

Table 2 presents the dynamic evidence for the migrant network hypothesis. In all models, the presence of a migrant spouse abroad (proxy for legal family reunification) is an extremely powerful explanation for Senegalese female migration, but not so for male migration. A model re-run with "migrant spouse bias" included (results not shown) demonstrates that failure to separate out the migrant spouse effect exaggerates household network effects on female migration.

Table 2 (Model 1) also shows that the migrant network hypothesis appears to be robust to the other competing explanations (household strategies), overall and in separate analysis by gender. For men, non-household migrant networks (migrant network hypothesis) have a large and significant impact on migration beyond what household migrant networks (household strategies) can account for, and these impacts are on a comparable scale as the household migrant networks. For women, non-household networks appear to have an even larger effect than household networks. These results validate the importance of clearly defining and restricting migrant networks and overtly controlling for both competing explanations.

The evidence is strong that migrant networks are important for international migration for both men and women, beyond important alternative explanations.

Sources of Migrant Social Capital: Tie Strength

Once non-household networks are categorized into strong and weak ties (Table 2, Model 2), results confirm the importance of "strong ties" (network ties to close family) and "weak ties" (migrant network ties outside close family). Overall, the differences between the impacts of strong and weak ties do not appear to be statistically significantly in all the models. For women, weak ties appear to have a negative (albeit not statistically significant) effect on migration, as compared to strong ties. Also, for men, weak ties appear to have a positive (albeit not statistically significant) effect on migration, as compared to strong ties. These results support the contention that having personal migrant networks outside close family

increases the propensity to migrate internationally for both men and women. The direction of these results is similar to those in studies using the aggregate weak tie measure.

When I utilize a more theoretically-driven indicator for tie strength, the results (Table 2, Model 3) challenge the findings of previous literature. The impact of the network varies with the different strengths of network ties: the "weaker" weak ties (friends) seem to have a stronger influence than strong ties, while the "stronger" (aunt/niece) and "middle" weak tie (cousin) has a lesser influence (although the difference is not statistically significant). In addition, there is a clear gender difference. Supporting the strength of ties theory, but contradicting previous findings (which used aggregate weak ties), the "weaker" weak ties (friends) have an extremely large and significant impact on male migration between Senegal and Europe, greater than both the effect of strong and household networks. This seems to challenge the literature's contention that strong ties are more important than weak ties in international migration. At the same time, female migration follows the pattern predicted by the literature (strong ties more important than weak ties). In fact, no weak tie network category is statistically significant for women.

All in all, I find preliminary evidence to support both competing hypotheses about tie strength. For female migration, the results support the contention that stronger ties contribute more dependable help and resources to the potential migrant and thus increase their likelihood to migrate. At the same time, for male migration, the results seem to suggest the opposite, supporting the explanation that weaker ties contribute broader information, help and resources to the potential migrant, thus increasing their likelihood to migrate. Furthermore, since the literature has been limited to cumulative network measures (whether any network member has ever been to destination by year t-1, contrasted with whether any network member is living at destination in year t-1), I have rerun the analysis for these "ever been" migrant indicators (Table 3). While weak tie effects and alternative explanations are comparable and similar in scale, the cumulative modeling of strong tie networks appears to dampen their effect; the dynamic effects are even larger. A likely explanation is that individual migration decisions may be especially sensitive offers of housing at destination, which strong tie networks are more likely to offer and which only current migrants can provide. Next, we go beyond dichotomous indicators and analyze specific resources of migrant social capital.

RESOURCES OF MIGRANT SOCIAL CAPITAL: AMOUNT AND DIVERSITY

Table 4 summarizes the results of the analysis of the levels and diversity of migrant social capital resources. First, greater levels of migrant social capital resources appear to increase the migration propensity overall (Table 4, Model 2). Surprisingly, the migration experience of weakly tied network members is especially important, while that of strongly tied networks lack significance for both men and women. Ambiguous effects were also found in other studies of duration (Curran et al 2005), but due to the relatively non-circular nature of migration between Senegal and Europe, I could not substitute a frequency (or number of trips) measure for the duration (migration experience) measure. In any case, for male migration, there is evidence in support of the strength of ties hypothesis, as seen by the gradient of influence by weak tie category (Table 4, Model 4). The migration experience among stronger weak ties has no significant influence, but each year of migration experience of the middle weak tie category raises odds of migration by 1%, and that of the weaker weak tie category raises odds by 19%. For women, only the stronger weak tie category holds significance: each year of experience here increases migration odds by 2%.

Second, in terms of diversity of migrant social capital resources, the only significant effects were found for strongly tied networks. Here, the diversity of destinations in strong tie network

migration experience (parents and siblings) increases migration propensity. This effect runs in the opposite direction of what was found for internal migration in Thailand (Garip 2008). Also, diversity of destinations in weak tie network does not appear to have significant influence here, while in the Thai context, diversity (using aggregate weak tie) was found to diminish migration propensity (Garip 2008).

The final findings are related to the alternative explanations. Migrant spouse continues to be extremely influential for female migration and not at all for male migration. At the same time, the evidence for the importance of the amount of household migrant network (proxy for household decision-making strategy) and its diversity is mixed. Overall, there appears to be some evidence for both, but this fades away in the gender-specific analysis.

CONCLUSIONS

In the last two decades, literature on migrant networks and their roles in influencing migration outcomes have focused on ties to close family members and village-level migration. Less attention has been dedicated to investigating the effects of weak personal ties: extended family and friends. In order to understand clearly how social capital impacts the migration decision, it is essential to account for network ties of varying strengths and to test the stamina of the migrant network hypothesis against important alternative explanations.

I believe this article contributes to existing research in three ways. First, I have tested the validity of the migrant network theory beyond what concerted household strategies can explain, and beyond legal family reunification. Prior work had largely neglected to account for competing explanations in their affirmation of the migrant network hypothesis. Here, I have found strong evidence for the migrant network hypothesis net of the alternative explanations. Analysis of household strategies has revealed an interesting and theoretically-important finding. It seems that the concerted household strategy explanations proposed by Palloni et al (2001) and rigorously tested on a restricted sample of brother-pairs are particularly sensitive to the operationalization of household membership in the case of female migration, and the original (father migration) may only apply to male migration. Although this finding may seem surprising, for years gender scholars have critiqued the short-sightedness of viewing the household as a unitary decision-making body, especially when there is conflict between the 'household' and the potential migrant (e.g. Boyd 1989; Gregorio Gil 1998; Hondagneu-Sotelo 1994). More theoretical and empirical attention in this regard is needed. Spousal reunification is another important albeit-neglected explanation for female migration. It has such explanatory weight in international migration that I believe it merits distinction in future studies of migrant networks. All in all, the migrant network hypothesis remains robust to both concerted household strategies and legal family reunification.

The second contribution has been to clarify the role of personal migrant networks by analyzing source (of different tie strengths), amount (years of migration experience) and diversity (of destination) of migrant social capital. I have found differences for male and female migration. The first analysis of the effects of ties to current migrants reveals that female migration behaves, as expected by the migration literature: strong ties (close family) have a greater influence on migration than weak ties. At the same time, for male migration, friendship networks appear to play a key role, and these "weakest" weak ties are more influential than strong ties. Subsequent joint analyses of source and amount of social capital reveal that net of alternative household explanations and migrant spouse, the resources of strong ties do not first appear to influence migration. At the same time, gender differences exist in terms of the strength of ties hypothesis: for male migration, resources from the weakest migrant network tie are most influential, while for female migration, resources from

the strongest weak tie is the most influential. Nearly all the diversity indicators lack influence, only the diversity of strong ties' destinations significantly influences male and female migration: the greater the diversity of strong ties, the greater propensity to migrate.

Finally, this article compares for the first-time dynamic and cumulative measures of migrant networks. The cumulative measures used in most of the literature appear to mask some of the actual (dynamic) effect of strong ties.

Although this article makes a key first step towards understanding the influence of tie strength and weak ties in international migration, it has certain limitations. First, although the network indicators represent an improvement, they still do not directly capture the tie strength: the levels (and fluctuations) of time spent, emotional intensity, and mutual confiding in each relationship. More precise measures of migrant networks should be collected and analyzed in order to lessen the literature's dependence on so-called predictors or proxies for networks.[22] Second, the article accounts for the amount and diversity of migrant social capital resources, but does not capture the other aspect known to be important, the accessibility of these resources (Garip 2008). Future study ought to. Third, for precision's sake, I limited the study to direct migration from Senegal to Europe and Senegalese networks in Europe, and am thus unable to comment on more complex migration strategies and itineraries, such as those found in step-wise international migration (Paul 2011), where migrants intentionally work in "stepping stone countries" (perhaps oil-rich Libya, in the case of Senegalese migrants) in order to accumulate the human, financial and social capital to move to a more desired destination. Linking migrant networks to specific migration strategies and itineraries would help clarify their role and deepen our understanding of international migration.

[22] Kanaiaupuni et al (2006) found that different dimensions of migrant network were associated with different aspects of child health at origin. They analyzed the Mexican Health and Migration Survey data, which included a number of additional network measures: proximity; frequency of contact; co-residence; whether they offered emotional support or financial resources for the year prior to the survey.

REFERENCES

Ai, C. and E. Norton. 2003. "Interaction terms in logit and probit models" *Economics Letters* 80(2003): 123-129

Amuedo-Dorantes, C. and K. Mundra. 2007 "Social Networks and Their Impact on the Earnings of Mexican Migrants" *Demography* 44(4): 849-863

Antoine, P. and J. Nanitelamio. 1996. "Can polygamy be avoided in Dakar?" *Courtyards, markets and city streets: urban women in Africa* (ed. Kathleen Sheldon). Boulder (CO), USA: Westview.

Arango, J. and M. Jachimonwicz. 2005. "Regularizing Immigrants in Spain: A New Approach" *Migration Information Source.* Migration Policy Institute.

Bass, L. and F. Sow. 2006. "Senegalese Families: The Confluence of Ethnicity, History, and Social Change" *African Families at the Turn of the 21st Century* (ed. Yaw Oheneba-Sakyi and Baffour K. Takyi). Westport (CT), USA: Praeger.

Beauchemin, C. and A. Gonzalez Ferrer. 2011."Sampling international migrants with origin-based snowballing method: New evidence on biases and limitations" *Demographic Research* 25(3): 103-134.

Beine, M., F. Docquier and C. Ozden. 2011. "Diasporas" *Journal of Development Economics* 95(1): 30-41.

Borjas, G. J. 1987. "Self-Selection and the Earnings of Immigrants" *American Economic Review* 77(4): 531-553.

Burt, R. 1995. *Structural holes: the social structure of competition.* Cambridge: Harvard University Press.

Castles, S. 1986. "The Guest-Worker in Western Europe – An Obituary" *International Migration Review* 20(4): 761-778.

Cerrutti, M. and D. Massey. 2001. "On the Auspices of Female Migration from Mexico to the United States" *Demography* 38(2): 187-200.

Chiswick, B.R. 1978. "The effect of Americanization on the Earnings of Foreign-born Men" *Journal of Political Economy* 86(5): 897-922.

Chiswick, B.R. 1999. "Are immigrants favorably self-selected?" *American Economic Review Papers and Proceedings* 89: 181-185

Chort, I. 2010. "Migration networks in Senegal" Migration: A World in Motion. A Multinational Conference on Migration and Migration Policy. Maastricht, Netherlands. February 18-20, 2010

Curran, S. and E. Rivero-Fuentes. 2003. "Engendering Migrant Networks: The Case of Mexican Migration" *Demography* 40: 289-307.

Curran, S., F. Garip, C. Chung, and K. Tangchonlatip. 2005. "Gendered Migrant Social Capital: Evidence from Thailand" *Social Forces* 84: 225-55.

Davis, B. and P. Winters. 2001. "Gender, Networks and Mexico-US Migration" *Journal of Development Studies* 38(2): 1-26.

Davis, B., G. Stecklov, P. Winters. 2002. "Domestic and international migration from rural Mexico: Disaggregating the effects of network structure and composition" *Population Studies* 56: 291-309

de Haas, H. 2008. “Irregular Migration from West Africa to the Maghreb and the European Union: An Overview of Recent Trends” *IOM Migration Research Series* 32: May 2008.

DeSipio, L. 2002. “Sending Money Home... for Now. Remittances and Immigrant Adaptation in the United States,” *Sending Money Home: Hispanic Remittances and Community Development* (ed. R. de la Garza, B. L.). Lanham (MD), USA: Rowman and Littlefield.

Entwisle, B., K. Faust, R. Rindfuss and T. Kaneda. 2007. “Networks and Contexts: Variation in the Structure of Social Ties” *American Journal of Sociology* 112(5): 1495-1533.

Espinosa, K. and D. Massey. 1999. “Undocumented Migration and the Quantity and Quality of Social Capital” *Migration and Transnational Social Spaces* (ed. Ludger Pries). Ashgate, UK: Aldersho Press.

Evers Rosander, E. 2002. “El Dinero, el Matrimonio y la Religión: las comerciantes senegalesas de Tenerife (España)” *Mujeres de un Solo Mundo: Globalización y Multiculturalismo* (ed. Carmen Gregorio Gil and Belén Agrela Romero). Granada, Spain: Universidad de Granada.

Fussell, E. and D. Massey. 2004. “The Limits to Cumulative Causation: International Migration from Mexican Urban Areas” *Demography* 41(1): 151-171.

Gabrielli, L. 2010. *Los procesos de socialización de los hijos e hijas de familias senegalesas y gambianas en Cataluña.* Barcelona: Fundació Jamue Bofill.

Garip, F. 2008. “Social Capital and Migration: How do Similar Resources Lead to Divergent Outcomes?” *Demography* 45(3): 591-617.

Gasparetti. L. 2011. “Relying on Teranga: Senegalese Migrants to Italy and their Children left behind” *Autrepart* 1-2(57-58): 215-232.

Gerdes, F. 2007. “Country Profile: Senegal” *Focus Migration Series.* Country Profile: 10.

Granovetter, M. 1973. “The Strength of Weak Ties” *American Journal of Sociology* 78(6): 1360-1380.

Granovetter, M. 1983. “The Strength of Weak Ties: A Network Theory Revisited” *Sociological Theory* 1: 202-233.

Gregorio Gil, C. 1998. *Migración femenina: su impacto en las relaciones de género.* Madrid, Spain: Narcea.

Hatton, T.J and J.G. Williamson. 2002. “Out of Africa? Using the Past to Project African Emigration Pressure in the Future” *Review of International Economics* 10: 556-573.

Heering, L. R. Van der Erf and L. Van Wissen. 2004. “The Role of Family Networks and Migration Culture in the Continuation of Moroccan Emigration: A Gender Perspective” *Journal of Ethnic and Migration Studies* 30: 323-337

Hayase, Y. and KL Liaw. 1997. “Factors on Polygamy in Sub-Saharan Africa: Findings based on the Demographic and Health Surveys” *The Developing Economies* 35(3): 293-327.

Hondagneu-Sotelo, P. 1992. “Overcoming Patriarchal Constraints: The Reconstruction of Gender Relations Among Mexican Immigrant Women and Men” *Gender & Society* 6(3): 393-414.

Hondagneu-Sotelo, P. 1994. *Gendered Transitions.* Berkeley, USA: University of California Press.

Jasso, G. and M. Rosenzweig. 1986. "Family reunification and the immigration multiplier: U.S. immigration law, origin-country conditions, and the reproduction of immigrants" *Demography* 23(3): 291-311.

Kanaiaupuni, S. 2000. "Reframing the Migration Question: An Analysis of Men, Women, and Gender in Mexico" *Social Forces* 78(4): 1311-1347

Kanaiaupuni, S., K.M. Donato, T. Thompson-Colón and M. Stainback. 2005. "Counting on Kin: Social Networks, Social Support, and Child Health Status" *Social Forces* 83(3): 1137-1164.

Levinson, A. 2005. "Regularisation programmes in Italy" *COMPAS: The Regularisation of Unauthorized Migrants: Literature Survey and Country Case Studies.* COMPAS: University of Oxford.

Locoh, T. 1995. "Familles Africains, Population et Qualité de la Vie" *Les Dossiers du Centre Français sur la Population et le Développement (CEPED)*: 31. Paris: CEPED.

Marsden, P. and N. Campbell. 1984. "Network Studies of Social Influence" *Sociological Methods and Research* 22(1): 127-151.

Massey, D. 1990. "Social Structure, Household Strategies, and the Cumulative Causation of Migration" *Population Index* 56: 3-26.

Massey, D and K. Espinosa. 1997. "What's Driving Mexico-U.S. Migration? A Theoretical, Empirical and Policy Analysis" *American Journal of Sociology* 102(4): 939-999.

Massey, D. and Garcia España, F. 1987. "The Social Process of International Migration" *Science* 237: 733-738.

McKenzie, D. and H. Rapoport. 2010. "Self-Selection Patterns in Mexico-U.S. Migration: The role of Migrant Networks" *The Review of Economics and Statistics* 92(4): 811-821.

Mexican Migration Project. 2011. http://mmp.opr.princeton.edu

Munshi, K. 2003. "Networks in the Modern Economy: Mexican Migrants in the U.S. Labor Market" *The Quarterly Journal of Economics* 118(2): 549-599.

Palloni, A., D. Massey, M. Ceballos, K. Espinosa and M. Spittel. 2001. "Social Capital and International Migration: A Test using Information on Family Networks" *The American Journal of Sociology* 106: 1262-1298.

Paul, A.M. 2011. "Stepwise International Migration: A Multistage Migration Pattern for the Aspiring Migrant" *American Journal of Sociology* 116(6): 1842-86.

Parrado, E. and M. Cerrutti. 2003 "Labor Migration between Developing Countries: The Case of Paraguay and Argentina" *International Migration Review* 37(1): 101-132.

Sandell, R. 2005. "Were they Pushed or Did they Jump? The Rise in Sub-Saharan Immigration" *Real Instituto Elcano ARI document* Nº 133/2005.

Schmidt di Friedberg, O. 1993. "L'immigration africaine en Italie: le cas sénégalais" *Études Internationales* 24(1): 125-140.

Stecklov, G., C. Carletto, C. Azzarri, and B. Davis. 2011. "Gender and Migration from Albania" *Demography* 47(4): 935-961.

Toma, S. and S. Vause. 2011. "The role of kin and friends in male and female international mobility from Senegal and DR Congo" *MAFE Working Paper series* no. 13.

Westoff, C. F. 2003. “Trends in Marriage and Early Childbearing in Developing Countries” *DHS (Demographic and Health Surveys) Comparative Reports* No. 5. Calverton (USA): ORC Macro.

Winters, P. A. de Janvry and E. Sadoulet. 2001. “Family and Community Networks in Mexico-U.S. Migration” *Journal of Human Resources* 36: 159-184.

Lacomba Vázquez, J and A. Moncusi Ferré. 2006. “Senegaleses en la Comunidad Valenciana: Redes, Confradías y Venta Ambulante” in M. Jabardo Velasco (ed.) *Senegaleses en España. Conexiones entre origin y destino*. Madrid: Observatorio de la Inmigración.

Table 1: Descriptive Information of Non-migrants and Migrants (at time of interview)

		Non-migrants		Migrants		
		Mean	SE	Mean	SE	
CONTROLS						
	Age	39.20	(0.614)	40.18	(0.528)	
	Gender (male=1)	0.449	(0.0234)	0.710	(0.0242)	*
FAMILY OF ORIGIN						
	Urban origin	0.712	(0.0205)	0.750	(0.0251)	
	Firstborn	0.241	(0.0203)	0.262	(0.0220)	
	Number of Siblings	8.463	(0.261)	7.634	(0.290)	
	Father unknown or deceased	0.0969	(0.0145)	0.0683	(0.0119)	
Father's Education						
	No formal schooling	0.517	(0.0234)	0.440	(0.0263)	
	Primary school	0.166	(0.0178)	0.203	(0.0224)	
	Secondary and above	0.225	(0.0199)	0.289	(0.0264)	
Religious affiliation						
Muslim	Layene	0.0294	(0.00746)	0.0337	(0.0218)	
	Khadre	0.0305	(0.00727)	0.0239	(0.00803)	
	Mouride	0.303	(0.0213)	0.351	(0.0258)	
	Tidiane	0.478	(0.0234)	0.297	(0.0232)	
	Other Muslim	0.0776	(0.0131)	0.158	(0.0179)	
Christian	Catholic	0.0768	(0.0132)	0.0598	(0.0106)	
	Other Christian	0.000773	(0.000555)	0.00309	(0.00273)	
INDIVIDUAL STATUS (AT TIME OF INTERVIEW)						
Current Household Structure						
	Married	0.740	(0.0206)	0.799	(0.0193)	
	Has children	0.694	(0.0219)	0.738	(0.0222)	
	Number of Children	2.968	(0.155)	2.342	(0.122)	*
Education	No formal schooling	0.308	(0.0217)	0.170	(0.0189)	*
	Primary school	0.372	(0.0231)	0.198	(0.0192)	*
	Lower secondary	0.160	(0.0161)	0.251	(0.0280)	*
	Baccalaureate & above	0.160	(0.0167)	0.380	(0.0252)	*
Property	Land	0.0879	(0.0128)	0.287	(0.0266)	*
	House	0.104	(0.0140)	0.381	(0.0285)	*
	Business	0.0819	(0.0120)	0.0959	(0.0236)	
Current Occupational Status						
	Working	0.619	(0.0228)	0.805	(0.0233)	*
	Studying	0.0375	(0.00834)	0.0465	(0.0177)	
	Unemployed	0.0546	(0.0113)	0.0616	(0.0124)	
	At Home	0.230	(0.0195)	0.0481	(0.0104)	*
	Retired	0.0352	(0.00896)	0.0307	(0.00834)	
	Other Inactive	0.0245	(0.00791)	7.72e-3	(0.00466)	
MIGRANT NETWORK						
	No Ties	0.509	(0.0233)	0.288	(0.0222)	*
	Only Strong Tie	0.157	(0.0169)	0.302	(0.0257)	*
	Only Weak Tie	0.259	(0.0211)	0.201	(0.0189)	
	Both Ties	0.0755	(0.0116)	0.208	(0.0249)	*
	Weak Tie - stronger	0.125	(0.0146)	0.104	(0.0136)	
	Weak Tie - medium	0.134	(0.0164)	0.148	(0.0170)	
	Weak Tie - weaker	0.142	(0.0172)	0.227	(0.0250)	*
	Individuals	1011		659		

Note: * Differences significant at p<0.01. Individual weights included.
Source: MAFE-Senegal 2008.

Table 2: Logistic Estimation of the Odds of being a 1st time Migrant in a Year: "Dummy" Strength of Ties & Migrant Networks

		(1)			(2)			(3)		
		All	Men	Women	All	Men	Women	All	Men	Women
CONTROLS										
	Age	0.65***	0.50***	0.67**	0.64***	0.51***	0.66**	0.64***	0.50***	0.66**
	ln(age)	3.76 e5***	9.46e7***	1.20e5**	4.21e5***	6.92e7***	1.39e5**	4.84e5***	8.75e7***	1.55e5**
FAMILY OF ORIGIN										
	Urban origin	1.34*	1.13	1.85†	1.34*	1.06	1.96†	1.35*	1.00	1.93*
	Firstborn	1.14	1.34	0.75	1.13	1.37†	0.70	1.15	1.54*	0.69
	Number of Siblings	0.95***	0.93**	0.96†	0.95***	0.93**	0.96†	0.95***	0.92**	0.96†
	Father unknown or deceased	0.82	0.59	1.02	0.78	0.56	1.06	0.82	0.56	1.03
Father's Education (ref: No formal schooling)										
	Primary school	1.13	1.40	1.11	1.13	1.41	1.20	1.15	1.47	1.26
	Secondary & above	0.85	0.99	0.65	0.86	0.96	0.73	0.88	1.08	0.79
Religious affiliation (ref: Tidiane)										
Muslim	Layene	1.15	0.76	0.66	1.15	0.79	0.55	1.06	0.70	0.51
	Khadre	0.70	1.59	0.59	0.70	1.74	0.60	0.69	1.54	0.55
	Mouride	1.52***	1.46	2.18†	1.53***	1.53	2.15*	1.47***	1.42	2.05†
	Other Muslim	2.11***	1.72†	4.57***	2.14***	1.79†	4.57**	2.07***	1.66†	4.49***
Christian	Catholic	0.94	-	2.24*	0.94	-	1.87	0.95	-	1.80
	Other Christian	1.24	0.36*	1.73	1.18	0.39*	1.68	1.29	0.37*	1.76
INDIVIDUAL STATUS										
Current Household Structure										
	Married	1.02	1.22	2.58*	1.02	1.31	2.44*	1.02	1.22	2.46*
	Polygamous	1.41	0.83	-	1.44	0.81	-	1.56	0.89	-
	Number of Children	0.83***	1.02	0.76***	0.82***	1.00	0.74***	0.83***	1.04	0.74***
Education (ref: Primary school)										
	No formal schooling	0.81	1.03	1.08	0.80	1.02	1.06	0.83	1.09	1.06
	Lower secondary	1.49***	1.67†	4.41**	1.51**	1.77†	4.33***	1.53**	1.71†	4.24***
	Baccalaureate & above	1.39**	1.88*	5.37***	1.41*	1.96*	5.24***	1.42**	1.95*	5.41***
Property	Land	0.97	1.80	1.57	0.98	1.71	1.78	0.95	1.79	1.96
	House	2.39***	1.52	8.04***	2.36***	1.61	9.00***	2.46***	1.82*	8.80***
	Business	0.73	0.93	0.05***	0.79	1.04	0.04***	0.78	1.04	0.05**

Table 2 (*continued*)

Current Occupational Status (ref: Working)									
Studying	1.17	0.83	3.27*	1.22	0.87	3.15*	1.23	0.81	3.17*
Unemployed	1.71**	1.49	1.75	1.67**	1.53	1.72	1.67**	1.37	1.70
At Home	0.70*	4.79***	0.96	0.69**	5.13***	0.99	0.72*	5.48***	1.01
Inactive	0.57†	2.06†	0.40†	0.56†	2.01†	0.41†	0.57†	1.94	0.42
MACRO FACTORS									
Periods (ref: before 1984)									
1984-1993	1.28	1.48	0.66	1.30	1.53	0.72	1.30	1.53	0.72
1994-1998	1.22	0.91	0.96	1.28	0.97	1.04	1.27	0.95	1.05
1999-2003	2.06**	1.61	0.98	2.20**	1.76	1.10	2.19**	1.77	1.09
since 2004	1.71*	0.98	0.60†	1.83*	1.11	0.67	1.83*	1.14	0.66
Urban population growth (%)	1.08	1.23	0.83	1.06	1.19	0.86	1.04	1.17	0.85
GDP growth per capita (%)	0.96*	0.97	0.96	0.96*	0.97	0.96	0.96*	0.97	0.96
MIGRANT NETWORK									
Having a non-household migrant network	2.31***	3.13***	2.83***						
No Tie				0.46***	0.43**	0.30**			
Strong Tie only				ref	ref	ref			
Weak Tie only				0.90	2.07	0.63			
Both Ties				0.72	0.90	1.26			
Strong Tie							1.74***	1.80*	3.02**
Weak Tie									
Weak Tie – stronger							1.00	1.05	1.17
Weak Tie – medium							1.41†	0.96	1.67
Weak Tie – weaker							2.21***	3.29***	1.31
Having a household migrant network	1.85***	3.10***	1.97*	1.63***	2.60***	1.81†	1.71***	2.91***	1.99*
Control for Migrant Spouse	4.08***	1.02	9.30***	4.11***	1.03	9.50***	4.09***	1.11	9.56***
N (person years)	25339	23233	22928	25339	23233	22928	25339	23233	22928

Results are presented in odds ratios.
† p<0.10; *p<0.05; **p<0.01; ***p<0.001.
Source: MAFE-Senegal 2008.

Table 3: Logistic Estimation of the Odds of being a 1st time Migrant in a Year: "Ever been" Strength of Ties & Migrant Networks

	(1)			(2)		
	All	Men	Women	All	Men	Women
Having a non-household migrant network						
Strong Tie	1.40***	1.43	2.60***	1.42**	1.51	2.64**
Weak Tie	1.70***	2.27***	1.89†			
Weak Tie – stronger				1.03	1.03	1.34
Weak Tie – medium				1.34†	1.00	1.68
Weak Tie – weaker				2.25**	3.38**	1.09
Having a household migrant network	1.63***	2.75***	1.89†	1.69**	2.96**	1.89*
Control for Migrant Spouse	4.14***	0.88	10.33***	4.21**	0.95	10.18**
N (person years)	25339	23233	22928	25339	23233	22928

Results are presented in odds ratios. Controls include age, ln(age), urban origin^, religious affiliation^, father's education^, father unknown/deceased at age 15^, firstborn^, number of siblings^, own highest level of education^, marital status, polygamous, number of children, occupational status, land ownership, home ownership, business ownership, period effects, % urban population growth and % GDP per capita growth. Except for indicators marked with ^, all other indicators are time-varying, year-by-year.

† p<0.10, *p<0.05; **p<0.01

Source: MAFE-Senegal 2008.

Table 4: Logistic Estimation of the Odds of being a 1st time Migrant in a Year: Resources in Migrant Network (Amount and Diversity)

	(1)			(2)			(3)			(4)		
	All	Men	Women	All	Men	Women	All	Men	Women	All	Men	Women
Amount of migration experience												
Non-household migrant network	1.01*	1.01**	1.01	1.00†	1.01*	1.01						
Strong Tie							1.01	1.00	1.01	1.01	1.00	1.01
Weak Tie							1.00	1.02**	1.01			
Weak Tie – stronger										1.01†	1.01*	1.02†
Weak Tie – medium										1.00	1.00	0.98
Weak Tie – weaker										1.05**	1.19**	0.97
Household migrant network	1.02**	1.01	1.05**	1.02**	1.01	1.05*	1.02**	1.01	1.05**	1.02**	1.01	1.05**
Diversity of migration experience												
Non-household migrant network				1.02	1.08	1.05						
Strong Tie							1.09	1.38*	1.24†	1.09	1.40*	1.30*
Weak Tie							1.00	1.03	0.98			
Weak Tie – stronger										1.00	1.19	1.44
Weak Tie – medium										0.96	1.21	1.18
Weak Tie – weaker										0.88	0.81	0.85
Household migrant network				1.14*	1.13	1.20	1.13	1.11	1.18	1.13*	1.09	1.15
Control for Migrant Spouse	4.34**	1.32	10.19**	4.34**	1.36	9.63**	4.29**	1.11	9.79**	4.28**	1.06	10.00**
N (person years)	25339	23233	22928	25339	23233	22928	25339	23233	22928	25339	23233	22928

Results are presented in odds ratios. Controls include age, ln(age), urban origin^, religious affiliation^, father's education^, father unknown/deceased at age 15^, firstborn^, number of siblings^, own highest level of education^, marital status, polygamous, number of children, occupational status, land ownership, home ownership, business ownership, period effects, % urban population growth and % GDP per capita growth. Except for indicators marked with ^, all other indicators are time-varying, year-by-year.

† p<0.10; *p<0.05; **p<0.01

Source: MAFE-Senegal 2008.