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**Labor migration, poverty and the long-term development impact of
international migration**

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PRELIMINARY DRAFT: NOT FOR CIRCULATION OR CITATION

**Selected Paper prepared for presentation at the 2015 Agricultural & Applied Economics
Association and Western Agricultural Economics Association Annual Meeting, San
Francisco, CA, July 26-28**

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ABSTRACT

We estimate the present-day effects on rural Moroccan households of past international migration--specifically, recruitment to work in the French mines sixty years--and its associated remittances and pensions. Using cluster analysis twice—once to categorize households as poor and non-poor in the early 1960s and again to categorize the directly-descended household in 2014—we identify the households that moved upward economically over the intervening period. Seemingly-unrelated probit estimation is then used to gauge the degree to which migration facilitated this process. We find that migration significantly increased the likelihood that the sending family's current-day members would presently be non-poor. Surprisingly, we also find that the simple act of applying to migrate also has a similar effect. For the poorest (in the pre-migration period) of households, recruitment for work could well have been exogenous. For these households, migration to work in the French mines is, by far, the strongest predictor of escaping poverty sixty years later.

I. Introduction

The short to medium-term effects of labor migration and remittances on poverty, inequality, investment patterns, agricultural production, local labor markets, and other economic outcomes are well documented (Adams and Cuecuecha 2013, Arslan and Taylor 2012, Pfeiffer et al 2009, Stark 2005). However, for labor migration to have a lasting development impact--to sustain upward mobility over more than the 5-10 year period common for most data sets--positive wealth outcomes associated with remittances should be apparent over a longer time span. How do households that have had international migrants at some point in the past fare with respect to those who have not, not just over the past five years but over the past fifty? Conventional wisdom holds that international migrant households would do better, but methodological and empirical challenges make testing that hypothesis difficult. This is primarily due to the problem of self-selection into migration, and the difficulty of collecting reliable data on assets or wealth and the migration experience for periods longer than a few years. Scholars have explored some issues relating to the long-term implications of migration: whether migrants sustain remittances over time, the impact of policy on migration flows, and how migration changes in relation to levels of poverty and economic growth in the sending countries, among others (de Haas 2005, Gallina 2006, Massey and Taylor 2004,). These treatments of migration rely on national level data sets that offer few insights about migration and wealth dynamics over time at the household level. Conversely, a diverse array of qualitative studies have detailed complex spatial and temporal variation in the ways migration affects household wealth outcomes especially in terms of economic inequality and shifting social relations (de Haan and Rogaly 2002, Glick-Schiller and Faist 2010). Supporting these studies with quantitative analysis remains a challenge.

This study relies on a unique household-level dataset from an oasis valley in Morocco to address household wealth outcomes associated with migration and remittances over multiple generations—a 60-year period—and suggests a method to link migration experiences (and associated remittances and pensions) with upward economic mobility over this period. We conducted a survey with 306 households in an oasis valley system with a distinct geography and cultural history, developing a questionnaire informed by long-term anthropological fieldwork on rural livelihoods, migration, and land use in the region. The resulting data set includes 1) present-day outcomes of both migrant-sending and non-sending households, including households that unsuccessfully applied for migration, 2) pre-migration characteristics of both types of households, and 3) retrospective data on major investments made over the intervening 60-year period. Having these data—in particular, data on the 'rejected' would-be migrants—allow us to address the self-selection issue that poses such a challenge for migration analysis.

Moreover, these data document the effects of a migration treatment that we argue was quasi-randomly assigned: migration was highly desirable and, at the same time, open to nearly everyone. In the early 1960s, a labor recruiter for French coal mines held a series of recruitment drives for adult men in which migrants were selected in a largely random process. Finally, we are able to document the minimal attrition to our representative sample of the valley's rural population through community interviews and family histories that trace household membership over multiple generations. While some migrants did bring their families to Europe, the Mgoun valley is known as region to which migrants kept close ties, often returning after years in the coal mines or remaining an active member of their household in their natal community even when they stayed abroad.

We take advantage of the relative stability in households despite high levels of out-migration, an unusual migration selection process, and recall data that captures an exceptionally long time span to test for the effects of migration and the long-term investments resulting from migration. Our findings indicate that having an early international migrant in the household positively and significantly increased the likelihood of the present-day household's escape from poverty.

II. Theoretical framework and literature review

The New Economics of Labor Migration (NELM)—with its emphasis on migration as a household decision aimed at least in part at mitigating risk and overcoming credit constraints—has long dominated analyses of migration's impact on sending households and economic development in sending countries more generally (Stark 1978, 1991, Taylor 1999). Within this broad framework, migration can have a positive impact on household wealth outcomes by providing a source of investment capital, easing risk constraints on those investments, and overcoming credit access problems. The large body of literature testing this and other effects of migration and remittances on poverty, inequality, productivity, and livelihood diversification, however, has not produced universally applicable conclusions about the relationship between

migration and development, especially at the household level. The empirical diversity is too great, not only across countries, but within them as well.

Despite this empirical diversity, some theoretical assumptions about the effect of migration remittances are borne out in empirical analyses. Numerous studies show that migrants have a higher propensity to invest than non-migrants (de Haas 2007, Massey et al. 1998). Remittances do more than simply ease credit constraints—as qualitative interviews in the context of this research in Morocco suggest, higher sustained income is a more desirable way to facilitate investments than credit. Migrant households translate their higher incomes into greater productive capacity through investments in education, agriculture, businesses, or other income-generating activities (Adams and Cuecuecha 2013).

The effects of investments on migrant-sending households and their communities may take years to become apparent. Taylor and Lopez-Feldman (2010) use 22-year migration histories embedded in a national rural household survey to conclude that Mexican migration to the US significantly increased both rural incomes and land productivity. Their work highlights the importance of sufficient temporal scale: many migration impacts take several years to show significant and lasting effects, implying that studies with shorter time frames—and most studies only have data for shorter periods—are missing some of the most important processes migration sets in motion.

If the empirical strategy for addressing the importance of time frame ultimately rests in data collection, the issues associated with endogeneity are typically addressed econometrically. This is because of the sheer rarity of random selection into migration. McKenzie et al. (2010) and Gibson et al. (2013) study a rare case: the lottery in Tonga for migration to New Zealand. McKenzie et al. use the Tonga lottery to gauge the problem of endogeneity and the degrees to which various econometric techniques are able to account for it. Unobservable characteristics can introduce bias not only because they compel some households to select into migration, but also because they may cause some migrating households to subsequently leave the sample (Gibson et al. 2013). The nature of the migration event studied herein partially mitigates the endogeneity issue. Because of the way workers were recruited for the French mines, we argue that assignment into this particular migration “treatment” was as random as can possibly be found, barring migration lotteries.

Morocco is one of the world's primary labor sending countries: approximately 3 million people of Moroccan descent—the country's total population is 38 million—lived abroad in 2004, and the country is the fourth largest remittance receiver in the world, receiving \$36 billion in 2003 (de Haas 2009). Large and sustained waves of outmigration, especially from the rural southeastern oases, the southwest Souss area, and northern Rif mountains, began when Morocco signed labor agreements with the former West Germany (1963), France (1963), Belgium (1964) and the Netherlands (1969) (de Haas 2007). This period of organized labor recruitment was relatively brief, peaking in the early 1970s when European immigration policies became more

restrictive following the economic contraction of 1973-1974 (though immigration through more informal networks that involved migrants sending back contracts and family reunification kept overall immigration levels high).

This organized period of recruitment was transformative for many rural areas in Morocco, including the Mgoun valley, sparking economic, social, and political changes that have reconfigured rural and household economies. Despite this history, systematic, empirical research on the impact of migration and remittances is still lacking in Morocco (de Haas 2009). Studies have shown, however, that remittance effects have significant effects on poverty and household wealth, in part due to persistently high levels of remittances long after analysts predicted they would decline (de Haas and Plug 2006). De Haas reviews the existing literature on migration in Morocco, describing macro-economic evidence that migration supports income growth, especially in rural areas with high levels of international migration (2009). Diverse studies also indicate high levels of migrant investment in Morocco, especially in housing, service sectors, and agriculture; diversification of livelihood activities in migrant households; and “investment leakage” or multiplier effects of migration remittances that have resulted in the growth of regional towns as market and employment centers (de Haas 2009). To our knowledge, no research has attempted a micro-level, long-term quantitative analysis of the wealth or equity outcomes of the early migration period for households in sending communities. If migration is to have lasting development impacts beyond the short-medium term that is the norm for migration studies, migration outcomes should be visible over a generational and even multi-generational time span. The unique circumstances of labor recruitment in early 1960s Morocco, coupled with the geographic and cultural specificity of the Mgoun valley, permit this kind of analysis through a household survey conducted in 2014.

III. Study context and data

Context

The narrow riparian oasis valley of Mgoun extends from the High Atlas mountains in a southeasterly direction towards the Saharan desert. The valley stands in the rain shadow of the Atlas and is considered the “pre-Sahara” because the arid steppe surrounding the river represents a transition from the mountains to the hyper-aridity of the desert. In Kelaa Mgouna, the market town at the base of the valley, average annual rainfall calculated over a 20-year period hovers around 150 mm, too little for rain fed agriculture (Centre de Mise en Valeur Agricole 2010). Historically, then, the region supported a transhumant form of extensive pastoralism in the steppe, as groups moved herds of primarily goats and sheep up to the high mountain pasture in the spring and down into the steppe lands at the bottom of the valley in the summer. Irrigation networks supported intensive oasis agriculture in the narrow ribbon surrounding the Mgoun River, the only river in the region that currently runs all year, fed primarily by snow melt from the Atlas Mountains.

Prior to the French military conquest of the Moroccan southeast in 1934, the final resistance to the Protectorate (1912-1956), Mgoun and surrounding areas were largely autonomous of the central government. Though the region did have broader commercial ties, especially through the trans-Saharan trade, life in Mgoun was precarious: environmental uncertainty in this disequilibrium ecological setting and rigid social hierarchies exemplified by indentured sharecropping resulted in frequent famines and chronic, extreme poverty. Thus, when the prospect of higher standards of living—and political freedom from sharecropping—appeared in the form of labor recruitment to France, most households were eager to participate.

This massive, organized wave of outmigration shapes the empirical strategy of our dataset. In 1963, the government of Morocco and France signed an agreement authorizing recruitment of primarily rural Moroccan male labor to alleviate labor shortages in the French coal mines (Atouf 2011). One famous recruiter, Félix Mora, worked with local government officials to stage recruiting drives in market towns throughout the southeast, and other rural areas. Town criers made the announcements in the weekly markets, the main source of information at the time, and three separate recruitment drives occurred between 1963 and 1965 in Kelaa Mgouna and two other nearby market towns.

Herein lays our argument that selection into the migration treatment was largely random: all applicants were welcomed; neither literacy nor identity papers were required; there were no fees; and there were no selection criteria around status, racial or ethnic identity, or background. On the appointed day, men lined up by the hundreds and were told to remove their shirts. Mora famously went up and down the line, examining the physical appearance of the men and stamping their shoulders green for “accepted” or red for “rejected.” Oral histories recounted how Mora deliberately made the men stand out in the hot pre-Saharan sun for hours to test their endurance. As shown in Table 1, many were rejected for their weakness—the physical legacy of relative deprivation, short stature, low weight, poor vision, or simply because Mora was “choosing one, skipping one,” in the words of one respondent. In total, Mora recruited 78,000 men in his drives throughout the southeast of Morocco.

The selection process was not, of course, as random as it would be in an experiment, or even in a lottery. However, we are able to use our data on the rejected applicants and their present-day progeny to ascertain the degree to which selection (both into migration and *application* to migrate) was random, as in McKenzie et al. (2010). Furthermore, our baseline (pre-migration characteristics) data also permit the use of instrumental variables in estimating the migration effect. First, those rejected for weakness or poor health may have been systematically poorer and more malnourished, though the statistical comparison discussed below does not yield significant differences in asset ownership. It is possible that Mora rejected for low weight or height based on his understanding of what was needed for work in northern French mines and that “short stature” reflected the smaller average size of southern Moroccans in comparison to Europeans rather than stunting or deprivation. Second, relative isolation seemed to influence the likelihood of having heard about Mora’s arrival and the ability to travel on the appointed day. Residents of remote

mountain communities in particular would have had more difficulty traveling to recruitment sites, and many in those communities were transhumant pastoralists who were on the range with their herds. Third, some did not want to apply for personal or political reasons: fear of the unknown, a desire to stay with their family, and hostility to the former colonial regime. Fourth, there were demographic considerations, as some families did not have adult men to spare. We discuss this in greater depth below in presenting our instrumental variables. Finally, some wealthier, high status households opted not to apply in the initial round because, as one respondent noted, “we did not have to; we were well off. But when we saw the first migrants send back so much money, then everyone went to the second and third recruitment drives.” Since Mora's second and third recruitment happened in rapid succession (early 60s) this initial self-selection term had no material difference over the long term, since both rich and poor did end up leaving in close succession. Thus, even though there were some non-random aspects to the recruitment, oral histories paint a portrait of a migration experience that was both highly desirable and open to nearly everyone: people describe how rich and poor applied and were selected, so that a former sharecropper and his overlord might work side by side in the French coal mines. The possibilities of upward mobility through migration were therefore widely available.

Data

This migration experience formed the basis of an in-depth household survey conducted in 18 rural communities in a five-commune (county) area comprising the Mgoun valley and the surrounding steppe. Focusing on the valley and the surrounding environs allowed the survey to capture the full variation of migration experience, agro-ecological diversity, and livelihood systems while also marking a locally meaningful region. This strategy minimized the possibility that social or ecological differences across oasis valley systems might influence how key variables shape wealth outcomes. Within the Mgoun valley, the sample was stratified according to agro-ecological and economic zones in order to capture the diversity of the region. From previous ethnographic fieldwork, we can confirm that these zones include populations with the full range of migration experience: non-migrants, internal migrants, and international migrants. The zones also capture the diversity of economic activity, from agricultural growth areas to areas where agriculture is contracting, different levels of commercial activity, population densities, and degrees of remoteness. Seventeen households were interviewed in each community. They were selected through simple random sampling, based on each community's list of households receiving potable water. Interviews were conducted to ensure that households without a water account were added into this list and that households with two or more accounts were not overrepresented.

The survey was administered in the spring and summer of 2014 by three enumerators from the region. They were able to spend extended periods with each household and return if necessary to complete the survey. The questionnaire collected complete demographic information on the households, including baseline household characteristics in the early 1960s, just as Mora, the

French labor recruiter, was first arriving in the region. Such characteristics include the number of adult males at the baseline date of 1960, social status (as measured by roles in customary governance institutions or sharecropping status) and asset ownership. Before the migration period, when most aspects of the economy were unmonetized (the first bank in the valley opened in 1975), wealth was measured almost exclusively in two assets, land and livestock. We consider recall data on asset ownership during the baseline period to be accurate because of the continuing importance of these two assets and because they are widely known and easily confirmed by other households. This is a reflection of the social organization of oasis agriculture: different households are aware of other's ownership because their plots are interspersed with one another, customary irrigation managers allocate water based on land ownership, and collective land representatives maintain a historical account of land ownership. Recall data were verified by these third parties in selected communities. Recall histories also documented the full migration experience of current and former household members. A series of questions specifically addressed the Mora recruitment drives in the early 1960s, including who in the household applied, the reasons for not applying, who was not selected and why, who was selected, and who migrated. Finally, detailed data on current asset and income were collected (for the year covering the 2013-2014 agricultural season), including investments (recall histories documented large investments in the past), land acquisition and ownership, occupations and wage income of current household members, enterprise income, current and past remittances and pensions, complete agricultural production data, vehicles owned, and housing or real estate income and investments.

IV. Methods and identification strategy

We seek to estimate the present-day effects of recruitment to work in the French mines sixty years ago. Our main question is whether early international migration—more specifically, being the direct progeny of someone who was recruited by Mora in the 1960s—decreased the chances of being poor, sixty years later. Using cluster analysis twice—once to categorize households as poor and non-poor in the early 1960s and again to categorize the directly-descended household in 2014—we identify the households that moved upward economically over the intervening period. Seemingly-unrelated probit estimation is then used to gauge the degree to which migration facilitated this process. In our two-equation system, the first equation is the present-day outcome (household escaped poverty) as a function of having migrated through the Mora recruitment and 1960s-era variables as covariates. The second equation is migration through Mora recruitment as a function of the excluded variables discussed below. In addition to the impact of migration, we estimate the impact of *application*—whether the household sent any men to stand in line to apply with Mora—using the same method, covariates, and excluded variables. The coefficient on *application* measures the effect of unobservable family characteristics that motivated the decision to send male household members to apply.

Our identification strategy rests on the following: 1) Our anthropological field research shows that the complete outmigration of entire families was rare (i.e. attrition was minimal). 2) We are able to identify post-1960s newcomers to the region and verify that their numbers were few and that they did not differ demographically from the resident population (i.e. what 'dilution' may be present is unlikely to bias our results). 3) The specific circumstances surrounding recruitment into early international migration in the region and the nature of the initial labor sought (unskilled mining work) allow us to argue that the opportunity to migrate in this setting was not only *open* to nearly everyone, but also, with its comparatively higher pay, *attractive* to everyone. Thus men from all walks of life applied and migrated, presenting a situation in which there is likely to be less selection bias to begin with. 4) We are able to categorize households into those that never sought to send a migrant, those that sent someone who was rejected, and those with a member who successfully migrated with Mora. For households in each of these groups, we have pre-migration characteristics as well as present-day characteristics. Thus we can test for selection at two levels: application and migration. 5) Finally, we use seemingly-unrelated probit estimation with excluded variables in the migration equation to estimate the effects of both application and migration in determining the present-day welfare outcomes of households.

Sample selection

A major advantage of the data set is that the Mgoun valley's history and strong cultural identity allows us to consider this randomly chosen, present-day sample of households as representative of households in the early 1960s as well. Fieldwork in the research communities confirmed minimal levels of household attrition from the baseline period, and provided a strong basis on which to develop the sampling strategies and tailor the household survey to capture the local social and economic dynamics prior, during, and—as international migration becomes more difficult—after the migration periods. Fieldwork also established the continued importance of patrilineal and patrilocal households—households formed around a male head of household, assets passed through the male line, pooled resources, and shared living arrangements, with the spouses and children of migrants continuing to stay in the family home while the migrant was away. Migrants recruited in the 1960s were exclusively male and initial waves of migrants left their spouses with their families, with only a minority sending for their families during a period of policy support for reunification in Europe, primarily in the 1980s.

Community surveys revealed a small number of households that left the region entirely. Even when a migrant opted to stay in Europe over the long term, they most often retained their immediate families in Mgoun or retained close enough ties with the household that they continued to remit and were considered an active member of the household at the time of the survey in 2014. Many also retired to Mgoun and rejoined their families. Between the household surveys and the community surveys, we were able to establish degrees of presence: entire households that left (the only group that would be missing entirely from the current sample), migrants who stayed away and took their immediate families but retained ties to their households, migrants who are still abroad but left their immediate families in Mgoun with their

households, migrants who returned to Mgoun and to their households, and migrants who returned to the region but are no longer part of the original households.

Anthropological fieldwork confirmed that even when the migrant and his immediate family did leave the sample, the effects of that migration experience would be captured in the present-day sample through their household members who remain or established their own household at some point during the migrant's absence. There are cases of "shared migrants," one head of household who migrated in the 1960s and whose children established separated households in adulthood. The empirical strategy outlined in the next section details how we accounted for the impact on migration on households that "divided," in local parlance, their assets and created independent households. This strong tendency for the migrating men to maintain close ties with their households and the region allows us to document the effect of migration on the households of virtually everybody who migrated as part of the recruitment drives.

Another way that a present-day sample can misrepresent the 1960's-era population is through immigration of households into the region, or "dilution." Mgoun is not only a migrant sending region, it is a receiving area in that immigrants from more remote or other surrounding areas have moved to the valley, especially around the market town, to take advantage of wage labor opportunities. These immigrant households are all from the surrounding region, meaning that even if they did not originate from the valley itself, they do not differ significantly or in systematic ways from households that were in the sample during the baseline and contemporary periods. The survey sample was selected from all households currently living in the valley even if they moved into the valley after 1960. The same baseline asset, migration, and demographic data were collected on these newcomer households (Mora did recruit in surrounding regions as well), meaning they could be treated the same way in the analysis as households present in the valley before 1960.

Excluded variables

While the specific circumstances surrounding recruitment into early international migration in the region and the nature of the initial labor sought (unskilled mining work) allow us to argue that the opportunity to migrate in this setting was open to nearly everyone, we "instrument" it with a number of variables to address the possibility of endogeneity (more precisely, in the seemingly-unrelated probit estimation, we exclude key variables from the present-day outcome equation). The first such variable is *head age*, or the age of the current household head. This variable indicates where in its lifecycle the household was at the time of recruitment in the early 1960s. An age of 70 or above would indicate the household head was of an eligible age to migrate himself; a younger head of household would be too young to migrate themselves.

The second excluded variable is *men*, the number of adult males in the current household head's household in the benchmark year of 1960 as reported by the current head of household. Félix Mora officially recruited male workers between the ages of 18-30 (Atouf 2011). Age verification

was difficult in this rural context only a few years after independence (1956) brought a more consistent government campaign to issue identity cards. This variable nonetheless indicates whether there were adult males “to spare” in the household; while not all adult males would have been eligible to migrate with Mora, the presence of more than one would indicate a greater likelihood of being able to release a household member for migration. Women were not recruited. Low numbers of adult males would reduce the likelihood of a household sending some to the recruitment site and no males in the household would prevent migration altogether because of the importance of having at least one adult male at this time (and even into the present) to make production decisions, do major agricultural tasks, and otherwise lead the family.

We follow the literature in assuming that location and prior migration experience (i.e. established migration networks) are uncorrelated with unobservable traits (e.g. health, reputation, risk aversion, resourcefulness) that could influence present-day outcomes. For example, Adams and Cuecuecha (2012) use distance to railroad lines and McKenzie et al. (2010) use the distance to labor offices. Our third variable is therefore *isolated*, which takes the value 1 if the household was “close” to the recruitment centers in the benchmark year of 1960 and 0 if the household was distant. This was calculated on the basis of two survey questions asking for the household's place of origin and arrival date in their current location, if they are not native to their community. We considered a location to be close if travel in the early 1960s would have permitted relatively easy access to the recruitment site (within a day by foot, pack animal, and in cases where roads were accessible, motorized transport). Relative distance would impact the probability of migrating by rendering the recruitment center less accessible but was not correlated with income status at this time, as high status pastoralist households may have been isolated from the newer market town where recruitment was focused but still have been relatively well-off at the time.

A fourth variable, *prior experience* takes the unit value if the household had migrants prior to the benchmark year of 1960 and 0 if it did not. Previous experience with migration in this region was focused on well-digging elsewhere in Morocco, military service with the Moroccan royal army or the French colonial services, work in Moroccan mines, or travel to colonial Algeria as paid agricultural labor. While an accepted and commonly known practice, this form of migration was not as systematic, organized, or pervasive as the migration precipitated by Mora's recruitment, and it was primarily focused in Morocco and Algeria. Our “network effect” variable differs from that used, for example, by Taylor and Lopez-Feldman (2012) in that theirs indicates whether anybody *in the same village* had migrated previously. Our variable indicates the presence of a family member who had previously migrated. While *prior experience* was indeed a choice made by the previous generations of the households, we believe that any effect this variable has on present-day outcomes will be strictly through the propensity to migrate with Mora—i.e. it does not violate the exclusion restriction. This is because income from such early migration was much more modest and because households would have made these choices three generations ago.

V. Results

Comparison of Means

For a household to report that an immediate family member (the household head or father of the household head) migrated with Mora, the migrant had to have first applied, and then been selected for work. We can therefore think of that migrant as having received two nested “treatments:” application and selection. The top half of Table 2 shows pre-migration era variable means for households that 1) sent an immediate household member to apply for work versus those that did not (left two columns) and 2) had an immediate household member selected for work versus those with a member who applied but was not selected (right two columns).

A comparison of means suggests that selection into the two treatments was random. More precisely, application and subsequent selection for work both appear to be uncorrelated with (1960s era) household characteristics that are likely to be early indicators of unobservable traits influencing current-day assets and income. One exception is the “government role” variable. Household members selected for work came from families in which more members held local government positions. Mora used his previous connections as a French colonial officer to arrange recruitment drives and it is possible that households with a member in local government were better informed about Mora’s arrival or could otherwise negotiate for privileged consideration. However, oral histories also indicated a countervailing trend—that wealthier households did not feel the need to go—and reports indicated a largely random selection process once basic health and other physical criteria were met.

The ability of household members to apply to Mora—that is, to be aware of recruitment and then present oneself to the recruitment location—is, as expected, negatively correlated with *isolated*. Also as expected, application to Mora is positively correlated with *prior experience*. Additional instruments are the age of the household head, to capture household's point in its life cycle, and the number of working-age males in the household at the time of the recruitment, although these appear not to be correlated with migration or intent to migrate.

As a further check as to the randomness of application process, when a household reported that no household members applied for work, we asked about the primary reason why. As Table 3 shows, approximately half of the given responses imply that households that did not send anyone did not do so for idiosyncratic reasons. Most common among these responses are the household not having any working age men (“lifecycle of the household”), being unaware of recruitment, and being unable to apply because the household's working age men were traveling outside the region at the time. Still, the remainder of the given responses raises the possibility of non-random selection into the “application” treatment. These responses include household members not wanting to apply and households having insufficient financial means to apply. Though there were no fees associated with Mora’s recruitment, respondents spoke about not being able to spare any household labor—even with the prospect of high salaries, their survival depended on the presence of the potential migrant. They would also have to bear the cost of transportation to the recruitment site and the point of departure to France, which may have been too much for

some households to bear. It is possible that the abovementioned two responses are correlated with risk aversion and/or (unobservable) poverty, which may be translated inter-generationally, influencing present-day outcomes.

We asked the same question for households that applied to but were then rejected by Mora. While many present-day household heads did not know why they themselves or (their fathers) were rejected for work, 41% of the households with rejected members did. The given reasons are all related to health/physique, with lack of stature being the single most common response. This, too, corroborates our belief that Mora recruited workers irrespective of household status within communities, provided that the applicant could manage to present himself to the recruitment center, and be of adequate health and stature.

The lower half of Table 2 summarizes the means of *present-day characteristics* of 1) households that sent an applicant versus those that did not and 2) households in which the household head or past household head migrated with Mora versus those with no migrants. Comparison of the two sets of means suggests that selection for work did indeed influence present-day characteristics (conditional on the household having sent an applicant), but that there also may have been some selection on unobservable characteristics into the applicant (“applied to Mora”) pool.

A comparison of the “applied” group to the “did not apply” group suggests that certain unobservable characteristics may have made some households more likely to send men to apply for migration. The present-day families of the men who lined up for work in the mines have, on average, fewer sheep and goats, more vehicles, more international and domestic past migrants (members who migrated domestically and then returned or passed away), greater wage income and greater domestic remittances when compared to those that did not send any men to stand in line. These differences may indicate that the households that sent men to apply were more focused on sedentary agriculture, as was true of communities centered around the market towns; if they were in subordinate patron-client relationships—a common feature of the highly unequal social hierarchies of the time—they may have been more open to leaving as migrants than pastoralists, whose livelihood was relatively high status.

A comparison of the “selected” group to the “applied but rejected” group implies that, conditional on application, households that sent a migrant have more members with professional/vocational training, had fewer domestic past migrants (to be expected, since they already had a migrant in the household and did not need to migrate domestically), have higher gross business earnings, have higher gross crop income, and receive less remittances from domestic migrants. Finally, these households also had more past international migrants, but this is to be expected, as past international migrants include the migrants recruited by Mora. The means also suggest that the households of the migrants own more land, vehicles, businesses, and receive more pensions, although these means are not significantly different at the 5% level. Migration therefore appears to have eased cash constraints and allowed households to invest in more lucrative activities as the valley’s economy became more thoroughly integrated into the

national and international economies. While overall educational levels are still relatively low, international migrant households are able to pursue professional or vocational training to enable members to move into the skilled trades and transport sector. They are able to open businesses that require large capital outlays; remittances are particularly important here because of continued cultural injunctions against the use of formal credit. Finally, they make capital and other investments in agriculture that result in higher gross crop income.

Cluster analysis and seemingly-unrelated probit estimation

The above-mentioned comparisons of means suggest that households may have self-selected into migration, but even conditional on this potential self-selection, the migration treatment itself had lasting, statistically significant, positive effects on present-day outcomes, especially in terms of assets. We now turn to formally testing this hypothesis. We estimate the likelihood of a household leaving poverty based on various pre-migration era characteristics, chief among them whether the household had an immediate household member selected to work in the mines. Doing so first requires the categorization of households into rich or poor in both the past (1960s) and the present (2014). We do this using cluster analysis on key assets in both periods as seen in table 4. To determine a household's past status, we focused on a few major assets that all households can reasonably be expected to remember: land, livestock, political connections, and whether the head of household at the time was a sharecropper. While we also collected recall data on education, access to communal lands, and whether the household had land rights in their community, we decided against using these in the cluster analysis, as the levels of these assets varied little within the sample.

We find that categorizing households into four (1960s-era) groups results in the lowest within-group variation and generates clusters that are consistent with our anthropological interviews. As seen in Table 5, among these four 1960s-era clusters, one large cluster clearly comprises abjectly poor households: Households in cluster 3, comprising 64% of the sample, had, on average, 7.50 acher (an acher is the local unit of land measurement, equal to .025 hectares) of land, compared to the sample mean of 18.09 acher; had 5.41 head of sheep or goats, compared to 42.84; did more sharecrop work, 17% of households as opposed to 13%; and held very few governmental positions, 2%, compared to 8%. Despite being such a large group, the means of all four clustering variables for this group differ significantly from the means taken over the remainder of the sample.

To categorize households as poor or non-poor in the present day, we again use cluster analysis, but with an expanded list of assets: land, livestock, middle-school education, trees (fig, almond, and date), and vehicles (see Table 6). We rely on more clustering variables because we recognize that households have diversified their livelihood portfolios considerably in the past sixty years, and because we do not have to rely on the recollections of the interviewees for these data (i.e. the data quality is better for more assets). We find that the optimal number of clusters is five. Again, one cluster stands out in terms of its households having low levels of all clustering assets.

Households in cluster 1 have, on average, 4.65 acher of land, compared to the sample mean of 10.89 acher; 4.29 small animals, compared to 5.88; 0.65 household members completing middle school, compared to 0.83; 3.62 trees, compared to 15.07; and 0.12 vehicles, compared to 0.18. A t-test comparing the mean asset levels of households in this cluster to those in the remaining clusters confirms that membership in this cluster is a meaningful indicator of present-day asset poverty.

Assets, however, are simply the means to generate income (and, ultimately, wellbeing). Given a judicious mix of clustering asset variables, we expect that income data will show that the “asset poor” show lower income levels as well. The bottom half of Table 4 shows, by cluster, the means of major income measures. Mean wages, remittances, and gross business income are indeed lower for the asset-poor group; one exception, however, is the total agricultural income. The income data suggest another potential group of poor households--those in cluster 3. These households have significant landownership (a mean of 14.48 acher) but their income by all measures is low. Fieldwork indicates that these households may own land but have labor shortages or inadequate capital to work the land. Because there are strong cultural injunctions against selling land, even when a household is not able to work it, those households are usually going to leave the land uncultivated rather than sell it; they may entrust it to a sharecropper.

Once households are classified as poor and non-poor for both periods, we estimate a system of seemingly-unrelated probit equations to ascertain the impact of migration. Recall that the first equation predicts the present-day poverty outcome as a function of migration with Mora. We use two variants of the outcome: the household escaped poverty (this variable takes the unit value if the household was categorized as poor in the 1960s but is now categorized in one of the four (contemporary) non-poor categories) and the household is currently non-poor (i.e. the household is now categorized in one of the four (contemporary) non-poor categories, regardless of initial status). The second equation estimates the likelihood of migration with Mora as a function of the excluded variables discussed above. In addition to the impact of migration, we estimate the impact of *application* to migrate using the same method.

By estimating the effect of *selection* and *application* over select subsets of the sample, we can estimate subtly different things. Specifications 1 and 5 in Table 7 show the effect of *application* (which, in some cases, resulted in *selection* of the household as well) for the entire sample. As expected, the effect of applying to migrate is positive, and significantly so (1% level). This is unsurprising, however, because the specification mixes up the effect of successful application (i.e. migration) with application only (rejection). By restricting the sample to the households of men who were never selected by Mora, either because they never applied, or because they applied and were subsequently rejected, we can quantify the effect of simply “heeding Mora's call.” Interestingly, our estimates of this “simple application effect” are also significantly positive.

Specifications 3 and 7 show the effect of selection by Mora, or migration, for the entire sample. The estimated effect presumably comprises the effect of the migration experience and the resultant streams of remittances and pensions. Estimates of this effect are, as expected, positive, and significantly so (1% level) where the outcome variable is “presently non-poor.” However, these estimates likely capture the “simple application effect” as well, which appears to be significant in its own right. Thus our final specifications, 4 and 8, estimate the effect of migration conditional on application by restricting the sample to households that applied. The result is the pure effect of migration (conditional on application). Despite the small size of the subsamples, estimates of this pure migration effect are significantly positive (1% level).

Combined, these results suggest three things. First, that selection by Mora of a household head or the father of the household makes a household significantly more likely to be non-poor in the current period. Second, some of the migration effect may be attributed to characteristics that allowed a household to send men to apply, or to the act of application itself. This can be seen from the highly significant coefficients on “applied.” Third, based on the statistics for the Wald tests of exogeneity, there appears to have been systematic selection into migration (both by the households themselves—i.e. self-selection—and by Mora), underscoring the importance of using excluded variables to identify the causal effect of both migration and application to migrate. However, if we restrict the analysis to households that were abjectly poor in the 1960s, the exogeneity of migration cannot be ruled out.

VI. Conclusions

This study estimates the effect of a specific international migration event in southern Morocco—recruitment to work in the French mines in the early 1960s—on the economic mobility of sending households over the subsequent sixty-year period. Estimation is facilitated by the open and quasi-random nature of the recruitment process, the strong cultural identity of the sending region, patrilineal inheritance practices, and the availability of recall data on assets extending back to the early 1960s. We argue that, combined, these factors reduce the potential bias—from both sample selection and self-selection into migration—of our estimates. Furthermore, our data permit the classification of households not just into “migrant-sending” and “non-migrant sending,” but into those that never intended to send a migrant, those that intended to send a migrant, those whose applicant was rejected, and those that successfully sent a migrant. Having the two binary categories—application and selection for migration—permits us to separately estimate the effect of application by itself, in addition to that for migration.

We use a system of seemingly-unrelated probit equations in which the first equation predicts whether the household escaped poverty as a function of migration (application) and the second equation predicts whether the household sent a male member to migrate (apply). Categorization of households into poor and non-poor in the 1960s and in the current period is based on cluster analysis of basic asset data. Our data confirm that that the recruitment drives did indeed attract a

wide and varied swathe of society; however our estimation results strongly suggest that there was systematic selection into migration, both by the households themselves and by the labor recruiter. Controlling for this selection, we still find that migration significantly increased the likelihood that the family's current-day progeny would presently be non-poor. Surprisingly, we also find that the simple act of applying to migrate also has a similar effect. However, if we restrict ourselves to the half of the sample whose households (in the 1960s) were abjectly poor, successful recruitment could well have been exogenous. For these households, migration to work in the French mines is, by far, the strongest predictor of escaping poverty.

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Table 1: Reasons for rejection for men who applied to immigrate to France

Reasons for rejection	Frequency	Percent
Do not know	8	27%
Vision problems	3	10%
Health problems	1	3%
Too short	11	37%
Too weak	5	17%
Weight too low	2	7%
Total	30	100%

Table 2: Comparison of means: applied to immigrate and selected for immigration

<i>Households</i>	Applied to Mora		Selected for work	
	No	Yes	No	Yes
	227	79	54	25
Pre-migration characteristics				
Owned land (acher)	17.42	19.99	19.89	20.20
Sheep and goats	38.63	54.60	67.07	26.54
Head education level	3.12	5.11 *	5.78	3.68
Head held governance role	0.09	0.04	0.00	0.12 *
Native to area	0.69	0.76	0.72	0.84
Access to communal land	0.80	0.88	0.84	0.95
Head was sharecropper	0.13	0.11	0.15	0.04
Migration instruments				
Head age	52.49	54.22	55.17	52.16
Number of men aged 15-60	3.11	3.03	3.11	2.83
Previous migrant in family	0.08	0.22 *	0.17	0.32
Located in remote area	0.27	0.14 *	0.15	0.12
Present-day characteristics				
Household size	7.15	6.19 *	6.13	6.32
Members completing sec. school	0.79	0.96	0.94	1.00
Members with formal training	0.61	0.71	0.65	0.84 *
Owned land (acher)	10.99	10.60	9.88	12.14
Sheep and goats	6.47	4.18 *	4.04	4.48
Trees (fig, almond, date)	13.74	18.89	19.41	17.76
Owns vehicle	0.15	0.27 *	0.24	0.32
Owns business	0.12	0.11	0.09	0.16
Past migrants (domestic)	0.33	0.49 *	0.59	0.28 *
Past migrants (international)	0.06	0.15 *	0.07	0.32 *
Current migrants (domestic)	0.87	0.80	0.94	0.48 *
Current migrants (international)	0.12	0.20	0.15	0.32
Income 2013-2014				
Gross business income	15,912	43,658	3,778	129,800 *
Value of agricultural production	64,758	63,934	17,616	163,981 *
Wage income	47,287	74,574 *	83,545	55,196
Remittances (domestic)	4,596	7,060 *	8,940	3,000 *
Remittances (international)	1,361	2,177	1,611	3,400
Pensions	1,985	4,038	3,056	6,160
* mean differs at 5% level using one-tailed test.				

Table 3: Reasons for not applying to migrate

Reasons for not applying	Frequency	Percentage
High status—did not need to go	1	1%
Husband had died (for female headed household)	1	1%
Pastoralist—on the range	3	2%
Hostility to France	3	2%
Already employed	4	2%
Does not know about this period	17	9%
Unaware of recruitment	28	15%
Traveling at time of recruitment	24	13%
Lifecycle of the household (no adult males to spare)	28	15%
Did not want to go	34	18%
No financial means	49	26%
Total	192	100%

Table 4: Clusters based on pre-migration (1960s) characteristics

<i>Households</i>	Sample	Cluster 1	Cluster 2	Cluster 3 “asset poor”	Cluster 4
	306	54	14	196	28
Landholding	18.09	47.67 **	34.79 **	7.50 **	23.89 **
Livestock	42.84	13.61 *	326.14 **	5.41 **	157.79
Father sharecropper	0.13	0.06 *	0.07	0.17 **	0.04
Father in government	0.08	0.28 **	0.00	0.02 **	0.14
* indicates difference in mean w.r.t. rest of sample, 5% significance ** indicates difference in means w.r.t. rest of sample, 1% significance					

Table 5: Clusters based on present-day (2013/2014) characteristics

<i>Households</i>	Sample	Cluster 1 “asset and income poor”	Cluster 2	Cluster 3 “income poor”	Cluster 4	Cluster 5
	306	190	2	29	81	4
Clustering variables						
Landholding	10.89	4.65 **	50.60 **	14.48	16.59 **	146.00 **
Livestock	5.88	4.29 **	14.50	10.86 **	7.01	17.75 *

Middle school education	0.83	0.65 **	1.50	0.83	1.25 **	1.00
Trees	15.07	3.62 **	326.00 **	52.72 **	20.44 *	21.25
Vehicle ownership	0.18	0.12 **	1.00 **	0.34 **	0.22	0.50 *
Income variables						
Wage income	54,332	42,663 **	48,650	49,947	84,320 **	36,000
Total remittances	6,804	5,888 *	5,000	11,369 *	7,144	11,250
Gross agricultural income	64,545	71,642	115,725	23,813	61,105	66,851
Gross business income	23,052	14,589	0	15,483	27,852	400,000 **

Table 6: Seemingly-Unrelated Probit Estimation

Outcome variable	(1)		(2)		(3)		(4)	
	baseline poor (all) N=185		Leaving poverty baseline poor (never applied/ rejected) N=169		baseline poor (all) N=185		baseline poor (applied) N=49	
Application for migration	1.411	***	1.566	*				
Selection for migration	(0.445)		(0.944)		1.284		1.494	***
Sharecropper	-0.085		0.038		(0.898)		(0.444)	
Land	(0.298)		(0.332)		0.031		-0.660	
Livestock	-0.003		0.001		(0.305)		(0.765)	
Governance role	0.017	*	0.025	**	0.017	*	-0.001	
Native	(0.009)		(0.010)		(0.010)		(0.026)	
Constant	0.207		0.163		0.017			
	(0.723)		(0.741)		(0.732)			
	-0.215		-0.126		-0.160		-0.347	
	(0.201)		(0.210)		(0.215)		(0.462)	
	-0.740	***	-0.850	***	-0.726	**	-0.220	
	(0.212)		(0.289)		(0.218)		(0.538)	
Endogenous variable	Application		Application		Selection		Selection	
Isolated	-0.139		-0.325		0.055		-0.489	
Men	(0.478)		(0.556)		(0.622)		(1.670)	
Isolated X men	-0.026		-0.048		0.019		-0.075	
Head age	(0.066)		(0.095)		(0.078)		(0.190)	
Prior experience	-0.055		-0.014		-0.075		0.137	
Sharecropper	(0.129)		(0.148)		(0.165)		(0.444)	
Land	0.006		0.009		0.007		0.008	
Livestock	(0.007)		(0.011)		(0.010)		(0.014)	
Governance role	0.740	***	0.595	**	0.911	***	0.821	**
Native	(0.260)		(0.297)		(0.317)		(0.377)	
Constant	0.182		0.367		-0.425		-0.899	*
	(0.342)		(0.428)		(0.509)		(0.536)	
	0.037	**	0.041		0.005		-0.025	
	(0.018)		(0.026)		(0.024)		(0.029)	
	-0.004		-0.004		0.003		0.019	
	(0.009)		(0.007)		(0.014)		(0.032)	
	-5.900	***	-8.061	***	-4.333	***		
	(0.233)		(0.290)		(0.250)			
	0.323		0.319		0.348		0.320	
	(0.236)		(0.241)		(0.352)		(0.550)	
	-1.440	***	-1.742		-2.223	**	-0.810	
	(0.519)		(0.486)		(0.959)		(1.311)	
"rho" (ath rho)	-0.827	*	-1.098		-0.503		-1.677	
	0.469		1.444		0.539		2.385	
Wald test stat., rho=0	3.109		0.578		0.873		0.494	
p-value	0.078		0.447		0.350		0.311	

Robust standard errors in parentheses.

Table 6, continued

Outcome variable	(5)	(6)		(7)	(8)			
	entire sample (all) N=283	Being non-poor entire sample (never applied / rejected) N=259		entire sample (all) N=283	entire sample (applied) N=77			
Subsample size	N=283		N=259	N=283		N=77		
Application for migration	1.480 (0.256)	***	1.853 (0.124)	***				
Selection for migration				1.398 (0.448)	***	1.265 (0.197)	***	
Sharecropper	-0.073 (0.237)		-0.090 (0.231)	-0.037 (0.245)		-0.381 (0.518)		
Land	0.010 (0.005)	*	0.011 (0.004)	**	0.013 (0.005)	***	0.006 (0.009)	
Livestock	-0.000 (0.001)		-0.000 (0.001)		0.000 (0.001)		-0.000 (0.001)	
Governance role	0.580 (0.295)	**	0.767 (0.326)	**	0.192 (0.287)		-0.786 (0.856)	
Native	-0.224 (0.174)		-0.229 (0.175)		-0.148 (0.182)		-0.057 (0.331)	
Constant	-0.681 (0.152)	***	-0.650 (0.151)	***	-0.532 (0.158)	***	-0.403 (0.322)	
Endogenous variable	Application		Application		Selection		Selection	
Isolated	-0.312 (0.381)		-0.226 (0.338)		-0.580 (0.545)		-0.425 (0.862)	
Men	-0.040 (0.047)		-0.045 (0.062)		-0.103 (0.068)		-0.110 (0.090)	
Isolated X men	-0.052 (0.108)		-0.032 (0.085)		0.067 (0.163)		0.097 (0.253)	
Head age	0.009 (0.005)		0.010 (0.004)	**	0.003 (0.008)		0.002 (0.008)	
Prior experience	0.677 (0.222)	***	0.399 (0.212)	*	0.891 (0.249)	***	0.695 (0.214)	
Sharecropper	-0.028 (0.265)		0.016 (0.255)		-0.539 (0.458)		-0.784 (0.655)	
Land	-0.000 (0.004)		-0.000 (0.006)		-0.008 (0.006)		-0.030 (0.012)	***
Livestock	0.001 (0.001)		0.001 (0.001)		-0.001 (0.001)		-0.000 (0.001)	
Governance role	-0.563 (0.378)		-7.920 (0.201)	***	0.565 (0.380)		8.693 (0.308)	**
Native	0.248 (0.196)		0.185 (0.186)		0.316 (0.290)		0.424 (0.409)	
Constant	-1.091 (0.350)	***	-1.300 (0.306)	***	-1.397 (0.561)	**	-0.259 (0.552)	***
"rho" (ath rho)	-1.070 0.416	***	-20.211 1.674	***	-0.855 0.349	**	-15.450 3.40	***
Wald test stat., rho=0 p-value	6.607 0.010		145.721 0.000		5.986 0.014		20.571 0.000	