Keeping up with the Diallos[1]?

Household Wealth, Relative Deprivation, and Migration from Senegal to Europe

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Abstract:

Recent increases in both legal and clandestine sub-Saharan migration to Europe have elicited public and media concern about an African "invasion." African migrants are seen as "destitute" or "desperate," with escape from extreme poverty perceived as the main motivation for migration. This perception has also shaped EU policy responses to migration, with a focus on interdiction of illegal entry, repatriation of clandestine migrants, and alleviation of the sending-community poverty that is seen as driving migration. Empirical research, however, has cast doubt on the commonplace perception that poverty is *the* fundamental driver of migration. Oded Stark's relative deprivation hypothesis suggests that inequality in the sending community may be a more important determinant of the decision to migrate than absolute poverty. Using data from the Migration between Africa and Europe (MAFE) study, this paper investigates the extent to which relative deprivation is a motivation for migration between Senegal and Europe. I hypothesize that different stages in the process of cumulative causation of migration are associated with different motivations for migration: both higher wealth and higher levels of household relative deprivation are associated with migration in early (or pioneer) stages of migration; wealth barriers to migration fall but relative deprivation increases as migration becomes more prevalent in the sending community; and the end result of the process of cumulative causation is that migrant households ultimately have higher levels of wealth and lower levels of relative deprivation than non-migrant households. I estimate a household-level model that measures both cross-sectional household wealth and relative deprivation by a wealth index constructed from household ownership of assets and access to services, and use instrumental variable techniques to estimate counterfactual household wealth and relative deprivation at earlier stages in the process of cumulative causation. I find support for the hypothesis that relative deprivation is a potential motivation for migration in a counterfactual world prior to migration in the community, and that migrant households are significantly wealthier than non-migrant households at the observed end point of the process of cumulative causation. These findings are relevant to current policy debates on migration and development, and may highlight the unintended consequences of European "codevelopment" strategies for migration reduction: policies aimed at limiting migration via economic development in the sending societies may inadvertently end up increasing migration if they address only absolute income levels and not inequality.

**Introduction**

     Immigration is an increasingly contentious political, economic, and social issue for

European nations, many of which are experiencing significant inflows of foreigners for the first

time. Although Europe hosts immigrants from all parts of the world, migration from sub-Saharan

Africa in particular has been increasing in recent years. Lucas (2006) reports that the continent's

sub-Saharan African population increased by almost one million between 1990 and 2000 to a

total of three million, while legal migration flows from sub-Saharan Africa to Western Europe

have increased from roughly 13,000 migrants per year in the early 1960s to nearly 50,000 per

year in the late 1980s (Zlotnick 1993) and to over 100,000 per year in the early 2000s (Migration

Policy Institute 2007). Although these increases in legal sub-Saharan migration to Europe have

been substantial, the spectacle of boatloads of clandestine African migrants washing up on the

beaches of the Canary Islands has captured public attention. Apprehensions of unauthorized

migrants in the Spanish territory increased from 875 in 1999 to over 31,000 in 2006, with sub-

Saharan Africans accounting for 86% of the total in 2006 (de Haas 2007). Despite the fact that

such clandestine sea crossings represent only a small percentage of total sub-Saharan African

immigration to the European Union (de Haas 2006), the apocalyptic image of an African

invasion – fleets of leaky fishing boats carrying a "wave" or "exodus" of "desperate" Africans,

fleeing war and poverty at home and in search of a European "El Dorado" – has become

widespread (de Haas 2007). Although recent research (see Lessault and Beauchemin 2009) has

shown that sub-Saharan migration to Europe can be characterized as neither an exodus nor an

invasion in demographic terms, public perceptions of the desperation of African migrants persist.

     Increasing stocks of sub-Saharan migrants along with increased visibility of both legal

and illegal flows from Africa thus seem to shape public perceptions of African migration:

migrants are "destitute" or "desperate," and escaping from extreme poverty is seen as the main explanation of why migrants would risk their lives in increasingly risky sea crossings (de Haas 2006). This perception has also shaped European Union (EU) policy responses to migration, with a focus on interdiction of illegal entry, repatriation of clandestine migrants, and development at the level of the sending country in an attempt to alleviate the poverty that is seen as driving migration.

Despite popular perceptions of the important role that poverty has played in pushing sub-Saharan migrants to Europe, empirical research has shown that most migration is not undertaken by the poorest members of a society. De Haas (2007) notes that African migrants to Europe – even those making clandestine crossings – are often well-educated and of moderate socioeconomic backgrounds. This is consistent with research on migration to a variety of destinations that consistently finds that the poorest of the poor face a "poverty constraint" and are thus often unable to migrate (Skeldon 2003). These findings cast doubt on the commonplace perception that poverty is a fundamental driver of migration, even in a region as poverty stricken as West Africa.

Contrary to popular perceptions of the role of poverty in sparking migration, there is speculation in the migration theory literature (see Stark 1991) that inequality in the sending community may be a more important determinant of the decision to migrate than the absolute level of deprivation faced by individuals or households. If inequality is indeed a fundamental determinant of migration from sub-Saharan Africa, even policies aimed at limiting migration via economic development in the sending societies may inadvertently end up increasing migration if they address only absolute levels of deprivation and not inequality. Given the intensity of public

scrutiny of and policy interest in African migration to Europe, it is crucial to understand the real drivers of this phenomenon.

Senegalese migration to Europe provides an opportunity to investigate the effects of inequality and absolute poverty on migration. Senegal has played a particularly large part in the recent evolution of sub-Saharan migration flows to Europe. While recent population estimates indicate that Senegal accounts for approximately 4.6% of the population of West Africa (U.S. Census Bureau 2009), Senegalese immigrants make up 18.1% of the West African immigrants in the main European receiving countries (de Haas 2007). Indeed, de Haas (2007) reports that Senegalese migrants in Europe are almost as numerous as those from Nigeria, despite the fact that Nigeria's population is eleven times that of Senegal. In addition to Senegalese migrants being disproportionately represented in Europe, Senegal stands out as a country that has diversified its migration destinations, with Senegalese increasingly present in Italy and Spain as well as their traditional destination of France (de Haas 2007). Senegal has also been heavily implicated in recent "wave" of clandestine migrants attempting to enter Europe via the Canary Islands. Many of the fishing boats transporting migrants across the Atlantic during 2006's peak in maritime apprehensions originated in poor villages on the coasts of Senegal (BBC 2007).

Despite Senegal's apparent poverty, it is also relatively more stable and prosperous than many of its neighbors in the region, and experiences levels of within-country inequality comparable to high-inequality countries such as the United States and Russia (United Nations Development Program 2008). Senegal, with a disproportionately high number of migrants in Europe, has a low rate of absolute poverty relative to its regional neighbors of 18% living on less than $1 per day (UNDP 2008), while Nigeria, which accounts for a disproportionately low proportion of West African immigrants in Europe (de Haas 2007), has the highest level of

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absolute poverty in the region (over 70% living on less than $1 per day) (UNDP 2008). In addition to its relatively low rate of poverty, Senegal experiences relatively high rates of inequality and development compared to its regional neighbors (UNDP 2008). Given the important role that Senegal plays in sub-Saharan migration to Europe coupled with its particular socioeconomic position in the region, Senegalese migration to Europe is an ideal case for studying the impacts of both inequality and absolute poverty in the sending community on the decision to migrate internationally. To what extent is migration between Senegal and Europe a product of inequality in the sending communities as opposed to absolute poverty in the sending communities?

**Literature Review**

Current common-sense wisdom on international migration sees movement as occurring mainly from developing to developed countries with the goal of gaining access to better jobs and higher wages. This phenomenon is specifically what neoclassical economic migration theory predicts: at the macro level, international migration of workers is caused by differences in wage rates between countries (Harris and Todaro 1970), while at the micro level, individual rational actors migrate when they expect a positive net return from international movement (Todaro 1976). The economic gradient between countries – usually expressed in terms of wage differentials – induces movement, which continues until a macroeconomic equilibrium is reached in which neither wage differentials nor incentives to migrate exist. This theory would predict that individuals that face the largest absolute wage differentials would have the greatest incentive to migrate, and thus poverty in the form of low absolute incomes should strongly predict migration.

Despite the seeming concordance between economic motives for migration and neoclassical migration theory, a framework that focuses solely on individual utility maximization

cannot adequately explain many facets of contemporary migratory patterns (Arango 2000). For example, the so-called "migration hump" – which demonstrates that emigration increases along with a country's level of development (Martin and Taylor 1996) – is counterintuitive from a neoclassical perspective but has nonetheless been observed for many countries in both historical and contemporary periods of migration. Other phenomena, such as remittances and circular migration, are equally baffling for the neoclassical economic framework.

There thus seems to be ample evidence that large wage differentials and low absolute income in sending communities cannot fully account for the decision to migrate, and migration scholars have proposed a variety of theories to fill in some of the gaps in neoclassical theory. One of the most fruitful theoretical challengers to the neoclassical economics framework has been the new economics of labor migration (NELM). This framework posits the household (as opposed to the individual) as the unit of analysis of migration decisions, and understands migration as a strategy for managing risk and overcoming local market imperfections as opposed to maximizing lifetime individual income (Stark 1991). Since NELM shifts the locus of the migration decision to the household and its interactions with local conditions, this body of theory also suggests that inequality may contribute to the economic motivations to migrate.

Stark and colleagues (see Stark 1991, Stark and Yitzhaki 1988, Stark and Taylor 1989, Stark and Taylor 1991) have developed a hypothesis that attempts to factor inequality in the sending community into migration decisions via the mechanism of relative deprivation. While neoclassical theory emphasizes that migration occurs because of a maximization of individual income in absolute terms, the relative deprivation approach hypothesizes that a household engages in migration in order to improve its position in the distribution of income relative to other households in its reference group. In effect, household utility is a product not only of

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maximizing absolute income but also of minimizing the disutility stemming from the relative deprivation arising from intra-group comparisons (Stark and Taylor 1989).

While neoclassical economics would predict equal probabilities of migration for individuals with the same expected absolute gain in income regardless of their positions in the distribution of income, NELM's relative deprivation approach contends that households' probabilities of engaging in migration will vary even if they have the same expected absolute gain in income because of their different positions in the community's distribution of income (Stark and Taylor 1989). Thus, initial relative deprivation will positively influence the household's probability of sending a migrant to a destination where expected returns to migration are great enough to improve the household's relative position in the community distribution (Stark and Taylor 1989). At a macroeconomic level, Stark (2006) has found that relative deprivation is positively related to a country's Gini coefficient; it thus seems plausible that the "migration hump" and Kuznets's (1955) curve that relates increasing inequality to increasing levels of development may be both conceptually and empirically related.

The relative deprivation hypothesis hinges on the assumption of stability over time of the migrant's and the household's reference group. If the migrant's new host community is substituted for the sending community as a reference group, the act of migration could actually increase the migrant's sense of relative deprivation; maintaining the sending community as a reference group, in contrast, means that gains from migration increase the household's income and thus decrease both the migrant's and the household's deprivation relative to the stable reference group. Stark and Taylor (1991b) argue that the social and cultural distinctiveness of international receiving communities minimizes the risk of reference-group substitution for international migrants; estrangement, detachment, and social distance in the receiving

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community can keep the migrant oriented towards the sending community, while internal migrants are more susceptible to substituting the new community as a reference group. Reducing deprivation relative to a stable reference group is thus a plausible motivation for engaging in international migration.

Stark and colleagues have performed several empirical tests of the hypotheses of relative deprivation using data from Mexico. Stark and Taylor (1989, 1991a) report that, controlling for absolute income gains, Mexican households' probability of engaging in Mexico-US migration is directly related to households' initial level of relative deprivation. They found that relatively deprived Mexican households are more likely to engage in international migration than households that face less relative deprivation (i.e., more favorably situated in the sending community's income distribution). These studies thus conclude that, while absolute income gains may directly impact the probability of international migration, relative deprivation plays a significant independent role in Mexico-US migration decisions.

Despite this empirical support for the relative deprivation hypothesis, Stark and Taylor introduce several caveats. They argue that the most relatively deprived households in a community may, in fact, be less likely to migrate than their relative deprivation would predict because of a poverty constraint; the poorest households in a community, regardless of their level of relative deprivation, are mainly concerned with survival and lack the capital or credit necessary to engage in international migration. Stark and Taylor (1989, 1991a) find a negative relationship between relative deprivation and migration for the poorest households in their samples, a finding consistent with the dampening of relative income considerations as a result of subsistence concerns. Another important modification of the theory arises from the existence of migrant networks. Stark and Taylor (1989, 1991a) report that households with kinship networks

in the US have a higher probability of engaging in additional international migration. They argue that these networks play a crucial role in reducing the potential costs and risks of an international move. Networks thus seem to mediate any decision to migrate internationally, whether that decision is motivated by absolute or relative income concerns.

One of the criticisms of the relative deprivation hypothesis is that it has limited applicability. Arango (2000) argues that NELM theory in general and the relative deprivation hypothesis in particular are hampered by a lack of widespread empirical verification. A number of recent studies have attempted to test the relative deprivation hypothesis with settings and specifications different from those that gave rise and initial support to the idea.

VanWey (2005) and Bhandari (2004) both conceive of relative deprivation in terms of the distribution of land instead of income. VanWey studies the impact of land ownership on internal and international migration in Mexico and internal migration in Thailand. Contrary to the predictions of the relative deprivation model, VanWey finds no evidence that inequality in the distribution of land increases households' propensities to migrate in any of the settings studied. Conversely, Bhandari reports that Nepalese households with higher levels of relative land deprivation are more likely to engage in migration. Quinn (2006) extends Stark and Taylor's original work in Mexico by examining relative deprivation both in terms of income and in terms of wealth measures such as housing, land, and consumer durables. Although he finds support for relative deprivation as a motivation for intra-Mexico migration, he reports a negative relationship between relative deprivation and probability of migrating to the US. Recent work on relative deprivation thus fails to lend consistent support to the relative deprivation hypothesis.

One analytical roadblock that might explain the inconsistent evidence for relative deprivation is the choice of indicators for household economic status. Much recent work has

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extended Stark and Taylor's (1989) original income-based conception of relative deprivation to a wider set of indicators of economic status. Given the difficulty households and individuals have in directly observing the income distribution of a community, it is more plausible that tangible indicators such as housing or consumer durables would serve as an observable proxy for income differences or as a basis for perceptions of deprivation in and of themselves. In addition, Rutstein and Johnson (2004) argue that it is notoriously difficult to collect accurate information regarding household income in the developing world, and that income is generally a poor proxy for both household consumption and long-term economic well-being.

Although it is laudable that recent research has attempted to extend Stark and Taylor's (1989) original hypothesis to non-income measures of economic well-being, there has been little effort to do so in a systematic way that accounts for the relative importance of different indicators of standards of living. VanWey and Bhandari both use land ownership, while Quinn includes consumer durables and housing in addition to land, but all of these studies have examined the independent effects of each of these endowments. It is overly simplistic to think that any particular household asset could be a reasonable proxy for overall household economic status. Even when multiple indicators are used, the relationship between any particular asset and overall wealth is not immediately apparent; as Rutstein and Johnson (2004) point out, owning a bicycle may be a sign of wealth up to a certain level, but then may be a sign of poverty for those who are richer. In work for the World Bank on measuring household wealth, Filmer and Pritchett (2001) propose constructing a wealth index on the basis of a variety of indicators, including housing type, access to water and sanitation services, ownership of consumer durables, and ownership of land and livestock. Using principal components analysis, they are able to extract weights for the wealth indicators and thus construct an index that measures wealth holistically.

Their index has been adopted by the Demographic and Health Surveys and has proven useful in studies of the relationships between demographic behavior and economic status. Since individuals and households probably assess relative deprivation on a variety of dimensions, it would make sense to use a holistic measure of economic well-being, which past research has failed to do.

A more serious impediment to consistent findings regarding the role of relative deprivation is inadequate theorizing and empirical specification of the dynamism of the process of migration. Stark and Taylor (1989) realized that relative deprivation is endogenous to the process of migration in a community: the current distribution of income and a household's place in it are, in part, the results of past migration by members of that community. Using cross-sectional data to test their hypothesis would thus likely show a negative relationship between relative deprivation and migration, as households that engaged in migration as a response to past relative deprivation are likely to have addressed their deprivation through remittances and are no longer relatively deprived in the cross-sectional observations. In addition, cross-sectional data would likely demonstrate a positive association between household income and migration as a result of this process. Stark and Taylor's (1989) analytical strategy dealt with this endogeneity by using instrumental variable (IV) techniques to predict households' counterfactual income and associated level of relative deprivation in the absence of migration. They then used these migration adjusted counterfactual estimates to test the effects of absolute level of income and relative deprivation on households' propensity to engage in migration. Although VanWey's event history model can account for some of the endogeneity inherent in migration decisions, both Quinn and Bhandari use unadjusted cross-sectional data to estimate the effect of relative deprivation and thus do not correctly specify their models.

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Although Quinn's (2006) findings are inconsistent with the relative deprivation hypothesis, he attempts a reconciliation by acknowledging the endogeneity inherent in the migration process. He argues that households' previous US migration experience may be driving his results by simultaneously decreasing deprivation among households with migrants in the US and increasing the likelihood of further US migration from the household. Thus, the relative deprivation of non-migrant households may be increasing as households with migrants acquire more income and wealth; since these households have no prior migration experience, however, the cross-sectional data do not show a relationship between these households' relative deprivation and the probability of migration. Indeed, non-migrant households may have a high motivation to engage in international migration because of their level of relative deprivation, but their lack of access to a network of previous migrants means that they are not able to overcome the costs of movement. Despite this explanation, Quinn is unable to show this endogenous relationship directly.

It is clear that relative deprivation is part of the self-feeding and dynamic process of migration, and as such Massey's (1990) theory of the cumulative causation of migration illuminates this dynamic process. This theory states that migration feeds back on social structures in the sending community and changes the context in which migration decisions are made, usually in ways that make migration more likely. Massey (1990) contends that one of the main loci of feedback is the sending community's income distribution. Migrant remittances can have a profound impact on a sending community's income distribution, and that the infusion of cash and goods from outside the sending community can increase the relative deprivation among nonmigrant households in the community and thus their propensity to migrate internationally as

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a remedy for their deprivation. Massey argues that this leads to a "self-feeding cycle of migration, increased deprivation, and further migration" (1990, 14).

Massey is also explicit about the conditions under which migration is a viable way to remedy relative deprivation: opportunities for income within the sending community must be limited, migrant incomes outside the community must be high, and network connections must make employment in the receiving community easily attainable. Thus, he acknowledges the importance of taking both absolute income considerations and migrant networks into account when assessing the link between relative deprivation and migration but also emphasizes the way in which responses to relative deprivation can alter the distribution of income and goods in a community and can thus change other households' experiences of relative deprivation. Prior work on relative deprivation has failed to take into account exactly this dynamism: it has examined relative deprivation either at a counterfactual beginning point of the process of migration (Stark and Taylor 1989) or has used cross-sectional data that is, arguably, the product of past migration (Bhandari 2004, Quinn 2006), but has not adequately theorized or specified how inequality and relative deprivation change as migration diffuses throughout a community.

Understanding how relative deprivation and absolute poverty function as motivations for migration requires recognition of the dynamism and temporal interdependencies of the migration process. The theory of cumulative causation is a useful framework for thinking about how both absolute poverty and inequality operate to motivate migration decisions at different stages of the self-feeding migration process. In the *early phase* of cumulative causation, no migration has yet occurred in the sending community. Contrary to the expectation of neoclassical economic theory, most scholars of cumulative causation posit some economic selectivity during this initial phase: pioneer migrants come from the middle or upper-middle ranges of the sending community's

economic hierarchy because they access to the economic resources to finance expensive international movement (Massey 1990; Massey et al. 1993; Massey et al. 1994; Lindstrom and Lopez Ramirez 2009). This selection thus has a curvilinear effect: those without resources are too poor to be able to afford international movement, while those at the upper end of the economic hierarchy are indifferent to migration. During the *intermediate phase* of cumulative causation when migration becomes increasingly common in the sending community, the costs of movement drop as social connections to those with migrant experience diffuse throughout the population and migration becomes decreasingly economically selective (Massey 1990; Massey et al. 1993; Massey et al. 1994). There is thus a progressive lowering of the bar to international movement, and an increasingly negative relationship between absolute economic status and migration. During the *late phase* of the process of cumulative causation, migration is widespread within the sending community and the process loses its dynamism; labor shortages and resultant rising wages in the sending community even raise the benefits of not migrating (Massey 1990). Although theorists have not clearly predicted the impact of poverty at this stage of the process, it seems evident that most households with the desire and means to migrate will have done so prior to this stage, leading to a positive relationship between absolute economic status and migration.

While the impact of migration on the sending community's income distribution is one of the seminal concerns of the theory of cumulative causation, the role of relative deprivation at different stages of the process of migration has not received as much attention as the changing role of economic selectivity. Most theorists seem to neglect or simply dismiss the possibility of relative deprivation as a motivation for migration during the *early phase* of cumulative causation. Massey et al. (1993) argue that income inequality prior to migration is not great in most sending communities because they are mostly poor, rural, and focused on subsistence agriculture. It is

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only when pioneer migrants start to remit cash and goods to the sending community that relative deprivation takes hold as a motivation for migration: some households are able to make vast improvements to their economic status via migration, which causes households lower in the distribution to feel relatively deprived and induces them to migrate, which, in turn, further exacerbates income inequality and spurs further migration (Massey et al. 1993). Income inequality and relative deprivation are thus both high as the rate of outmigration increases, so there is a positive relationship between relative deprivation and migration in the *intermediate phase* of cumulative causation. During the *late phase* of cumulative causation, the majority of a sending community's households have links to labor migrants, and remittances serve to decrease inequality and relative deprivation; we should thus expect a negative relationship between cross-sectional relative deprivation and migration when migration is widespread in a sending community.

Despite the utility of the framework of cumulative causation for examining the evolution of the independent impacts of inequality and absolute poverty on the decision to migrate, it is a framework in need of additional empirical verification. Fussell and Massey (2004) question the validity of the framework for explaining migration from urban areas. They argue that the cumulative causation of migration is inhibited in cities and offer evidence that the greater size, social complexity, and economic heterogeneity of Mexican urban areas prevented migration flows from reaching the same kind of self-feeding levels as observed in Mexican rural sending areas. They point to the more complete markets for labor, insurance, capital, and credit present in cities, all of which lessen many of the most powerful strategic motivations for international migration. The framework also seems to have been tested only on the Mexican case, with other dynamic migration systems left unexamined.

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**Hypotheses**

It seems clear that relative deprivation can offer a strong motivation for international migration even when controlling for absolute economic status. It thus offers a plausible way of testing the extent to which migration between Senegal and Europe is a response to absolute poverty or inequality. Despite early evidence that relative deprivation strongly predicts international migration, it is also clear that the relative deprivation hypothesis is in need of further empirical verification. The Senegalese context provides a good empirical proving ground for an expanded and dynamic hypothesis of relative deprivation that incorporates a holistic measurement of household's absolute economic status and relative deprivation as well as explicit attention to the endogenous nature of migration decisions motivated by relative deprivation as originally proposed by Stark and Taylor (1989, 1991b) and extended by Massey's (1990) theory of cumulative causation. It also provides an opportunity to test the theory of cumulative causation in an urban non-Mexican setting. Despite Fussell and Massey's (2004) assertions that this process does not function in cities, I will hypothesize that absolute economic status and relative deprivation will have different effects at different phases of the community's migratory evolution.

My first set of hypotheses concern the late phase of the process of cumulative causation, the observed world that is a product of past migration:

H1. Observed cross-sectional absolute household wealth, as measured by a composite asset index, will be positively related to the likelihood of Dakarois households having a migrant in Europe at constant levels of other variables; richer households will be more likely to have engaged in migration in the past, *ceteris paribus*.

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H2. Observed cross-sectional household relative deprivation, as measured by a composite asset index, will be negatively related to the likelihood of Dakarois households having a migrant in Europe at constant levels of other variables; less relatively deprived households will be more likely to have engaged in migration in the past, *ceteris paribus*.

My second two hypotheses concern the intermediate phase of cumulative causation, a limited counterfactual world where some households have engaged in migration and the dynamic process of migration has begun to alter the community's wealth structure:

H3. Limited counterfactual absolute household wealth, as measured by a predicted composite asset index, will be negatively related to the likelihood of Dakarois households having a migrant in Europe at constant levels of other variables; poorer households will be more likely to engage in migration, *ceteris paribus*.

H4. Limited counterfactual cross-sectional household relative deprivation, as measured by a predicted composite asset index, will be positively related to the likelihood of Dakarois households having a migrant in Europe at constant levels of other variables; more relatively deprived households will be more likely to engage in migration, *ceteris paribus*.

My third set of hypotheses concern a full counterfactual world in which no migration has occurred and the process of cumulative causation has not altered the community's wealth structure, making is possible to examine the association between both absolute poverty and relative deprivation and the propensity to migrate:

H5. Full counterfactual household wealth, as measured by a predicted composite wealth index, will have a curvilinear association with the likelihood of Dakarois households having a migrant in Europe at constant levels of other variables; households from the

middle of the economic status distribution in a counterfactual world without migration are more likely to engage in migration, *ceteris paribus*.

H6. Full counterfactual relative deprivation, as measured by a predicted composite wealth index, will be positively related to the likelihood of Dakarois households having a migrant in Europe at constant levels of other variables; more relatively deprived households in a counterfactual world without migration are more likely to engage in migration, *ceteris paribus*.

**Data and Methods**

*Data*

The data for this study come from the Migration between Africa and Europe (MAFE-Senegal) survey, a project coordinated by *Institut National d'Études Démographiques* (INED, France), in association with the *Institut de Population, Développement et Santé de la Reproduction* of the University of Dakar (IPDSR, Senegal). It also involves the Pompeu Fabra university (UPF, Spain) and the *Forum Internazionale ed Europero di Ricerche sull' immigrazione* (FIERI, Italy). The survey was conducted with the support of the Agence *nationale de la rercherche* (ANR, France), the *Ile de France* Region, the *Institut de recherche pour le développement* (IRD, France), the *Centre population et développement* (CEPED, France) and the FSP programme entitled "International Migrations, territorial reorganizations and development of the countries of the South." The MAFE-Senegal project, inspired in part by the long-running Mexican Migration Project (MMP), consists of a multi-country survey that collects data on return migrants, non-migrants and their households in the communities of origin as well as on migrants in the destination countries of France, Italy, and Spain. The first wave of MAFE-Senegal data collection took place between February and July 2008, and included observations at

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both the household and individual levels. The household dataset comprises a stratified random sample of 1,139 households in 60 census tracts (*districts de recensement*) of the Senegalese capital of Dakar. Interviewers met with the head of each household, and collected cross-sectional social, demographic, and economic data for the household and all of its members. The individual dataset includes 1,037 individuals in Dakar (both non-migrants and returned migrants) who were sampled randomly from the household sample, as well as 600 Senegalese migrants in Europe (200 in each of France, Italy, and Spain) who were selected via snowball sampling. Interviewers collected in-depth retrospective life histories from each individual, including information on education, family formation, employment, and migration history of the interviewee as well as his/her migration network.

This study uses the cross-sectional household-level data provided by the head of the household at the time of administration of the household survey. The final analytic sample consists of 1,012 observations for which neighborhood identifier, household identifier, and asset ownership was known (88.8% of the total sample).

*Methods*

*Dependent variable*

The dependent variable in the analysis is a dichotomous indicator of household European migration status. I defined a household as having a European migrant if the household head reported a member of the household as living abroad in any European country at the time of the interview. Of the total analytic sample of 1,012 households, 592 households (58.5%) did not have a European migrant (hereafter referred to as "non-migrant households," even if they have a migrant in a destination other than Europe), while 420 households (41.5%) did have a European migrant (hereafter referred to as "migrant households").

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*Independent variables*

The main independent variables in the analysis are an index of household wealth and a measure of household relative deprivation based on household wealth. While these variables were not directly observable (see calculation details below), descriptive statistics of the constitutive components of the independent variables for migrant and non-migrant households are presented in table 1, and included household head sociodemographic characteristics, household sociodemographic characteristics, and household migration characteristics.

[ Table 1 about here ]

*Construction of wealth index*

Following the procedure outlined by Filmer and Pritchett (2001) and Rutstein and Johnson (2004), I constructed an index of household wealth to serve as both an independent variable in its own right as well as the basis for calculation of household relative deprivation. Based on the household head's responses to questions about a wide variety of household assets, including durable goods, vehicles, housing, water and sanitation, electricity, cooking fuel, land, and livestock, I created dichotomized indicators of household ownership of and access to each asset (see table 2 for descriptive statistics for the indicators). I then used principal components analysis (PCA) to assign weights to the indicator variables. As Filmer and Pritchett (2001) point out, PCA is a data reduction technique that allows the extraction of a small number of orthogonal linear combinations of the variables that are most successful in capturing the information common to all of the variables, with the first principal component capturing the largest amount of common variation. They propose using the scoring factors for the first principal component as weights for each dichotomized asset indicator, which are then summed to create an overall wealth index for the household. Table 2 reports the scoring factors and descriptive statistics for

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each asset item, as well as the effect of moving from 0 to 1 for a given asset on the overall wealth index (reported as "scoring factor x SD"). Illustratively, the effect of owning a refrigerator or a television set increases a household's wealth by 0.56 and 0.75 units (or about a quarter and a third of a standard deviation), respectively. The wealth index as thus constructed has a mean of zero and a standard deviation of 2.31, and ranges from -9.98 to 6.63.

[ Table 2 about here ]

*Prediction of counterfactual household wealth*

While the MAFE data describe the apparent higher economic well-being of migrant households, it is important to be cognizant of the fact that observed levels of economic status for migrant households are the product, at least in part, of past migration of their members. It is thus difficult to conclude from cross-sectional data that migrant households were not relatively or absolutely deprived at some point in the past before migration occurred. In order to test my hypotheses, then, I must construct a counterfactual for each household that approximates what the household's wealth would be in the absence of migration. Stark and Taylor (1989) followed a similar strategy in their original formulation of the relative deprivation hypothesis, using instrumental variable (IV) techniques to predict household income in the absence of migration by each household member and the level of relative deprivation associated with this predicted income. I estimated an OLS regression of the household wealth index on the household head sociodemographic characteristics, household sociodemographic characteristics, and household migration characteristics listed in table 1. The results of this regression are reported in Appendix 1. I then predicted household wealth in the absence of migration (i.e., all of the household migration characteristics were set to zero for the prediction). Table 3 presents means for both the observed and overall predicted wealth index. The predicted index had a mean of -0.31 (compared

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to a mean of zero for the cross-sectional wealth index), and the correlation between observed and predicted household wealth was $r = 0.63$ ($p < 0.001$).

*Calculation of relative deprivation*

While many measures of relative deprivation exist, including a variety used in other examinations of migration, I have chosen to use Stark and Taylor's (1991b) original conceptualization. They argue that relative deprivation, as a social comparison of economic or social status, involves perception of two fundamental conditions on the part of the actor: the proportion of members of the reference group that have more wealth (or income or some other measure) than the actor and the amount by which those members' possession exceeds the actor's possession. The first condition defines the actor's position in a given reference group, while the second condition defines the actor's sense of deprivation relative to those of higher economic or social status. Stark and Taylor (1991b) operationalize this concept as follows:

$$RD_i = [1 - F(w_i)][E(x - w_i \mid x > w_i)]$$

where $RD_i$ is relative deprivation for actor $i$, $1 - F(w_i)$ is the proportion of members of the reference group who have more wealth than actor $i$ (condition 1), and $E(x - w_i \mid x > w_i)$ is the mean excess wealth of those members of the reference group who have more "stuff" than actor $i$ (condition 2). As Stark points out in a recent (2006) discussion, this operationalization weights actor $i$'s position in its reference group's distribution of wealth in such a way that deprivation is more strongly felt if the richer members of the reference group are a lot richer than if they are only a little bit richer.

The choice of a relevant reference group is obviously of key importance in measuring relative deprivation effectively. Most studies of the effect of relative deprivation on migration have been in a rural context, where social and geographic constraints make the choice of the

local village as a reference group relatively unproblematic. Investigations of relative deprivation in other contexts (e.g., happiness or health), as well as at least one recent study on the impact of relative deprivation on migration (Micevska et al. 2007), define reference groups socially instead of geographically, focusing on the sociodemographic characteristics that are likely to be salient in social comparisons. Although a densely populated urban area like Dakar is likely to give rise to multiple reference groups, both geographic and social, I have chosen to use the geographic unit of the census tract as a rough proxy for a neighborhood reference group. I posit that comparisons involving measures of household wealth such as durable goods and vehicles operate mainly on a neighborhood level, with individuals' and households' sense of relative deprivation emanating from comparison of what they possess with what those in closest physical proximity possess.

Using Stark and Taylor's (1991b) formulation, I calculated three relative deprivation measures for each household corresponding to the late, intermediate, and early stages of cumulative causation. I used different combinations of household and community wealth for each calculation. The first measure, corresponding to a late stage in the process of cumulative causation, uses the observed wealth index both for the household and its neighborhood reference group, and thus corresponds to cross-sectional relative deprivation. The second measure uses the predicted wealth index for the household and the observed wealth index for the rest of the households in the neighborhood reference group. This second measure is a limited counterfactual, corresponding to a hypothetical world where the relevant household's wealth is what it would be in the absence of migration by members of that household, while the rest of the households have their observed wealth; this approximates an intermediate stage in the process of cumulative causation. The third relative deprivation measure uses the predicted wealth index for

both the household in question and all of the other households in the reference group, and thus corresponds to a full counterfactual world where all households' wealth has been adjusted to what it would be in the absence of all migration; this full counterfactual world approximates an early stage of cumulative causation prior to migration in the community. Table 3 reports the overall mean of relative deprivation along with group-specific means for both migrant and non-migrant households. All of the measures are bounded by zero, which corresponds to the level of relative deprivation experienced by the "richest" household in a given reference group; increases from zero thus correspond to increasing levels of relative deprivation.

[ Table 3 about here ]

*Estimation of logistic regression models*

Using a series of logistic regression models, I estimated odds ratios for household European migration status. I estimated three sets of models corresponding to the late, intermediate, and early phases of cumulative causation. The first set of models, corresponding to the late phase of cumulative causation, used observed household wealth and observed household relative deprivation (calculated on the basis of the observed household wealth index for both the household and the reference group) as the main independent variables. The second set of models, corresponding to the intermediate phase of cumulative causation, used predicted household wealth and limited counterfactual household relative deprivation (calculated on the basis of the predicted household wealth index for the household and the observed wealth index for the reference group) as the main independent variables. The third set of models, corresponding to the early phase of cumulative causation used predicted household wealth and the full counterfactual household relative deprivation (calculated on the basis of predicted household wealth for both the household and the reference group) as the main independent variables.

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Within each set of models, I introduced additional theoretically driven control variables in two subsequent sub-models. I first introduced the squares of household wealth and relative deprivation to account for potential non-linearities in either absolute economic status or relative deprivation; this corresponds to theoretical concerns about a "poverty constraint" limiting the ability of the most relatively deprived households to migrate. The final sub-model introduces sociodemographic controls at the head-of-household and household levels.

**Results**

*Tests of hypotheses 1 and 2*

Table 1 shows that, although migrant and non-migrant households and heads of households have many similar sociodemographic characteristics, there seem to be some intriguing differences. Heads of migrant households have, on average, 1.72 more years of formal education than heads of non-migrant households, while heads of non-migrant households are more likely than heads of migrant households to have attended only religious school (i.e., Islamic instruction in the Koran) in lieu of formal public education (23.1% vs. 16.4%). Heads of non-migrant households are more likely to be working (64.4% vs. 49.5%) despite the fact that heads of migrant households are, on average, slightly older than heads of non-migrant households (53.2 years vs. 52.6 years). At the household level, migrant households are, on average, larger (12.31 vs. 9.87 members), older (average age of 28.73 years vs. 25.94 years), and better educated (7.28 years of formal schooling vs. 5.47 years) than non-migrant households. Households with European migrants are also more likely to benefit in material terms from that migration: 71.6% of European migrants received monetary remittances and 41.7% received remittances in the form of goods in the preceding 12 months, compared to 56.9% and 30.9% of households without migrants in Europe but with migrants elsewhere.

These material benefits are reflected in the differences between migrant and non-migrant households in terms of access to and ownership of assets. According to the descriptive statistics in table 2, migrant households have higher rates of ownership of all household durable goods (and are less likely to own no durables) and are also more likely to own high-status vehicles such as taxis and cars. Migrant households also have higher rates of home ownership and are more likely to live in a multi-story house or apartment. The cross-sectional descriptive data thus paint a picture of migrant households as having higher levels of economic well-being, which runs contrary to the dominant perception of sub-Saharan migrants to Europe as fleeing from poverty and destitution. These data also present evidence of sharp differentials of absolute economic status between migrant and non-migrant households, which could lead to perceptions of relative deprivation among the latter.

The results from the construction of the wealth index confirm the economic status differentials that exist between migrant and non-migrant households. Table 3 reports the mean value of the wealth index for migrant households as 0.75, while non-migrant households have a mean wealth index value of -0.53, a difference significant at less than the 1% level. Migrant households also have a lower mean level of relative deprivation than non-migrant households (0.73 vs. 1.24). These differences once again call into question the portrayal of sub-Saharan migrants as poverty-stricken; at least in comparison with other households in their sending communities, migrant households seem to be absolutely and relatively well-off.

The first set of logistic regression models confirms that higher levels of household economic status are statistically significantly correlated with having a migrant in Europe. Table 4, reporting odds ratios for household European migration, shows that the observed household wealth index is a statistically significant predictor of household migration status. Household

wealth has a statistically significant positive gross effect, and each one-unit increase in wealth is associated with a 32.4% increase in the odds of European migration.. In the final sub-model controlling for household relative deprivation, household head sociodemographic characteristics, and household average sociodemographic characteristics, each one-unit increase of the household wealth index is associated with a 30.4% increase in the odds of having a European migrant, an effect significant at $p < 0.001$. These results lend support to hypothesis 1, that households with higher economic status are more likely to have engaged in migration to Europe.

[ Table 4 about here ]

The first set of logistic regression models also allows a test of the relative deprivation hypothesis in a cross-sectional setting. Table 4 shows that household relative deprivation has a gross negative effect on the probability of a household having a European migrant: cross-sectional household relative deprivation is associated with a 37.7% decrease in the odds of the household having a European migrant when it is treated as the sole predictor. Controlling for absolute levels of economic status, the net effect of relative deprivation is positive but not statistically significant. There is thus some support for hypothesis 2: cross-sectional household relative deprivation is negatively correlated with the probability of having a European migrant, and its net effect is not significantly different from zero.

While these results lend support to hypotheses 1 and 2, they are not conclusive tests of either the absolute poverty hypothesis or the relative deprivation hypothesis. It is clear that migrant households have higher economic status and are not more relatively deprived than non-migrant households, but we cannot conclude that this was the case prior to migrant households' decision to engage in European migration. In addition, the associations between household economic status and migration status are, in part, the result of migration: migrant households

may have been absolutely and relatively deprived prior to migration, but have been able to address that deprivation through migrant contributions to household income and wealth. Observed cross-sectional household wealth and relative deprivation are thus the end point of the process of cumulative causation as described by Massey (1990): the community and the structures which gave rise to initial migration have been irrevocably altered by the ongoing process of migration itself. It is thus difficult to infer the effects of either absolute or relative poverty on prior migration decisions.

*Prediction of counterfactual wealth*

Using cross-sectional data, we cannot directly observe the conditions that gave rise to the decision to migrate or the conditions that prevailed in an earlier phase of the migration process. We can, however, attempt to estimate a counterfactual that approximates such conditions. I predicted counterfactual household wealth from the results of an OLS regression of observed wealth on household and household head sociodemographic characteristics and household migration characteristics. The same association exists between household migration status and counterfactual household wealth as between household migration status and observed household wealth: migrant households have, on average, higher counterfactual economic status than non-migrant households. According to Table 3, migrant households had a predicted wealth index mean value of 0.05, while non-migrant households had a predicted wealth index mean value of -0.61 (all differences were significant at less than the 1% level). While this counterfactual rests on a number of important assumptions – the most crucial being that migrant households' sociodemographic characteristics would not differ in the absence of migration – it nonetheless offers evidence that migrant households might plausibly have higher economic status than non-migrant households in a counterfactual world that exists prior to migration by the migrant

households. This prediction of household wealth serves as the basis for tests of hypotheses 3 through 6.

*Tests of hypotheses 3 and 4*

I approximated an intermediate stage in the process of cumulative causation with a limited counterfactual where the household's predicted wealth and the reference group's observed wealth is used as the basis for the calculation of relative deprivation: the household's wealth is adjusted for the absence of migrants while the other households in the reference group retain their observed wealth and migration status). Table 3 shows that migrant households in this intermediate stage of cumulative causation have lower relative deprivation than non-migrant households (0.98 vs. 1.11, significant at $p < 0.01$).

Table 6 reports results from multivariate logistic regression models for this intermediate phase of cumulative causation. In the limited counterfactual model, counterfactual household wealth has a consistently positive effect on the odds of household European migration, but its net effect is statistically insignificant when controlling for relative deprivation and household sociodemographic characteristics. The square of counterfactual household wealth, on the other hand, is associated with a 7.7% decrease in the odds of the household having a European migrant (significant at $p < 0.05$) even when all controls are present. Household relative deprivation again has a negative and statistically significant gross effect: it is associated with a 20.6% decrease in the odds of household European migration when it is the only predictor. The net effect of counterfactual household relative deprivation, though, is positive and statistically insignificant when controlling for absolute household wealth and household sociodemographic variables.

In this limited counterfactual world corresponding to an intermediate phase of cumulative causation, then, there is no significant association between either absolute household wealth or

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household relative deprivation and household European migration. The only statistically significant economic status variable in the fully controlled model is the square of counterfactual household wealth, and the negative effect indicates an association between low levels of household wealth and reduced odds of household European migration. Thus, the only significant economic predictor in this intermediate state of cumulative causation is the poverty constraint, meaning that only the poorest households are unable to engage in migration.

*Tests of hypotheses 5 and 6*

The bivariate associations presented in Table 3 indicate that migrant households have higher counterfactual household wealth than non-migrant households. This evidence supports hypothesis 5, which posited that migration is positively economically selective in the earliest phases of cumulative causation. Descriptive results thus far have supported this hypothesis: even in a counterfactual world where households' wealth is adjusted for the absence of migration, migrant households are still economically better off than non-migrant households (see table 3).

Bivariate associations also show that migrant households tend to have lower levels of relative deprivation than non-migrant households. In a full counterfactual world where predicted wealth of both the household and the reference group is the basis for the calculation of relative deprivation (corresponding to the earliest stage of cumulative causation where no migration has occurred), migrant households are still less relatively deprived than non-migrant households (0.52 vs 0.73, significant at the $p < 0.01$ level), indicating a lack of support for hypothesis 6.

Despite the statistically significant association between migration status and both higher counterfactual household wealth and lower counterfactual relative deprivation, it is necessary to test hypotheses 5 and 6 in a multivariate setting. Table 4 presents results from multinomial logistic models for this earliest stage of cumulative causation. The full counterfactual model

again shows a consistent positive association between counterfactual household wealth and the odds of household European migration, although the net effect of this variable is not statistically significant controlling for household relative deprivation and household sociodemographic variables. The square of counterfactual household wealth is associated with a 9.2% decrease in the odds of household European migration at constant levels of all other variables, indicating a poverty constraint even in a hypothetical world where no migration has occurred. There is thus some support for the hypothesized curvilinear effect of wealth: the negative quadratic term indicates that those households that are poor are unable to migrate, while rich households are indifferent to migration.

The pattern of associations between full-counterfactual relative deprivation and the odds of household European migration is also similar to the other models. The gross effect of relative deprivation is negative and statistically significant: each unit increase of full-counterfactual relative deprivation is associated with a 41.4% decrease in the odds of household European migration. Controlling for counterfactual household wealth and household sociodemographic variables, however, the relationship between full-counterfactual household relative deprivation and household European migration status is positive and statistically significant: each unit increase on the relative deprivation scale is associated with a 171% increase in the odds of household European migration at constant levels of other variables. There is thus some evidence to support hypothesis 6: more relatively deprived households in a world without migration corresponding to the early phase of cumulative causation are more likely to engage in migration. This is only true, however, when controlling for the household's absolute level of economic well-being, and the odds of household European migration are also subject to a statistically significant poverty constraint. This set of models thus seems to offer evidence that, in the early

phase of the process of cumulative causation, relative deprivation significantly increases the likelihood of household migration to Europe.

Apart from the household economic status predictors of interest, the multivariate logistic regression models showed that a number of the household and household head sociodemographic control variables were significantly associated with the odds of household European migration. Having a male household head tended to reduce the odds of European migration by about 50% ($p < 0.05$), while each additional year of household head's age reduced the odds of household European migration by about 12% ($p < 0.05$). At the household level, each one-person increase in the number of people living in the household increased the odds of household European migration by about 15% ($p < 0.05$). Average household age was associated with an increase in the odds of migration of 25% per year ($p < 0.01$), while average age squared was associated with a miniscule but significant reduction in the odds of migration ($p < 0.05$). The number of adults in the household was associated with a 22% increase in the odds of household European migration per adult ($p < 0.01$), while the number of non-migrant workers was associated with a 25% decrease in the odds of household European migration per worker ($p < 0.001$).

**Discussion and conclusions**

Popular perceptions of the determinants of sub-Saharan migration to Europe emphasize the role of absolute poverty in migrants' decisions. According to this view, Europe faces an invasion of destitute, impoverished Africans desperate to escape their home countries. This study has sought to compare the roles of absolute poverty and inequality in predicting household European migration status in 60 communities of Dakar, Senegal, and has found little evidence to support the commonplace view that absolute poverty is a main driver of migration. Using cross-sectional data, households with a member living in Europe were shown to have higher levels of

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economic status than households without a European migrant, both in terms of sociodemographic characteristics associated with high economic status and in terms of household wealth as measured by a wealth index. A first set of logistic regression models showed that higher household wealth was associated with higher probability of having a household member living in Europe, an association that was statistically significant even when controlling for a host of other potential confounding variables. In addition, there was no statistically significant association between relative deprivation and the probability of European migration, indicating that, in addition to their high absolute level of economic status, migrant households are not economically deprived relative to other households in their reference group.

Despite the strong positive association between household wealth and European migration status, it is impossible to infer a causal relationship on the basis of cross-sectional data. Indeed, it is impossible to demonstrate the temporal precedence of household economic status, so we cannot infer that higher household wealth is causally related to household European migration. It is even plausible to assume that cross-sectional household wealth is the result, at least in part, of past migration of household members, in which case the causal arrow would be reversed from its hypothesized direction, and migration would predict wealth. The observed positive association between household wealth and household European migration status thus can only be a snapshot of conditions at a point in time after which migration has already changed the initial conditions of the community which gave rise to migration in the first place. From this most recent "end point" of the process of cumulative causation, we can only conclude that migrant households are economically advantaged compared to non-migrant households, but not that it was this economic advantage (or lack thereof) that led to the decision to migrate. A proper

test of the roles of absolute and relative deprivation would require a longitudinal dataset with measures of household economic and migration status over time.

While I am not able to rewind the migration process to a point in time where it would be possible to observe a causal relationship between economic status and migration, I have attempted to approximate such a situation by making use of two counterfactuals corresponding to earlier phases in the process of cumulative causation. On the basis of predicted household wealth, I calculated household relative deprivation for two different scenarios: a "limited" counterfactual, corresponding to an intermediate phase of cumulative causation, where the household's relative deprivation was calculated on the basis of its predicted wealth and the reference group's observed wealth; and a "full" counterfactual, corresponding to an early phase of cumulative causation, where predicted wealth for both the household and the reference group served as the basis for the calculation of relative deprivation. In the limited counterfactual scenario, only the square of the wealth index was a significant economic status predictor of household migration status. This scenario thus conforms to an intermediate stage of the process of cumulative causation described by Massey (1990) where migration as a household strategy has become widespread as a result of social networks and neither absolute nor relative household economic status plays an important role in migration decisions.

The full counterfactual scenario, which approximated an early phase of cumulative causation where no households have engaged in migration, showed relative deprivation to be a significant positive predictor of household migration status, while only the square of household wealth was statistically significant. This evidence seems to support Stark and Taylor's (1989) hypothesis and early empirical findings that household's relative assessment of economic status positively predicts household migration decisions. The curvilinear association between

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household wealth and migration at this early phase of cumulative causation also supports

cumulative causation theorists' assertion (Massey 1990, Massey et al. 1994) that pioneer

migrants come from the middle ranges of the sending community's distribution of economic

status. Although causal claims of the role of relative deprivation or absolute economic status are

inadvisable given the nature of the data and the assumptions inherent in the construction of the

counterfactual, this study has provided evidence in support of the operation of both relative

deprivation and curvilinear economic selectivity at the earliest stages of the migration process.

This study has also made it possible to examine the process of cumulative causation and

the mechanisms underlying it in an urban, non-Mexican setting. Most prior theoretical work on

cumulative causation has focused on rural sending communities, and the consensus as outlined

by Massey et al. (1993) is that income inequality, and thus the relative deprivation motivation for

migration, is low in such communities prior to migration. This study, however, finds that relative

deprivation is associated with increased odds of European migration in the early phase of

cumulative causation in the urban setting of Dakar. As Fussell and Massey (2004) argue, the

dynamics underlying migration from cities may be different from those at work in rural areas,

and the more developed labor markets of cities undoubtedly manufacture inequality prior to any

migration occurring in urban communities. In addition, the dense social fabric of urban life may

be more conducive to social comparisons of visible inequalities, making relative deprivation a

more common phenomenon than in rural areas. The challenge for migration scholars, however, is

to specify when and how relative deprivation in urban areas is translated into migration. Fussell

and Massey (2004) contend that the dynamic process of cumulative causation does not occur in

urban areas precisely because of the myriad of opportunities for absolute and relative mobility

offered by most urban labor markets. In the case of Dakar, it could be that persistent economic

crisis in the 1980s and 1990s foreclosed many of the paths of mobility that urban labor markets usually offer, and relatively deprived households turned to migration as a remedy instead. In future research on this topic, I plan to use event-history data to determine whether and when migration in Dakar reached a self-feeding stage and to identify how the various phases of cumulative causation aligned with subjective assessments of absolute and relative economic status.

This study has also attempted to address a number of methodological gaps that have plagued the investigation of relative deprivation since Stark and Taylor's (1989) initial work. I used Stark and Taylor's (1991b) original conceptualization of relative deprivation, and also followed their lead in using counterfactual logic to show an association between relative deprivation and household migration. I also built on recent work in relative deprivation that used household assets instead of income as the basis for the calculation of relative deprivation (Bhandari 2004, VanWey 2005, Quinn 2006), but attempted to extend these insights by constructing a household wealth index using principal components analysis. Although widespread among analysts looking at other demographic behaviors and institutionalized as a measure in the Demographic and Health Surveys (Filmer and Pritchett 2001, Rutstein and Johnson 2004), this technique has been absent from the study of determinants of migration. Since income is notoriously difficult to measure in the context of developing countries while it is fairly easy to collect indicators of household assets, further use of this technique to study the relationship between household economic status and migration seems warranted.

This study has also broken empirical ground in the examination of determinants of Senegalese migration to Europe. Although high-quality data on African migration have been lacking in the past, the MAFE-Senegal project hopes to fill this gap. Given the widespread and

unquestioned assumptions regarding sub-Saharan African migration to Europe, this study fills a crucial void in demonstrating the role of household economic status in migration decisions.

Despite its contributions, this study also suffers from a number of shortcomings. Estimating counterfactual household wealth and relative deprivation is a stopgap measure stemming from the nature of the data collected. Only a longitudinal study would allow examination of the causal relationships underlying household migration decisions. In addition, my study has relied on a number of assumptions in the construction of both the household wealth index and the prediction of counterfactual household wealth. I do not know if my findings would be robust to alternative specifications, such as a wealth index constructed with another method (for example, by factor analysis or by simply entering household asset indicators into the model) or use of a different indicator of economic status altogether (such as income, which was absent from the dataset because of the difficulty of collecting reliable data on income).

An additional key assumption of my study is that the household's geographic neighborhood is the relevant reference group for the calculation of relative deprivation. Work on this phenomenon in other domains has suggested a number of different conceptualizations of reference groups, especially those constructed on the basis of sociodemographic indicators. In a densely populated urban environment such as Dakar, it is likely that households have multiple reference groups, so any thorough examination of relative deprivation would need to test more than just a single reference group. The biggest assumption that remains untested in the study of relative deprivation, though, is the stability of migrants' reference groups over time. Although such an assumption is concordant with NELM's general theoretical approach and helps explain both high levels of remittances and phenomena such as circular migration, it is not clear that reference group stability (instead of reference group substitution) is the most likely situation. It is

important to study the conditions under which circumstances migrants maintain their sending communities as reference groups, something this study has not attempted.

I have also not attempted to test how sensitive my results are to the exact choice of geographic reference group. It is clear that not all neighborhoods in Dakar are the same; indeed, some are quite well off and some quite poor. These unobserved neighborhood differenced might be driving some of the results. In future work on this topic, I plan to deal with unobserved neighborhood heterogeneity by estimating a multilevel model.

Although much work remains to be done on the impacts of absolute and relative deprivation on sub-Saharan migration to Europe, the policy relevance of this work makes future research crucial. Much European migration policy rests on neoclassical economic assumptions regarding migration motivations. For example, European "co-development" initiatives attempt to stem migration by increasing development assistance to sub-Saharan countries through collaboration with migrants already in Europe. While seemingly laudable, theorists of relative deprivation have noted that policies that raise living standards without paying attention to inequality in the sending community risk actually increasing migration as a result. Indeed, de Haas (2007) criticizes recent European development policies for making migration more likely, and points to Senegal as a prime example of the link between increased development and increased migration. Until future research disentangles the causal relationships driving sub-Saharan migration to Europe, policies designed to reduce such migration are bound to be ineffective at best and counterproductive at worst.

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**Table 1. Descriptive statistics from sample for analysis of international out-migration of household member from Dakar to Europe by household migration status and for full sample (N = 1012)**

| Variable | Households without European migrant(s) | | Households with European migrant(s) | | All Households | |
|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD |
| ***Household Head Characteristics*** | | | | | | |
| *Sex & Age* | | | | | | |
| Male | 0.66 | 0.47 | 0.60 | 0.49 | 0.64 | 0.48 |
| Age, years | 52.6 | 14.42 | 53.2 | 15.24 | 52.8 | 14.76 |
| *Education* | | | | | | |
| Formal schooling, years | 5.33 | 6.03 | 7.05 | 6.37 | 6.04 | 6.23 |
| Koranic school only | 0.23 | 0.42 | 0.16 | 0.37 | 0.20 | 0.40 |
| *Work status* | | | | | | |
| Working | 0.64 | 0.48 | 0.50 | 0.50 | 0.58 | 0.49 |
| At home | 0.10 | 0.30 | 0.19 | 0.40 | 0.14 | 0.34 |
| Unemployed | 0.02 | 0.14 | 0.04 | 0.19 | 0.03 | 0.16 |
| Student | 0.01 | 0.07 | 0.00 | 0.05 | 0.00 | 0.06 |
| Retired | 0.16 | 0.37 | 0.20 | 0.40 | 0.18 | 0.38 |
| Other inactive | 0.07 | 0.26 | 0.07 | 0.25 | 0.07 | 0.26 |
| *Occupation* | | | | | | |
| Executive | 0.04 | 0.21 | 0.07 | 0.25 | 0.05 | 0.22 |
| Skilled worker | 0.15 | 0.35 | 0.14 | 0.35 | 0.14 | 0.35 |
| Unskilled worker | 0.09 | 0.29 | 0.05 | 0.21 | 0.07 | 0.26 |
| Business owner | 0.03 | 0.16 | 0.01 | 0.11 | 0.02 | 0.14 |
| Self employed | 0.33 | 0.47 | 0.23 | 0.42 | 0.29 | 0.45 |
| Apprentice | 0.00 | 0.06 | 0.00 | 0.00 | 0.00 | 0.04 |
| ***Household characteristics*** | | | | | | |
| Number of members | 9.87 | 5.72 | 12.31 | 5.98 | 10.88 | 5.95 |
| Average age, years | 25.94 | 7.84 | 28.73 | 7.05 | 27.10 | 7.64 |
| Number of adults | 6.01 | 3.86 | 8.49 | 4.28 | 7.04 | 4.22 |
| Number of children | 3.86 | 3.00 | 3.81 | 3.07 | 3.84 | 3.03 |
| Under-18 dependency ratio | 0.84 | 0.80 | 0.54 | 0.47 | 0.71 | 0.70 |
| Number of men | 4.83 | 3.20 | 6.30 | 3.54 | 5.44 | 3.42 |
| Number of women | 5.04 | 3.38 | 6.00 | 3.50 | 5.44 | 3.46 |
| Sex ratio | 1.16 | 0.95 | 1.33 | 1.09 | 1.23 | 1.01 |

**Table 1. Descriptive statistics from sample for analysis of international out-migration of household member from Dakar to Europe by household migration status and for full sample (N = 1012)**

| Variable | Households without European migrant(s) Mean | SD | Households with European migrant(s) Mean | SD | All Households Mean | SD |
|---|---|---|---|---|---|---|
| Average years of formal schooling | 5.47 | 3.54 | 7.28 | 3.28 | 6.22 | 3.54 |
| Number of members with Koranic school only | 1.02 | 1.98 | 1.06 | 2.03 | 1.04 | 2.00 |
| Number of non-migrant workers | 3.14 | 2.37 | 3.14 | 2.20 | 3.14 | 2.30 |
| ***Household migration characteristics [a]*** | | | | | | |
| Number of migrants, all destinations | 1.47 | 0.93 | 2.13 | 1.42 | 1.06 | 1.40 |
| Number of migrants, Europe | 0.00 | 0.00 | 1.81 | 1.19 | 0.76 | 1.18 |
| Number of returned migrants | 0.93 | 1.65 | 0.53 | 1.24 | 0.46 | 1.16 |
| Number of working migrants | 0.93 | 0.79 | 1.53 | 1.20 | 0.75 | 1.09 |
| Duration since first migrant departure, years | 19.85 | 17.38 | 19.23 | 16.33 | 12.22 | 16.23 |
| Duration since first migrant departure to Europe, years | 0.00 | 0.00 | 14.23 | 13.10 | 5.91 | 10.97 |
| Receipt of remittances in last 12 months, cash | 0.57 | 0.50 | 0.72 | 0.45 | 0.37 | 0.48 |
| Number of migrants sending cash remittances in last 12 months | 0.68 | 0.77 | 1.17 | 1.12 | 0.57 | 0.94 |
| Receipt of remittances in last 12 months, goods | 0.31 | 0.46 | 0.42 | 0.49 | 0.21 | 0.41 |
| Number of migrants sending goods remittances in last 12 months | 0.37 | 0.72 | 0.59 | 0.91 | 0.29 | 0.70 |

Source: Migration between Africa and Europe (MAFE-Senegal) dataset 2008

[a] migration characteristics for non-migrant households are reported for those households that have a migrant in a non-European destination.

**Table 2. Descriptive statistics and scoring factors for asset variables entering the computation of the first principal component for calculation of household wealth index**

| Variable | Non-migrant Household Mean | Migrant Household Mean | Overall Mean | SD | Min | Max | Scoring Factors | Scoring Factor / SD |
|---|---|---|---|---|---|---|---|---|
| *Household durables ownership* | | | | | | | | |
| Refrigerator | 0.45 | 0.70 | 0.56 | 0.50 | 0.00 | 1.00 | 0.28 | 0.56 |
| Stove | 0.71 | 0.74 | 0.73 | 0.45 | 0.00 | 1.00 | 0.12 | 0.26 |
| Sewing machine | 0.07 | 0.11 | 0.09 | 0.29 | 0.00 | 1.00 | 0.11 | 0.40 |
| Radio/stereo | 0.71 | 0.82 | 0.76 | 0.43 | 0.00 | 1.00 | 0.17 | 0.41 |
| Television | 0.78 | 0.93 | 0.84 | 0.37 | 0.00 | 1.00 | 0.28 | 0.75 |
| Cable/satellite | 0.13 | 0.25 | 0.18 | 0.38 | 0.00 | 1.00 | 0.20 | 0.52 |
| VCR/DVD player | 0.38 | 0.58 | 0.47 | 0.50 | 0.00 | 1.00 | 0.27 | 0.54 |
| Telephone (landline or cell phone) | 0.74 | 0.93 | 0.82 | 0.38 | 0.00 | 1.00 | 0.23 | 0.60 |
| Computer | 0.11 | 0.17 | 0.14 | 0.35 | 0.00 | 1.00 | 0.22 | 0.63 |
| Internet access | 0.05 | 0.06 | 0.05 | 0.23 | 0.00 | 1.00 | 0.18 | 0.78 |
| Fan | 0.60 | 0.76 | 0.67 | 0.47 | 0.00 | 1.00 | 0.25 | 0.53 |
| Air conditioner | 0.04 | 0.09 | 0.06 | 0.23 | 0.00 | 1.00 | 0.17 | 0.73 |
| No durables | 0.03 | 0.00 | 0.02 | 0.14 | 0.00 | 1.00 | -0.18 | -1.29 |
| *Vehicle ownership* | | | | | | | | |
| Taxi | 0.01 | 0.02 | 0.02 | 0.14 | 0.00 | 1.00 | 0.03 | 0.23 |
| Family car | 0.11 | 0.22 | 0.15 | 0.36 | 0.00 | 1.00 | 0.23 | 0.64 |
| Motorcycle | 0.07 | 0.06 | 0.07 | 0.25 | 0.00 | 1.00 | 0.07 | 0.29 |
| Bicycle | 0.03 | 0.05 | 0.04 | 0.20 | 0.00 | 1.00 | 0.09 | 0.45 |
| Horse-drawn carriage | 0.01 | 0.00 | 0.01 | 0.08 | 0.00 | 1.00 | -0.02 | -0.26 |
| Canoe | 0.01 | 0.00 | 0.01 | 0.09 | 0.00 | 1.00 | -0.01 | -0.10 |
| No vehicle | 0.78 | 0.66 | 0.73 | 0.44 | 0.00 | 1.00 | -0.22 | -0.50 |
| *Housing characteristics* | | | | | | | | |
| Own house | 0.46 | 0.57 | 0.51 | 0.50 | 0.00 | 1.00 | 0.10 | 0.19 |
| Shack | 0.02 | 0.00 | 0.02 | 0.13 | 0.00 | 1.00 | -0.10 | -0.77 |
| Hut | 0.01 | 0.00 | 0.00 | 0.05 | 0.00 | 1.00 | -0.07 | -1.34 |
| One-story house | 0.50 | 0.47 | 0.48 | 0.50 | 0.00 | 1.00 | -0.06 | -0.13 |
| Multi-story house | 0.20 | 0.26 | 0.22 | 0.42 | 0.00 | 1.00 | 0.14 | 0.33 |

**Table 2. Descriptive statistics and scoring factors for asset variables entering the computation of the first principal component for calculation of household wealth index**

| Variable | Non-migrant Household Mean | Migrant Household Mean | Overall Mean | SD | Min | Max | Scoring Factors | Scoring Factor / SD |
|---|---|---|---|---|---|---|---|---|
| Apartment | 0.07 | 0.10 | 0.09 | 0.29 | 0.00 | 1.00 | 0.07 | 0.24 |
| Rented room | 0.19 | 0.15 | 0.18 | 0.38 | 0.00 | 1.00 | -0.08 | -0.20 |
| Other housing | 0.01 | 0.00 | 0.01 | 0.07 | 0.00 | 1.00 | -0.02 | -0.26 |
| Number of rooms (adjusted) | 0.44 | 0.39 | 0.43 | 0.35 | 0.06 | 6.00 | 0.06 | 0.17 |
| *Access to water and sanitation* | | | | | | | | |
| Indoor flush toilet, sewer | 0.41 | 0.36 | 0.39 | 0.49 | 0.00 | 1.00 | -0.06 | -0.13 |
| Indoor flush toilet, septic tank | 0.41 | 0.36 | 0.39 | 0.49 | 0.00 | 1.00 | -0.06 | -0.13 |
| Outdoor latrine | 0.29 | 0.21 | 0.25 | 0.43 | 0.00 | 1.00 | -0.09 | -0.20 |
| Public toilet | 0.01 | 0.00 | 0.01 | 0.08 | 0.00 | 1.00 | -0.06 | -0.82 |
| Nature | 0.01 | 0.00 | 0.00 | 0.06 | 0.00 | 1.00 | -0.06 | -1.08 |
| Other toilet | 0.04 | 0.02 | 0.03 | 0.17 | 0.00 | 1.00 | -0.05 | -0.30 |
| Interior well | 0.02 | 0.01 | 0.02 | 0.14 | 0.00 | 1.00 | 0.00 | -0.01 |
| Exterior well | 0.02 | 0.02 | 0.02 | 0.13 | 0.00 | 1.00 | -0.05 | -0.36 |
| Interior faucet | 0.86 | 0.90 | 0.88 | 0.33 | 0.00 | 1.00 | 0.17 | 0.52 |
| Exterior faucet | 0.10 | 0.06 | 0.08 | 0.27 | 0.00 | 1.00 | -0.18 | -0.65 |
| Other water source | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 1.00 | 0.01 | 0.12 |
| *Electricity and primary cooking fuel* | | | | | | | | |
| Has electricity | 0.91 | 0.98 | 0.94 | 0.24 | 0.00 | 1.00 | 0.22 | 0.92 |
| Gas | 0.91 | 0.97 | 0.93 | 0.25 | 0.00 | 1.00 | 0.21 | 0.83 |
| Charcoal | 0.05 | 0.02 | 0.04 | 0.19 | 0.00 | 1.00 | -0.15 | -0.78 |
| Wood | 0.02 | 0.00 | 0.01 | 0.11 | 0.00 | 1.00 | -0.12 | -1.09 |
| Other fuel | 0.01 | 0.00 | 0.00 | 0.05 | 0.00 | 1.00 | -0.06 | -1.09 |
| No fuel | 0.01 | 0.00 | 0.01 | 0.10 | 0.00 | 1.00 | -0.05 | -0.55 |
| *Land and livestock ownership* | | | | | | | | |
| Owns land | 0.18 | 0.25 | 0.20 | 0.40 | 0.00 | 1.00 | 0.12 | 0.29 |
| Owns livestock | 0.24 | 0.28 | 0.25 | 0.43 | 0.00 | 1.00 | 0.05 | 0.12 |
| | | | | | | | | |
| *Overall wealth index* | | | 0 | 2.31 | -9.98 | 6.63 - | - | - |

Source: Migration between Africa and Europe (MAFE-Senegal) dataset 2008.

Notes: Number of rooms equivalized by dividing total number of rooms in house by number of household members in residence. Scoring factor is the "weight" assigned to each variable (normalized by its mean and standard deviation) in the linear combination of variable that constitute the first principal component. The percentage of variance explained by the first principal component is 11.11%. The first eigenvalue is 5.33; the second eigenvalue is 2.76.

**Table 3. Means, Standard Deviations, and Ranges of Observed and Predicted Household Wealth and Relative Deprivation (N = 1012)**

| Variable | Households without European migrant(s) | | | | Households with European migrant(s) | | | | All Households | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | Mean | SD | Min | Max | Mean | SD | Min | Max | Mean | SD | Min | Max |
| *Wealth* | | | | | | | | | | | | |
| Observed wealth | -0.53 | 2.41 | -9.98 | 5.82 | 0.75 | 1.92 | -6.99 | 6.63 | 0.00 | 2.31 | -9.98 | 6.63 |
| Predicted wealth | -0.61 | 1.38 | -4.49 | 3.70 | 0.05 | 1.28 | -3.83 | 4.11 | -0.33 | 1.38 | -4.49 | 4.11 |
| *Relative Deprivation (RD)* | | | | | | | | | | | | |
| Observed RD | 1.24 | 1.37 | 0.00 | 8.11 | 0.73 | 0.89 | 0.00 | 6.89 | 1.03 | 1.22 | 0.00 | 8.11 |
| Counterfactual RD (1) | 1.11 | 0.83 | 0.00 | 6.14 | 0.98 | 0.78 | 0.00 | 4.42 | 1.06 | 0.81 | 0.00 | 6.14 |
| Counterfactual RD (2) | 0.73 | 0.72 | 0.00 | 4.50 | 0.52 | 0.56 | 0.00 | 3.84 | 0.64 | 0.66 | 0.00 | 4.50 |

Source: Migration between Africa and Europe (MAFE-Senegal) dataset 2008.

Note: all mean differences significant at $p<0.05$.

**Table 4. Logistic regression of household European migration status on relative deprivation, household wealth, and sociodemographic control variables.**

| Variable | Model 1 - observed | | | | | Model 2 - Limited (household) counterfactual | | | | | Model 3 -Full counterfactual | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) |
| *Independent variables* | | | | | | | | | | | | | | | |
| Relative deprivation | 0.623*** | | 0.989 | 1.124 | 1.240 | 0.794** | | 1.301* | 1.482 | 1.489 | 0.586*** | | 1.160 | 1.787 | 2.708* |
| | (0.0445) | | (0.109) | (0.244) | (0.316) | (0.0656) | | (0.136) | (0.354) | (0.402) | (0.0642) | | (0.181) | (0.604) | (1.058) |
| Wealth index | | 1.324*** | 1.319*** | 1.442*** | 1.304*** | | 1.460*** | 1.610*** | 1.666*** | 1.196 | | 1.460*** | 1.539*** | 1.740*** | 1.408 |
| | | (0.0442) | (0.0707) | (0.0914) | (0.105) | | (0.0749) | (0.105) | (0.114) | (1.110) | | (0.0749) | (0.116) | (0.148) | (1.317) |
| Relative deprivation squared | | | | 1.025 | 0.978 | | | | 0.999 | 1.001 | | | | 0.983 | 0.869 |
| | | | | (0.0505) | (0.0579) | | | | (0.0621) | (0.0673) | | | | (0.113) | (0.110) |
| Wealth index squared | | | | 0.964** | 0.983 | | | | 0.898*** | 0.923* | | | | 0.883*** | 0.908* |
| | | | | (0.0135) | (0.0158) | | | | (0.0272) | (0.0342) | | | | (0.0301) | (0.0379) |
| *Controls* | No | No | No | No | Yes | No | No | No | No | Yes | No | No | No | No | Yes |
| N | 1012 | 1012 | 1012 | 1012 | 1012 | 1012 | 1012 | 1012 | 1012 | 1012 | 1012 | 1012 | 1012 | 1012 | 1012 |
| Pseudo R-squared | 0.041 | 0.042 | 0.062 | 0.067 | 0.246 | 0.006 | 0.007 | 0.048 | 0.058 | 0.236 | 0.019 | 0.020 | 0.045 | 0.055 | 0.236 |
| Null log likelihood | -686.8 | -686.8 | -686.8 | -686.8 | -686.8 | -686.8 | -686.8 | -686.8 | -686.8 | -686.8 | -686.8 | -686.8 | -686.8 | -686.8 | -686.8 |
| Log likelihood | -658.4 | -658.3 | -644.2 | -640.6 | -518.0 | -682.7 | -682.0 | -653.5 | -646.9 | -524.9 | -673.5 | -673.1 | -655.8 | -648.9 | -524.7 |
| Model chi-square | 56.71 | 57.04 | 85.15 | 92.28 | 337.5 | 8.096 | 9.589 | 66.48 | 79.69 | 323.8 | 26.58 | 27.30 | 61.93 | 75.69 | 324.1 |

Source: Migration between Africa and Europe (MAFE-Senegal) dataset 2008

Note: Exponentiated coefficients; Standard errors in parentheses; * $p<0.05$, ** $p<0.01$, *** $p<0.001$

**Appendix 1. Results of OLS Regression of Observed Household Wealth on Household, Household Head, and Household Migration Characteristics Use for Prediction of Counterfactual Household Wealth**

| Variable | OLS model | |
|---|---|---|
| | Coefficient | SE |
| ***Household Head Characteristics*** | | |
| *Sex* | | |
| Male | -0.157 | 0.189 |
| *Ethnicity* | | |
| Wolof | -0.0265 | 0.254 |
| Mandingue | -0.0905 | 0.361 |
| Pular | -0.116 | 0.274 |
| Serer | -0.329 | 0.289 |
| Diola | -0.278 | 0.325 |
| Soninke | -0.144 | 0.345 |
| *Nationality and birthplace* | | |
| Senegalese nationality | -1.185* | 0.534 |
| Dakar birthplace | -0.124 | 0.129 |
| Foreign born | -0.918** | 0.308 |
| *Marital Status* | | |
| Single | 0.245 | 0.861 |
| Married, monogamous | 0.759 | 0.837 |
| Married, polygamous | 0.955 | 0.847 |
| Divorced | 0.616 | 0.884 |
| Widowed | 0.789 | 0.856 |
| *Religion* | | |
| Muslim, Mouride | -0.0714 | 0.234 |
| Muslim, Tidiane | -0.257 | 0.218 |
| Muslim, Khadre | -0.203 | 0.328 |
| Muslim, Layene | 0.528 | 0.495 |
| Christian | -0.550 | 0.307 |
| *Age* | | |
| Age | -0.0638* | 0.0278 |
| Age squared | 0.000597* | 0.000245 |
| *Education* | | |
| Years of formal schooling | 0.0696*** | 0.0165 |
| Koranic school only | 0.262 | 0.201 |
| *Work status* | | |
| Working | 0.188 | 0.87 |
| At home | -0.152 | 0.281 |
| Unemployed | -0.804 | 0.45 |
| Student | 0.144 | 0.994 |
| Retired | -0.155 | 0.277 |
| *Occupation* | | |
| Executive | 0.498 | 0.866 |

**Appendix 1. Results of OLS Regression of Observed Household Wealth on Household, Household Head, and Household Migration Characteristics Use for Prediction of Counterfactual Household Wealth**

| Variable | OLS model | |
|---|---|---|
| | Coefficient | SE |
| Skilled worker | 0.150 | 0.841 |
| Unskilled worker | -0.941 | 0.852 |
| Business owner | 1.300 | 0.917 |
| Self employed | -0.319 | 0.835 |
| *Household characteristics* | | |
| Number of household members | 0.0239 | 0.0366 |
| Average household age | -0.0112 | 0.0476 |
| Average age squared | -0.000209 | 0.000677 |
| Number of adults | -0.00503 | 0.0452 |
| Average level of formal education | 0.273*** | 0.0256 |
| Number of members attending Koranic school only | 0.00108 | 0.0374 |
| Number of women | 0.0585 | 0.0362 |
| Number of non-migrant workers | 0.0569 | 0.0369 |
| *Household migration characteristics* | | |
| Number of migrants (all destinations) | -0.285* | 0.117 |
| Number of migrants (Europe) | 0.207 | 0.109 |
| Number of returned migrants | 0.141* | 0.0658 |
| Number of migrant workers | 0.166 | 0.11 |
| Years since first migrant departure (all destinations) | 0.00682 | 0.00627 |
| Years since first migrant departure (Europe) | 0.00734 | 0.00834 |
| Receipt of cash remittances | 0.234* | 0.0926 |
| Receipt of durable goods remittances | 0.112 | 0.0993 |
| | | |
| Constant | -0.272 | 1.346 |

| | |
|---|---|
| N | 1013 |
| R-squared | 0.429 |
| F | 14.48 |

Source: Migration between Africa and Europe (MAFE-Senegal) dataset, 2008

Note: Standard errors in parentheses. * $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$