THESIS / THÈSE

DOCTOR OF ECONOMICS AND BUSINESS MANAGEMENT

Migration and Bequest Decisions
Theory and Evidence from the Bolivian Altiplano

Michels, Anne

Award date:
2019

Awarding institution:
University of Namur

University of Namur

Faculty of Economics, Social Sciences and Business Administration
Department of Economics

Migration and Bequest Decisions: Theory and Evidence from the Bolivian Altiplano

A Thesis submitted in fulfilment of the requirements for the degree of Doctor in Economics and Business Management

Anne Michels

September 2019

Supervisor of the Thesis:
Jean-Philippe Platteau (University of Namur)

Composition of the Jury:
Prof. François Bourguignon (Paris School of Economics)
Prof. Steven Durlauf (University of Chicago)
Prof. Jean-Marie Baland (University of Namur)
Prof. Catherine Guirkinger (University of Namur)

President of the Jury:
Prof. Mathias Hungerbühler (University of Namur)

Rempart de la Vierge, 13
B- 5000 Namur (Belgique)

Imprimé en Belgique
ISBN : 978-2-39029-077-3
Dépôt légal: D/2019/1881/28

Remerciements

Je voudrais tout d'abord remercier Jean-Philippe Platteau mon directeur de thèse pour avoir partagé avec moi sa passion illimitée pour l'économie et la politique mais aussi pour la peinture et la musique classique. Son expérience, son intelligence et sa brillante intuition m'ont guidé tout au long de cette thèse. Sans son amitié, sa patience et son support indéfectible celle-ci n'aurait jamais été possible.

Je tiens aussi à remercier Vincenzo Verardi et Marjorie Gassner pour leur rôle de mentor et leur soutien. Vincenzo m'a non seulement fait redécouvrir et aimer l'économétrie mais il m'a aussi fait découvrir la Bolivie, son pays de cœur. Marjorie m'a communiqué son amour pour l'enseignement et c'est certainement elle qui a le plus influencée ma manière d'expliquer et de transmettre des idées. Je remercie également Juan Antonio Morales qui m'a accueilli en Bolivie, m'a guidé et m'a conseillé tout au long de ma thèse.

Je souhaiterais aussi exprimer ma gratitude à deux de mes collègues qui sont également des amis très chers, Zaki Wahhaj et Renate Hartwig, qui m'ont fait part de leurs grandes connaissances et m'ont permis à un moment critique de voir mon travail sous un autre angle. Nos conversations stimulantes m'ont beaucoup apporté et sans votre amitié et vos encouragements je n'y serais certainement pas arrivés.

J'adresse tous mes remerciements à Jean-Marie Baland, François Bourguignon , Steven Durlauf et Catherine Guirkinger pour l'honneur qu'ils m'ont fait d'être dans mon jury de thèse. Malgré leur emploi du temps chargé ils ont pris le temps de lire ma thèse et d'en discuter avec moi. Leurs commentaires intelligents et toujours très constructifs m'ont permis de fortement améliorer cette thèse. Je remercie aussi Mathias Hungerbühler pour avoir non seulement accépté de prendre la présidence du comité de thèse mais aussi pour m'avoir aidé quand j'étais perdue dans les méandres de la théorie microéconomique.

J'exprime ma gratitude à Guilhem Cassan et Kaivan Munshi pour leurs conseils avisés et pour avoir partagé avec moi leur grande expertise.

Cette thèse n'aurait pas été possible sans mes enquêteurs Boliviens qui ont souvent travaillé dans des conditions très difficiles mais qui y ont mis tout leur cœur et et à qui je dois tout. Merci aux enquêtés qui ont répondu patiemment à mes questionnaires, qui m'ont accueilli parmi eux et qui ont accepté de nous dévoiler une partie de leur vie.

Toute au long de ma formation j'ai eu la chance de pouvoir encadrer les travaux pratiques de Markus Dejardin, Mathias Dewatripont, Marjorie Gassner, Jean-Yves Gnabo, Vincent Frogneux, Christel Lecourt, Noel Nizette et Christian Valenduc. Je leurs suis très reconnaissante pour la confiance qu'ils ont placé en moi. Enseigner à été une très belle expérience et j'ai beaucoup appris au contact des étudiants. Je voudrais aussi remercier les membres du département Faseg et tout particulièrement Marcus Dejardin, Christelle Lecourt, Eric Toulemonde, Denise Van Dam et Florence Art pour leur gentillesse et leur soutien.

J'ai aussi eu l'énorme privilège de faire ma thèse au sein du CRED qui est bien plus qu'un centre de recherche stimulant et dynamique. Ainsi, beaucoup de mes collègues sont devenus des amis et je voudrais tous les remercier pour tout ce qu'ils ont fait pour moi tout au long de cette thèse. Il m'est malheureusement impossible de les citer tous mais j'aimerais toutefois exprimer un mot particulier pour quelques-uns d'entre eux. Merci Tatiana de m'avoir ouvert la voie, à Imane pour ton amitié indéfectible et pour m'avoir fait découvrir le Maroc, à Stephanie pour ton support sans faille dans les moments difficiles, à Lore pour ton énergie, à François pour ta gentillesse, à Jérémie pour ton idéalisme et ta vision du monde, à Thi Minh pour nos discussions passionnantes, à Vincent S. pour nos longs dîners, à Vincent F. pour nos conversations sur l'université, à Nicolas D. pour ton optimisme, à Maëlys pour ton humour, à Wouter pour ton support calme et réfléchi, à Giulia pour ton intégrité et ta clairvoyance, à Petros pour ton enthousiasme, à Joaquin pour ta sympathie, à Fabienne pour ton dynamisme, à Mirone pour ta capacité à te révolter face aux injustices, à Simone pour ton anarchisme positif, à Paolo pour ta bonne humeur et ta bénévolance, à Rinchan pour nos discussions intenses sur l'état du monde, à Christian pour ta bienveillance et à Paola pour nos conversations intéressantes. J'aimerais aussi remercier Rohini pour ses encouragements et son écoute. Finalement, je tiens à remercier tout particulièrement Pierrette qui s'investit sans limite pour les membres de la faculté.

Pendant la réalisation de cette thèse j'ai pu aussi compter sur le soutien sans faille de mes amis. Dunja, ohne deine Unterstützung, deinen Ansporn, und deinen Glauben an mich hätte ich diese These niemals geschrieben. Sonja, ohne deine Freundschaft, deine Loyalität und deine Hilfe wäre ich überhaupt nicht auf die Universität gegangen. Merci Denis, Joëlle, Nicolas et Jonathan pour m'avoir accompagné et guidé dans mes premiers pas dans la recherche et pour les belles années passées ensemble à l'Ulb. Merci, Sibylle, Cécile, Christophe et Fidelma de vous être occupés de Garance afin que je puisse travailler sur la thèse.

Pour terminer, j'aimerais remercier ma famille. Mes parents, qui m'ont transmis leur conscience politique, leurs valeurs d'entre-aide et leur passion pour les cultures étrangères ce qui m'a certainement amené vers l'économie du développement. Mama, merci d'avoir gardé Garance quand je n'arrivais pas à la mettre à la crèche, merci de m'avoir transmis tes valeurs féministes et d'avoir partagé avec moi ton amour pour l'art. Papa, merci de m'avoir donné confiance en moi, d'avoir initié mon amour pour les livres et de m'avoir aidé avec la maison. Je remercie également Alfred pour son support infaillible et nos débats sur la politique et Marie-Louise, pour son honnête et son exigence de rigueur. Merci aussi à mes frères et sœurs, Peter, Sabrina, Frederic, Samuel, Sarah, Julia, Louisa et particulièrement à mes deux petits, Losang et Yeshe. Losang, ma petite soeur intelligente, forte et attentionnée qui m'a été d'un support moral inestimable et Yeshe mon petit frère érudit, curieux et bienveillant qui s'est beaucoup occupé de Garance et avec qui j'ai eu des longues conversations sur le monde académique. Mes beaux-parents, Viviane et Francis, m'ont aussi toujours soutenu et beaucoup aidé dans la gestion quotidienne. Savoir que Garance était auprès d'eux, heureuse et épanouie, m'a permis de travailler avec la tête libre. Je leur en suis très reconnaissante.

Je souhaite exprimer mes derniers remerciements à Webster et à Garance, sans votre amour et votre soutien je n'y serais jamais arrivé. Merci Webs, pour ton énergie, ton enthousiasme, ton soutien moral, tes encouragements et ton aide quotidienne. Merci d'avoir partagé avec moi les moments de bonheur comme de stress intense, d'être venu en Bolivie, d'avoir lu mes articles - au moins une dizaine de fois - et de m'avoir remplacé auprès de Garance. Garance, mon amour, le soleil de ma vie qui m'apporte tellement que je ne sais pas l'exprimer en mot.

J'aimerais dédier cette thèse à mes deux grands-mères: Căcilia Bertha et Maria Michels, deux femmes extraordinaires qui n'ont pas pu aller longtemps l'école mais qui font parties des personnes les plus éduquées que je connaisse.

Contents

Introduction

This thesis focuses on the links between migrants and their communities of origin in a context of rural-urban migration. Permanent migration is one of the key aspects of modern growth and economic development and there are today about 740 million internal migrants in the world. However, leaving one's community does not automatically imply severing all links with its members. Most migrants keep strong ties with their family members who stayed behind and remit a substantial part of their income to their communities of origin. These remittances tend to be particularly directed to poor households in a context of domestic migration where they finance a significant and often crucial share of household consumption expenditures. While many migrants may send remittances out of altruistic motivations, maintaining their land rights and thus their community membership might also be an important incentive. Migrants work mostly in the informal sector implying that they have no contract and very low job security. In this environment of high uncertainty, being able to return to their communities may be an important fall-back option. Granting the migrants' land access might however not be beneficial to non migrant family and community members. Are migrants interested in maintaining their land rights? When do communities allow migrants to hold land? Is land inheritance conditional on remittances? Is there a link between the bequest and the migration decision? Are remittances affected by the size of family and community networks at migration destination? Do these latter enforce remittances sent to the communities of origin? These are some of the questions addressed in the three chapters of the thesis. Answering them is crucial if one wants to understand the determinants of migration and the effect of migration on the communities of origin.

To study the links between the migrants and their communities of origin we collected original data in the Bolivian Highlands at both sides of the migration link, at the level of the migrants and the level of the communities of origin. First, we investigated around 450 households residing in eight different Andean (Aymara and Quechua) communities of the Bolivian Altiplano. The sample size might appear very small but these communities are very closed and are particularly mistrustful of outsiders. For each community, it took us several months of discussions with the authorities to get the authorization to conduct the survey and for some of them the permission was only granted after we provided a letter from the bishop of La Paz. A year later, we surveyed the migrant children who were declared as living in La Paz/El Alto by the rural households. Tracing the migrants proved to be an extremely difficult task because the family members living in the communities of origin almost never knew the address of their migrant children. Moreover, due to its rapid expansion, most streets in El Alto do not possess a name and house numbers are randomly attributed making it even more difficult to locate someone. We had thus to rely in most cases on hand drawings from family members to trace back the migrants. Because of the difficulties associated to the collection of data from both sides of the migration process there are to my knowledge only a very limited number of studies doing this.

Yet, gathering data from both actors of the migration and inheritance process proved to be crucial since significant divergences emerged between the answers provided by the parents and their migrant children. Indeed, answers depend on the respondent's understanding of the situation and the role each actor played in the decision. In particular, parents and migrants might have different interpretations of their respective roles in the decision making process. Furthermore, their answers may be subject to important respondent biases. Parents and migrants might respectively be tempted to modify the reporting of their role depending on the relative success of the migration experience for example. More importantly, in traditional patriarchal societies, it may be difficult to admit that a child migrated against the will of the father or rejected the land bequeathed by the father, therefore prompting the parents to overstate their weight in the decision. Also, parents may not easily confess that they sent their child away against his/her own will or that they deprived him/her of the possibility to return to the community, thus leading them to understate of their role. On the other hand, migrant children who did not inherit or do not expect it may feel ashamed and pretend to have no interest in the family land. These problems can be partly overcome by the design of the questionnaire but unfortunately not fully. On many crucial points the answers of the parents and the migrant children diverged and if we had relied on the answers of only one of the actors we would have gotten a distorted picture of the reality. While the divergences themselves were very informative and allowed us to identify interesting mechanisms we had also to ascertain whose answers are closest to the truth. In the instances where we were not able to establish this directly we relied on information from a third party exterior to the decision making process, the siblings of the migrant living in the city.

The existence of important divergences raises a crucial question concerning the reliability of answers provided by interviewees concerning their role in decisions, such as for example women's decision making power within their household. The answers obtained are indeed only very rarely crosschecked with other people with a stake in the decision. Furthermore, we know of no other study where a third person, well informed but with no clear stake in the assessment, was interviewed to confirm whose answers are reliable. This lightness with the data contrasts with the rigor required in identification and robustness test and is potentially very problematic. To avoid fallacies resulting from systematically biased answers, parties with different and opposite stakes in the investigated decisions together with third party observers should be interviewed. The disadvantage is that this method, although much more reliable, is costly. But high costs are currently justified when the issue is identification, and strong identification is misleading if the "data" problem is not overcome in an effective manner.

The outline of this thesis is the following: in the first chapter, we study the relationship between the migration and the inheritance decision at the level of the family. Based on the empirical material collected in the Bolivian Altiplano we propose a theoretical framework that is explicitly based on the interlinking of these two decisions. In our set up, such as in the strategic bequest theory, access to inheritance is conditioned on the fulfillment of remittance or care obligations. Yet, in our model these obligations are not only used by the parents as an instrument to extract care but also to prompt a child to migrate or to stay on the family farm. An interesting implication, which is confirmed by our data, is that once we take into account the migration decision the exchange mechanism is not applied anymore to all children. On the one hand, children who were coaxed to migrate by their parents do not have to fulfill care obligations to inherit land. On the other hand, children who have migrated against the will of their parents, in the same way as those who have left with their support, have to abide by their duties to inherit. Another interesting feature, which is also present in our data, lies in the possibility that a child rejects a bequest to which he/she is entitled to, and this rejection is not determined by the (excessive level of) care obligations set by the parents.

In the second chapter, we analyze the role of family and community networks in the remittance decision. We show that contrary to what is generally assumed in the social science literature, the threat of exclusion from community and family based migrant networks at migration destination does not act as an enforcement device for remittances. We find that the migrants who are the most dependent on family and community based networks in the city are also those who remit the least. Family networks at migration destination prove to be particularly detrimental. Important sharing pressure from their wider kinship network, including their network within the city, prevent migrants from remitting to their parents the amount they would choose to send out of altruism. Furthermore, migrants underreport their earnings to avoid demands from their wider kinship network with the objective to increase transfers to their close family.

The last chapter has been triggered by the observation that poor and unsuccessful migrant children have a higher probability to voluntarily forego their land inheritance rights in communities with corporate landownership rights. In these communities land access is conditional on the fulfillment of community duties which can be particularly difficult to satisfy for poor migrants. In a context migration, communities face indeed a two-pronged dilemma. On the one hand, they want to encourage migration and extract the highest possible tax from migrants to finance the largest possible amount of public good. On the other hand, the imposition of heavier taxes might dissuade some migrants from keeping their land access rights and ultimately from migrating if they anticipate that safeguarding their land access rights will be more difficult. This latter effect trough migration will not only decrease the amount of public good available but will also increase land pressure within the community. Based on a theoretical model we show that the exclusive outcome, where poor migrants are prevented from maintaining their land access rights, is more likely when urban growth is unaccompanied by rural development and when there are large income inequalities on the urban labour market.

Chapter 1

Interdependence between Migration and Partible Inheritance: Theory and Evidence from Bolivia

Anne Michels[1]

Abstract

There is a significant economic literature dealing with the issues of migration and inheritance separately. Yet, no work systematically addresses the two issues simultaneously. This paper is a first attempt to bridge that gap by looking at how the bequest decision is affected by the migration decision, and vice-versa. Based on first-hand data collected in the Bolivian Altiplano, a society dominated by norms of partible inheritance, we argue that the interlinking between migration and bequest decisions does matter, and we propose a formal model that explicitly takes this link into account. We analyze a variety of equilibrium outcomes covering all possible contexts within which migration decisions are taken. In particular, we show that the exchange mechanism that underlies the strategic bequest theory -care for parents is exchanged against access to bequest- is not applied to children who were coaxed to migrate by their parents. On the other hand, children who have migrated against the will of their parents, in the same way as those who have left with their support, can inherit if they have made transfers to them. Empirical relationships emerging from the Altiplano data confirm the existence of these equilibria.

Keywords: Family, Land Access, Inheritance, Migration

JEL classification: D10; D86; O12; O15; Q15

[1]The author thanks the participants of the UNU-WIDER project meeting on 'Land Inequality and Decentralized Governance in LDCs' for their helpful comments and suggestions. In particular my gratitude goes to Jean-Philippe Platteau, Catherine Guirkinger, Dilip Mookherjee, Pranab Bardhan, Elisabeth Sadoulet, Alain de Janvry, Maitreesh Ghatak, Sylvie Lambert and Juan Antonio Morales.

1 Introduction

Permanent migration is a key aspect of modern growth and development. It does not imply the severing of all links with the village of origin, in particular, migrants may be interested in maintaining their right to inherit family land and consequently remain members of their native community. We cannot rule out the possibility that the inheritance and the migration decisions are actually interrelated. This is mostly evident in the case of exclusive inheritance rules (unigeniture) under which parents compel all children except one to migrate in order to maintain the family landholding whole. Only the privileged child (the eldest son in the instance of primogeniture), who is allowed to stay on, is entitled to inherit that land. Although less obvious, the interdependence between migration and (land) bequest may also characterize partible inheritance. Thus, a child may decide to refrain from migrating if her/his inheritance right is not properly secured (inheritance conditions migration), or parents may decide to make land inheritance easier in order to induce a child to migrate (migration conditions inheritance). As these examples attest, who makes which decision matters for the way in which migration and inheritance interact and, assuming that migration promotes the structural transformation of the economy, inheritance rules or practices may either accelerate (in the second instance) or retard (in the first instance) economic growth and development.

Clearly, three questions need to be elucidated : who takes the migration decision, who takes the inheritance decision, and do these two decisions affect each other? An examination of the most salient strands of the relevant literature reveals that different answers can be given to these questions.

In the economic literature on migration, the migration decision is typically made by either the child concerned or by the parents. The former possibility is illustrated by the Todaro-type model in which a rural child migrates to a city if the expected wage gap between the locations of origin and destination exceeds migration costs (Sjastaad, 1962; Harris and Todaro, 1970). The latter is exemplified by the Stark-Levhari model in which the parents decide to send a child away to diversify the incomes of the household in a risk-prone environment (Stark and Levhari, 1982; Stark and Bloom, 1985; Rosenzweig, 1988a and 1988b). In both cases, the inheritance dimension is ignored. In a few papers describing particular contexts, however, the loss of land rights critically affects the decision to migrate. Thus, a child may be deterred from migrating permanently (or may opt for temporary migration) because migration is likely to cause the loss of access to land in the native village (see de la Rupelle et al., 2009; Mullan et al., 2011; Valsecchi, 2014). In this instance, significant efficiency costs are caused by a strict land access rule for migrants.

There is an important economic literature on bequest. Typically, however, it does not deal with migration decisions although in some cases the central argument makes more sense in a context of migration. To the question as to who makes the bequest decision, different answers are provided. In altruistic models, bequest is decided by the household head based on children's preferences (Becker, 1974, 1975; Becker and Tomes, 1979, 1986; Barro, 1974; Tomes, 1981) while in paternalistic models, it is based on the head's judgment about what is good for his children (Modigliani and Brumberg, 1954; Blinder, 1974, 1976). In most so-called exchange models of bequest, the decision is made by the parents in a Principal-Agent framework (Bernheim et al., 1985; Desai and Shah, 1983; Cox, 1987), or is the outcome of bargaining between them and their children (Kotlikoff and Spivak, 1981; Cox et al., 1996). Perhaps the most influential exchange model assumes that parents strategically use bequest as a way to extract maximum care from their children who compete among themselves for access to inheritance (Bernheim et al., 1985). Unlike most other models which have been tested in the specific context of developed countries (the United States, in particular), the strategic bequest model has been frequently brought to the data in the context of developing countries: care is then measured by remittances sent by long-term migrants (see, for example, Lucas and Stark, 1985; Hoddinott, 1992; de la Bière et al., 2002; La Ferrara, 2007)

In a study of the Peruvian Highlands, it has been explicitly shown through the estimation of an inheritance function that the strategic bequest theory is confirmed for migrant children yet not for those who remain on the family farm (Goetghebuer and Platteau, 2005, 2010). Another strand of literature, which draws heavily from historical material, makes a more explicit link to the migration context. This is especially true for studies of the practice of primogeniture whereby all the children except one are deprived of inheritance and thereby forced to migrate. Some studies stress the effect of improved outside economic opportunities on migration flows and the inheritance rules themselves (for a survey, see Baland and Platteau, 2001).

In this paper, we write a model that explicitly links the bequest and migration decisions in a Principal-Agent framework. The mechanism underlying this link can be summarized as follows. The social context is one of partible inheritance where the rule is for parents to allocate equal portions of the family land to all their children provided that they show sufficient interest in their native place and in parental wellbeing. This condition is automatically fulfilled for children staying on the family farm yet not for migrants who might be tempted to break their connection with the past. In setting the level of their requirements for access to land bequest, the parents take into account the circumstances of migration of each child, knowing that children are heterogeneous in terms of their preferred location. More specifically, they pay attention to whether they had to coax a child to migrate and, in the other way around, they keep in mind whether a child's move was backed by parental consent. In other aspects, parents provide equal inheritance treatment to their children. This attention to migration circumstances complicates the canonical strategic bequest model quite a bit even though we have striven to simplify our model as much as possible (for example, we do not consider competition for bequest between siblings).

Additional features of this model need to be stressed. First, we allow children to forsake inheritance regardless of the "price" required by the parents. In this case, the bequest decision is not under the parental control. Second, and more importantly, we do not impose the existence of an equilibrium contract between parents (acting as the principal) and children (the agent): it is thus possible that a child migrates against the will of the parental couple. If an equilibrium contract exists, it may happen that a (male) child who wants to migrate foregoes his plan because the parents are able to counteract it: access to inheritance then succeeds in inducing the child to comply. Conversely, a child who wants to stay in the native village may be prompted to migrate because this is what the parents want: the latter are then ready to relax the condition for access to inheritance sufficiently to induce compliance.

The proposed theory can account for a variety of situations in terms of migration-inheritance configurations. The second part of the paper is empirical and aims to document a wide range of situations in the light of first-hand data collected in the Bolivian Altiplano. In actual fact, the observations resulting from the analysis of this data has motivated our theoretical endeavour in the sense that we needed a unifying framework to explain these observations simultaneously. Rather than testing the theory in the sense of establishing causality, the empirical part provides strongly suggestive evidence, both statistical and econometrical, that is compatible with, or illustrates, some of the theory's key implications.

To elucidate the decision responsibilities for both migration and inheritance is a much more arduous task than may appear at first sight. Reporting biases are indeed likely when people are queried about decisions that may have entailed conflicts and suffering inside such a vital social unit as the family. To mitigate this problem as best as we could, we did not rely on the answers provided by only one of the parties involved. Not only were the same questions raised at both ends of the migration link, the parents and the migrant children, but they were also put to a third party external to the decisions, in this instance the siblings of the migrant child. The answers provided by this third type of respondents enable us to solve significant divergences between the answers given by the two parties directly involved in the matters under investigation.

The outline of the paper is now straightforward. Section 2 presents the model of interlinked migration and partible inheritance. Sections 3 and 4 discuss original empirical evidence with the objective of illustrating the theory. While in Section 3 we describe the methodology of data collection and the variables of interest, in Section 4 we estimate an inheritance function. A novel aspect of this estimation is that the context in which the migration decision was made is featured as an explanatory variable. Section 5 concludes.

2 A Principal-Agent model of interlinked migration and inheritance

In a first subsection, we describe the setup and the timeline of the model. It is then written and solved in the second subsection, leading to a variety of regimes defined in terms of specific migration-inheritance outcomes. Finally, the third subsection derives some key comparative-static results.

2.1 The setup and timeline

Acting as the principal, the parents make two decisions: migration and inheritance. Regarding the former, the parents may use incentives to induce a child to migrate. At a positive cost to themselves, the parents may even impose a punishment on a child who does not voluntarily comply with their migration decision. Regarding the latter decision, we follow the exchange model in which inheritance is conditional on fulfillment of a care duty by the children (possibly, but not necessarily, in the form of remittances). In the absence of a contractual agreement between parents and the child (that is, when incentives and punishment are ineffective), the child is not necessarily deprived of inheritance. Thus, if a child migrates against the will of the parents but gives them sufficient care after having migrated, the parents will not want to disinherit him/her. By sufficient care we mean a level at least equal to the child's utility from land bequest. This assumption embodies the idea that parents are reluctant to disinherit a child who disobeyed them in regard of the migration decision but later showed affection toward them and interest in maintaining links with the native village.

We also assume that parents are altruistic in the limited sense that they internalize their children's preference for living in an urban rather than a rural environment. Children thus have different types depending on the intensity of such intrinsic urban-vs-rural preference. As for their income-dependent utility, children have a probabilistic estimation of the urban wage obtainable in the event of migration. Parents have perfect knowledge of the type of their children (in terms of their urban-vs-rural preference) while they have the same probabilistic ex ante assessment of urban wages as their children. Ex post, they ignore the wage actually earned by a child who has migrated. Hence, once migration has occurred, they do not update the level of care requested from a migrant child to afford access to family land. This particular assumption may appear rather strong but it is well justified in migration contexts that are highly vulnerable to problems of asymmetric information (see Chort et al., 2012). That parents ignore the precise level of income (and expenditures) of their migrant children is fully validated by our own Bolivian data: no less than half of our sample parents do not even know the type of urban job in which their children are.

Lastly, children have an intrinsic utility or disutility from remaining members of their native community. When this component is too negative, interest in the family land vanishes. In order to keep the model as tractable as possible, we assume that this utility component is independent of both the preference for living in an urban-vs-rural environment and of the realized urban wage.

We may now describe the sequence of play in the game that describes the strategic relationships between parents and children:

Period 1: 1. At the beginning of period 1, parents set the level of care that migrant children must provide in order to inherit a portion of the family land, and the level of punishment that they will mete out to disobedient children.

The migrant child then chooses whether to enter into a contractual agreement with the parents regarding migration and filial care.

2. Migration or non migration takes place. Migrants observe their urban wage and decide whether to abide by the care obligations

Period 2: Bequest is distributed among the non-migrant children and those among the migrant children who have contributed.

2.2 The model

2.2.1 Participation and incentive compatibility constraints

Consider a family with n children and one parental couple living in a rural community. The parents have to define their bequest rule reflected in τ, the (minimum) level of care (or minimum remittance) that parents require to allow a migrant child to inherit family land. This decision is made in full knowledge of the value that a child assigns to family land, and this value may differ between children and depends on the migration status of a particular child. Indexing migrant status by m, and non-migrant status by ν, and assuming linearity of the child's utility from bequest, we write that

$$Eu_m\left[E(B)\right] = a_m + bE(B) \tag{1}$$

$$Eu_v\left[E(B)\right] = a_\nu + bE(B), \tag{2}$$

where $E(B)$ is the expected value of the land bequest B (itself dependent on the size of the family landholding, Q), a_m and a_ν are, respectively, the intercepts applying to the situation of a child who has migrated or who has stayed on the family farm, and b is a uniform slope coefficient. We consider the expected value of bequest because this value is not known ex ante: a child ignores how many siblings will migrate and how many among them will pay τ. The intercepts measure the respective values of different things for the children depending on their migration status: the value of a local social network, the magnitude of transaction costs incurred to take actual possession of the land, etc. Obviously, an intercept may be either positive or negative. If it is too negative, the expected utility of bequest may itself be negative, implying that the child will never be interested in acceding to inheritance. In this particular case, the parents are helpless: the (non-) inheritance decision belongs to the child.

In the following analysis, attention is focused on the case where children have an interest in family land, thus lending power to the parents who can not only extract a payment from them but also influence their migration decision.

Taking into account the level τ set by the parents, a child takes his/her migration decision by comparing the level of expected utility obtained in the city and in the rural community, respectively. Letting Δ_c be the child's expected utility gain from migration, we write:

$$\Delta_c = Eu_{u,c} - Eu_{r,c}$$

where

$$Eu_{u,c} = E(W_u) + \psi + h.\left[u_m\left(E(B)\right) - \tau\right] - D_u\pi \tag{3}$$

$$Eu_{r,c} = C + \alpha E(Y) + u_v\left(E(B)\right) - D_r\pi \tag{4}$$

In (3), $E(W_u)$ is the expected urban income, and ψ is the money equivalent of the urban-versus-rural preference of a child (with $\psi > 0$, if the child prefers to live in a city, and $\psi < 0$ if preference is for a rural environment). Moreover, π is the amount of punishment meted out by the parents, and D_u is a dummy equal to one when (i) there is disagreement between parents and child regarding migration, and (ii) the former want the latter to stay on the family farm even after allowing for the punishment cost borne by them. Finally, we have the term $h.[-]$, where h (< 1) is the probability that the child will actually pay τ to the parents, and the expression between brackets corresponds to the net benefit of paying τ for the child. Formally, h is the probability that $\tau \leq W_u - C_u$, that is, the probability that τ does not exceed the wage actually received in the migration destination, net of subsistence consumption expenditures in that location. With probability $1-p$, therefore, the migrant is not entitled to receive his/her share of family inheritance. To keep things simple, we assume that p is obtained through a guessestimate (based, say, on average past experiences in the community) and is used by all migrant children and their parents.

In (4), C is the subsistence consumption that parents customarily provide to a child working on the family farm, Y is the marginal product of the child's labour on that farm (itself dependent on the size of the family landholding, Q), and α is the share of the expected output that accrues to the child (the remaining portion, $1-\alpha$, accrues to the parents). We use the expected produce of family land, $E(Y)$, because ex ante the child does not know how many siblings will make their living on the family farm. Finally, D_r is a dummy equal to one when (i) there is disagreement between parents and child regarding migration, and (ii) the former want the latter to migrate even after allowing for the punishment cost borne by them.

From the above utility definitions, we deduce that

$$\Delta_c = E(W_u) + \psi - h\tau + pu_m\left(E(B)\right) - C - \alpha E(Y) - u_v\left(E(B)\right) - \left(D_u - D_r\right)\pi$$

The participation constraint of the child is thus satisfied if and only if $\Delta_c \geq 0$, implying:

$$h\tau \leq E(W_u) + \psi - C - \alpha E(Y) + (ha_m - a_\nu) - (1-h)bE(B) - \left(D_u - D_r\right)\pi \tag{5}$$

In words, the child will migrate and keeps his/her right to inherit if τ is not too high.

On the other hand, it is in the interest of the child to fulfill the care obligations (the incentive compatibility constraint) if and only if

$$\tau \leq Eu_m\left(E(B)\right) \Longleftrightarrow \tau \leq a_m + bE(B) \tag{6}$$

The above constraint does not apply to non-migrant children because they have an automatic access to land inheritance: no care duty is therefore required from them ($\tau = 0$). One obvious rationale behind this assumption is that the care provided by a staying child is already included in the parental share of the produce of the family farm, $1 - \alpha$.

Turning to the parents, they will want their child to migrate if and only if their expected utility derived from migration is higher than the expected utility obtained if the child stays in the community. Let Δ_p stand for the parents expected utility gain from the migration of their child:

$$\Delta_p = Eu_{u,p} - Eu_{r,p}$$

The first term on the RHS is defined as follows:

$$Eu_{u,p} = h\tau + \beta\psi - D_r\mu\pi, \tag{7}$$

where β (< 1) is the weight attached by the parents to the intrinsic relative utility of their child for living in an urban environment. Parents are thus partially altruistic in the precise sense defined by β. Moreover, μ (> 1) is the cost of a punishment unit for the parents.

The second term in Δ_p is:

$$Eu_{r,p} = (1-\alpha)E(Y) - C - D_r\mu\pi \tag{8}$$

The participation constraint of the parents is thus satisfied if and only if

$$\Delta_p \geq 0 \Longleftrightarrow h\tau \geq (1-\alpha)E(Y) - C - \beta\psi - \left(D_u - D_r\right)\mu\pi \tag{9}$$

According to the way the three conditions (5), (6), and (9) combine with each other, different equilibria are possible. Before analyzing them, several remarks are in order. First, we have $\tau \geq 0$, which is tantamount to assuming that parents cannot afford to subsidize migration moves of their children. Second, in all the foregoing reasoning, an important assumption is that parents do not adjust τ to take account of the specific economic situation of a migrant child. They are either unable or unwilling to make such an adjustment. Inability arises from poor information (see Subsection 2.1) whereas unwillingness may result from abidance of a rule that ignores specific circumstances. Note that such a rule can actually be justified by the absence of adequate information. Thus, even assuming that the parents know the incomes of their migrant children, they still ignore the amount of effort that each of them has applied in seeking work or performing jobs. Hence their recourse to a simple rule that abstracts from such intricacies.

Third, the assumption that $\mu > 1$ implies that the parents prefer to forego a unit of child's care to imposing a unit of punishment. The role of punishment will become clearer in the ensuing discussion of equilibria. Fourth, the expectation operator bears not only upon the urban wage but also upon the individual value of bequest, B, yet this is of no consequence in our simplified setup. Indeed, all the decisions are assumed to be made before the number of claimants to family land is known, which will obviously depend not only on the number of migrants but also on the realization of W_u for each of them. Fifth, in all the aforementioned equations, most parameters or variables (in fact all except $\alpha, \beta,\ and\, C$) are specific to the child whose problem is examined. In all rigor, they should therefore be individually indexed thus: $\psi_i, W_{u,i}, a_{m,i}, a_{v,i}, b_i, B_i, \tau_i, Y_i$. To avoid cumbersome spelling, we have nevertheless refrained from such indexing.

We are now ready to embark upon the equilibrium analysis. This is done in the three following subsections where we distinguish between equilibria with and without contract and, for the former, between equilibria with and without migration.

2.2.2 Equilibria with migration

We first start our discussion by looking at equilibria with migration.

REGIME 1: Parents and child are both in favour of migration

Regime 1 corresponds to the the canonical situation: the equilibrium level of care τ is equal to the optimal level which would be observed were the parents to ignore the effect of τ on migration decisions. The following inequalities then hold:

$$E(W_u)+\psi-C-\alpha E(Y)-a_v-(1-h)bE(B) \geq hbE(B) \geq (1-\alpha)E(Y)-C-\beta\psi-ha_m$$

Obviously, the parental couple and their child agree on the migration outcome (they both want migration), so that $\pi^* = 0$. Bearing in mind that the utility of the parents monotonously increases with τ (see (7)), the value of τ which maximizes the parental utility while satisfying the child's participation and incentive compatibility constraints is:

$$\tau^* = a_m + bE(B) \tag{10}$$

since (6) is the binding constraint in this case.

The first condition that defines this regime is easily elucidated. Let us rewrite the inequality between the first and last terms as

$$E(W_u) - E(Y) + (1+\beta)\psi \geq (a_\nu - ha_m) + (1-h)bE(B) - C$$

This inequality is more likely to be satisfied if the expected income differential $E(W_u) - E(Y)$ is large, and/or if β and ψ are high, meaning that the child has a strong preference for an urban environment and the parents strongly internalize it. Moreover, mutual agreement about migration is more likely if h and a_m have a large positive value, so that the parents can demand a sufficiently high compensation (τ) for accepting the departure of the child. Considering the inequalities between the first and second terms and between the second and the third terms, we see that $bE(B)$, which is the common component of the value of bequest for migrants and non-migrants, must neither be too large nor too small. If it is too large, the child will be dissuaded from migrating since by staying on the family farm s/he would receive the bequest at no cost. If it is too small, the parents will be too constrained while setting τ, and they may therefore prefer that their child remains in the community.

***REGIME 2*: Parents and child are both in favour of migration, but with reduced care obligations**

The inequalities defining Regime 2 are:

$$hbE(B) \geq E(W_u)+\psi-C-\alpha E(Y)-a_v-(1-h)bE(B) \geq (1-\alpha)E(Y)-C-\beta\psi-ha_m$$

$$E(W_u) + \psi - C - \alpha E(Y) + a_v + ha_m - (1-h)bE(B) \geq 0$$

Like under Regime 1, both the parents and their child agree on the migration outcome and $\pi^* = 0$. In this case, however, parents will accept a lower τ in order to encourage the child to migrate. For $\tau = Eu_m\left[E(B)\right]$, indeed, the expected utility gain that the child derives from migration, Δ_c, is negative ((5) is violated) while the expected utility gain that the parents obtain, Δ_p, is positive, leading to disagreement. Because, by assumption, imposing a punishment π is more costly for the parents than decreasing the level of τ, they prefer to lower τ in order to persuade their child to comply with their wish, which is migration. Consequently,

$$\tau^* = E(W_u) + \psi - C - \alpha E(Y) + (ha_m - a_v) - (1-h)bE(B) \tag{11}$$

***REGIME 3*: Parents impose punishment to make the child migrate**

We now consider the case in which the three following inequalities hold:

$$(1-\alpha)E(Y) - C - \beta\psi \leq 0$$

$$E(W_u) + \psi - C - \alpha E(Y) + (ha_m - a_v) - (1-h)bE(B) \leq 0$$

$$(\beta+\mu)\psi - \left[1 + \alpha(\mu - 1)\right] E(Y) - (\mu-1)C + \mu(ha_m - a_v) + \mu E(W_u) - \mu(1-h)bE(B) \geq 0$$

The parental couple and their child disagree on the migration outcome. The first inequality means that the parents want the child to migrate for any level of τ (since they would obtain a negative expected utility were the child to remain on the family farm). Yet, the second inequality (condition (5) is violated) implies that the child does not want to migrate, even for $\tau = 0$. Since the parents are not able to pay a child to migrate ($\tau \geq 0$), they have to resort to punishment. Since it is costly for the parents, they want to minimize the level of π. To optimize, they will thus set $\tau^* = 0$ and manage π in such a way as to make the net expected utility of the child from migration equal to zero. The equilibrium levels of τ and π therefore write:

$$\tau^* = 0;\ \pi^* = C + \alpha E(Y) - E(W_u) - \psi - (ha_m - a_v) + (1-h)bE(B) \quad (12)$$

However, the parents will only punish the child if their own expected utility gain from migration with punishment is positive, that is, if:

$$C + \beta\psi - (1-\alpha)E(Y) - \mu\pi^* \geq 0$$

$$\Longleftrightarrow$$

$$(\beta+\mu)\psi - [1+\alpha(\mu-1)]\,E(Y) - (\mu-1)C + \mu(ha_m - a_v) + \mu E(W_u) - \mu(1-h)bE(B) \geq 0$$

which establishes the third inequality condition defining Regime 3.

2.2.3 Equilibria without migration

We now consider the possible equilibria without migration.

REGIME 4a: Parents and child are both against migration

Regime 4a is the analogue to Regime 1: parents and child agree on the migration outcome but, instead of that outcome being migration, it is the opposite. Formally, the following inequalities hold:

$$(1-\alpha)E(Y) - C - \beta\psi - ha_m \geq hbE(B) \geq E(W_u) + \psi - C - \alpha E(Y) - a_v - (1-h)bE(B)$$

That the child is reluctant to leave the family farm follows from the inequality:

$$hbE(B) \geq E(W_u) + \psi - C - \alpha E(Y) - a_v - (1-h)bE(B)$$

We can rewrite it as

$$E(W_u) + \psi \leq \alpha E(Y) + C + [a_v + bE(B)]$$

Bear in mind our assumption that, if the child were to migrate against the will of the parents (without a contract), the latter will not disinherit him/her provided that s/he does his/her best, which means supplying a care level equal to his/her value of land bequest: $\tau = a_m + bE(b)$. The above expression is therefore identical to

$$E(W_u) + \psi - h\left[\tau + a_m + bE(B)\right] \leq \alpha E(Y) + C + \left[a_v + bE(B)\right]$$

It is clear now that, when this condition is satisfied, the child's expected utility gain from migration is smaller than the expected utility obtained by remaining on the family farm where access to bequest is automatically granted.

As for the parents, they are opposed to their child's migration because

$$(1-\alpha)E(Y) - C - \beta\psi - ha_m \geq hbE(B)$$

The reason is that $\tau = a_m + bE(B)$ is the highest level of care (remittances) that the parents can get from their child. Yet, even this level turns out to be smaller than the level of τ satisfying their participation constraint.

Note that the elucidation of this regime is the exact inverse of the elucidation proposed for Regime 1.

REGIME 4b: ***Parents and child are both against migration***

The inequalities defining this variant of regime 4a are:

$$hbE(B) \geq (1-\alpha)E(Y) - C - \beta\psi - ha_m \geq E(W_u) + \psi - C - \alpha E(Y) - a_v - (1-h)bE(B)$$

Again both actors agree that the child should remain in the community. As seen above, a child does not want to migrate without contract if :

$$hbE(B) \geq E(W_u) + \psi - C - \alpha E(Y) - a_v - (1-h)bE(B).$$

Furthermore, the maximum level of τ satisfying the participation constraint of the child is smaller than the minimum amount of τ satisfying the participation constraint of the parents:

$$(1-\alpha)E(Y) - C - \beta\psi - ha_m \geq E(W_u) + \psi - C - \alpha E(Y) - a_v - (1-h)bE(B)$$

Consequently, parents want their child to remain in the community.

REGIME 5: ***Parents impose punishment to make the child stay***

Here, the two defining conditions are:

$$(1-\alpha)E(Y) - C - \beta\psi - ha_m \geq E(W_u) + \psi - C - \alpha E(Y) - a_v - (1-h)bE(B) \geq hbE(B)$$

$$[1 + \alpha(\mu - 1)] E(Y) + (\mu-1)C - (\mu+\beta)\psi - \mu E(W_u) + (\mu-h)bE(B) - ha_m + \mu a_v \geq 0$$

As we have seen above, the first inequality implies that parents do not want their child to migrate for a level of τ satisfying the latter's participation constraint. The child, however, is willing to migrate even without a contract. Indeed,

$$hbE(B) \leq E(W_u) + \psi - C - \alpha E(Y) - a_v - (1-h)bE(B).$$

Parents must therefore mete out a punishment to make the child stay in the community. Punishment being costly for the parents they want to minimize the level of π so that:

$$\pi^* = E(W_u) + \psi - C - \alpha E(Y) - a_v - bE(B)$$

At the same time, parents will only punish the child if their expected utility gain from non-migration remains positive in the presence of punishment, implying:

$$(1-\alpha)E(Y) - C - \mu\pi^* \geq \beta\psi + h\left[a_m + bE(B)\right],$$

where $a_m + bE(B)$ is the level of care that the child who migrated without contract will pay at the end of the first period to prevent the parents from disinheriting him/her.

The above condition implies:

$$[1 + \alpha(\mu - 1)] E(Y) + (\mu-1)C - (\mu+\beta)\psi - \mu E(W_u) + (\mu-h)bE(B) - ha_m + \mu a_v \geq 0$$

2.2.4 Equilibria without contract

We now turn to equilibria obtained without contract. There are two such equilibria.

Regime 6: *The child stays on against the will of the parents*

There are three conditions associated with this regime:

$$(1-\alpha)E(Y) - C - \beta\psi \leq 0$$

$$E(W_u) + \psi - C - \alpha E(Y) + (ha_m - a_v) - (1-h)bE(B) \leq 0$$

$$(\beta+\mu)\psi - [1 + \alpha(\mu - 1)] E(Y) - (\mu-1)C + \mu(ha_m - a_v) + \mu E(W_u) - \mu(1-h)bE(B) \leq 0$$

Under this regime the parents and the child disagree about the optimal migration outcome. Like in Regime 3, the first inequality means that the parents want the child to migrate while the second one implies that the latter does not want. However, unlike in Regime 3, the third condition states that the cost of punishment necessary to invert the child's migration decision is so high that the expected utility gain of migration for the parents becomes negative. They therefore refrain from coercing the child to migrate. As a consequence, the child remains in the community but against the will of the parents.

Regime 7a: ***The child migrates against the will of the parents***

This regime is defined by the following inequalities:

$$(1-\alpha)E(Y)-C-\beta\psi-ha_m \geq E(W_u)+\psi-C-\alpha E(Y)-a_v-(1-h)bE(B) \geq hbE(B)$$

$$[1+\alpha(\mu-1)]\,E(Y)+(\mu-1)C-(\mu+\beta)\psi-\mu E(W_u)+(\mu-h)bE(B)-ha_m+\mu a_v \leq 0$$

Under this regime, just like under Regime 5, the parents and the child disagree on the migration outcome. While the former want the latter to remain in the community, the latter wants to migrate. Yet, unlike under Regime 5, the cost of punishment necessary to invert the child's migration decision is too high to make coercion an optimal strategy. The parents thus set $\pi^* = 0$, and the child migrates against the parent's will. As we know, this does not mean that the child automatically forsakes the right to inherit. This right can be safeguarded by paying $\tau = u_m\,[E(B)]$ at the end of the first period. We thus have that under this regime:

$$\tau^* = a_m + bE(B) \tag{13}$$

Regime 7b: ***The child migrates against the will of the parents***

The conditions associated with this last regime are:

$$E(W_u)+\psi-C-\alpha E(Y)-a_v-(1-h)bE(B) \geq (1-\alpha)E(Y)-C-\beta\psi-ha_m \geq hbE(B)$$

The last two terms imply that the parents do not want the child to migrate. On the other hand, the child is ready to migrate even without contract since:

$$E(W_u)+\psi-C-\alpha E(Y)-a_v \geq bE(B)$$

Under this regime, the parents refrain from resorting to punishment in order to bend the child's will, and the latter therefore migrates. To see this, bear in mind that the two conditions necessary to have a coercive equilibrium outcome are:

$$E(W_u) + \psi - C - \alpha E(Y) - a_v - \pi \leq bE(B)$$

$$(1-\alpha)E(Y) - C - \beta\psi - ha_m - \mu\pi \geq hbE(B)$$

The first condition states that the expected utility gain from migration in the presence of punishment is negative for the child. As for the second condition, it indicates that the expected utility gain from non-migration for the parents remains positive even allowing for the cost of punishment. However, since $\mu > 1$, these conditions cannot be simultaneously satisfied under Regime 7b.[2] Like in Regime 7A, the child migrates against the will of the parents but keeps the option of safeguarding inheritance rights by contributing $\tau = u_m [E(B)]$ at the end of the first period. We thus have that under this regime:

$$\tau^* = a_m + bE(B) \tag{14}$$

2.2.5 Summary

Denoting each regime by Rx (with $x = 1, 2, ...7$), we can now summarize our equilibrium analysis as follows:

R1 (Parents and child are both in favour of migration): $\tau^* = a_m + bE(B)$ and $\pi = 0$.

R2 (Parents and child are both in favour of migration, but with reduced care obligations): $\tau^* = E(W_u) + \psi - C - \alpha E(Y) + (ha_m - a_v) - (1-h)bE(B)$ and $\pi^* = 0$.

R3 (Parents impose punishment to make the child migrate): $\tau^* = 0$ and $\pi^* = C + \alpha E(Y) - E(W_u) - \psi - (ha_m - a_v) + (1-h)bE(B)$.

R4 (Parents and child are both against migration): τ, π *irrelevant*.

R5 (Parents impose punishment to make the child stay): τ *irrelevant* and $\pi^* = E(W_u) + \psi - C - \alpha E(Y) - a_v - bE(B)$.

R6 (Child stays on against parental will): τ *irrelevant* and π *useless*.

R7 (Child migrates against parental will): $\tau^* = a_m + bE(B)$ and π *useless*.

Provided that W_u is significantly smaller than $E(W_u)$, exclusion from bequest is more likely under *R1* and *R7* than under *R2*, yet it should not be observed under *R3*.

There is an alternative way to define our typology of regimes. It is obtained by distinguishing between various equilibria according to whether the child wants to migrate or not. In our setup, there are two meaningful ways to determine when the child can be considered to be willing to migrate. First, the child finds it profitable to migrate in the absence of pressure from the parents

[2] Rename the inequalities defining Regime 7b as $(a) > (b) > (c)$. It is not possible that by subtracting an amount π from (a), you make $(a) < (c)$, while by subtracting an even greater amount, $\mu\pi$ from (b), which is itself smaller than (a), you can keep (b) higher than (c).

(in the form of a punishment imposed if the child stays on), and allowing for the fact that to keep inheritance rights s/he will have to provide care obligations equivalent to (at least) the value of his/her expected share of the family land as assessed by him/herself. Second, the child finds it profitable to migrate if land bequest rights can be maintained in the absence of care obligations (and with zero punishment). Opting for that definition, the regimes can be sorted out as follows.

A child who wants to migrate does so either with the support of the parents (*R1*), or against their will (*R7*). Finally, the child may be coerced into foregoing his/her migration plan by the parents (*R5*). On the other hand, a child who wants to remain on the family farm may do so either with the support of the parents (*R4*), or against their will (*R6*). Again, the parents may manage to counter the child's plan, either by providing a special incentive in the form of reduced care obligations (*R2*), or by resorting to punishment in addition to canceling care obligations ($R3$).

Note that our model assumes that the motivation of parents to induce/compel children to migrate is related to land scarcity. In fact, because Y can be interpreted in many other ways, our theory has greater generality than may appear at first sight.

2.3 Results

The comparative statics on the model have proven quite tricky. They lead to clear results only with respect to variations of $E(W_u)$ and ψ (and β).

Our first proposition concerns $E(W_u)$ and is written thus:

Proposition 1. *(i) The probability of migration for a child increases with the expected urban wage,* $E(W_u)$.

(ii) The level of care obligations, τ*, monotonously increases with* $E(W_u)$.

(iii) A direct consequence of (ii) is that the incidence of exclusion from inheritance becomes larger as the urban wage disparity increases as a result of rising wages in the upper part of the distribution.

(iv) The probability of conflict between parents and child, whether it results in the use of punishment or in the absence of contract, is higher for relatively large and relatively small values of $E(W_u)$.

This directly follows from two sub-results:

(iva) The probability of conflict as defined under Regimes 3 and 6 increases as $E(W_u)$ *becomes smaller;*

(ivb) The probability of conflict as defined under Regimes 5 and 7 increases as $E(W_u)$ *becomes larger.*

The intuition behind all these results is rather straightforward. Bear in mind that $E(W_u)$ does not enter into the parental utility function, which simplifies the proofs given in Appendix A. As $E(W_u)$ increases *ceteris paribus*, the expected utility gain from migration for the child, Δ_c, increases. As a result, not only the likelihood that the child migrates but also his/her willingness to contribute to the parents' care increase (until the IC constraint, (6) is binding as far as τ is concerned). Conflicts between parents and child are less likely to arise in the intermediate range of $E(W_u)$ values. This is because for low values the child might not want to migrate while some parents are always eager to send the child away from the family farm (owing to a small value of Y). On the other hand, as $E(W_u)$ becomes larger, the child is increasingly willing to migrate while some parents may wish the opposite outcome (because of a large Y).

Our second proposition relates to ψ:

Proposition 2. *(i) The probability of migration for a child increases with his/her preference for an urban environment, ψ.*

(ii) The level of care obligations, τ, monotonously increases with ψ.

(iii) A direct consequence of (ii) is that the incidence of exclusion from inheritance becomes larger as ψ increases.

(iv) Conflicts between parents and child are more likely to arise for intermediate values of ψ.

Most of these results (shown in Appendix A) follow from the fact that ψ behaves like $E(W_u)$: like a higher expected urban wage, a stronger preference for urban life acts as an additional incentive to migrate and to provide a large amount of care for the parents. In one key respect, however, the behaviour of ψ differs from that of $E(W_u)$, and this is because ψ is featured in the utility function of the altruistic parents. Result (iv) hinges on that feature of the model. Bearing in mind that $\psi \lesseqgtr 0$, we have that ψ plays an important role in the utility functions of both parents and child when it has a strongly negative or strongly positive value (strong preference or strong dislike for urban life). Therefore, conflicts between them are unlikely. On the contrary, when ψ is close to zero, it does not play a significant role and conflicts may occur.

Analogously to Proposition 2, we can easily see that identical results are obtained by replacing ψ by β, the coefficient of altruism.

The effects of a variation in the size of the family landholding, Q, which itself determines Y and $E(B)$, are much more complex. This is because of two reasons. First, via Y and $E(B)$ with which it is positively correlated, Q plays a role in the three conditions (5), (6), and (9). Second, it is impossible to determine generally whether $\delta Y/\delta Q$ is smaller or greater than $\delta E(B)/\delta Q$. Owing to these two features, there are many different sequences of regimes, and it would be tedious to list all of them and figure out those which are most relevant. This said, we can establish the following proposition.

Proposition 3. *(i) The probability of migration for a child decreases with the size of the family landholding, Q.*

(ii) The relationship between Q and τ is non monotonous.

Result *(i)* is according to intuition. Regarding *(ii),* a variety of scenarios are possible depending on the configuration of parameter values. To illustrate, a rather plausible scenario that is not marked by any parent-child conflict is associated with a shift from *R1* to *R2* and *R4b*. In this scenario, τ increases with Q, then starts to decrease, and finally becomes irrelevant (there is no migration). This case, which can be obtained for reasonable values of ψ and $E(W_u)$ in particular, is elucidated as follows.[3] As Q is very low, the child wants to migrate and his/her IC (6) is binding, whereby $u_m[E(B)]$ increases with Q (R1). As Q further increases, the child's incentive to migrate is reduced and it is the child's PC constraint (5) that becomes binding beyond a certain threshold of Q (R2). Since the latter constraint diminishes as Q rises, the child's willingness to pay diminishes until it becomes so low that the PC of the parents (9) is violated (R4b): the parents do not want their child to leave the family farm when its size is sufficiently large.

Still more complex sequences cannot be ruled out, yet they are generally less plausible. For example, R7 is succeeded by *R1*, then by *R2* and *R4b*. This happens if the child has a strong aversion against urban life (ψ is strongly negative), and $E(W_u)$ is quite high.[4] The underlying logic is as follows. In the initial phase, when Q is low, the child migrates against the parents' will: because $E(W_u)$ is very high, migration is attractive for the child whereas the parents, who take ψ into account, have the opposite judgment (*R7*). In this first phase as well in the next one, the child's PC, (5), is non-binding unlike the IC, (6), which is binding and creates a situation in which the child's willingness to pay to remain entitled to bequest increases with Q and $E(B)$. The second phase starts precisely when (6) becomes higher than the parents' PC, (9): the latter then turn in favour of migration (*R1*). With still larger increases of Q, (5) becomes binding and τ now diminishes with Q (*R2*). When Q becomes very high, the child's willingness to pay becomes so low that it falls below the level acceptable to the parents -(5) is smaller than (9)-, and both concur that migration is undesirable (*R4b*).

Finally, and rather incidentally, we mention a secondary result concerning the effect of a variation in h. This result is that, according to intuition, the incentive to migrate from the standpoint of both the child and the parents decreases as h rises.

3 Data and key descriptive statistics

3.1 The data

To highlight the interrelationship between migration and (land) inheritance decisions, we conducted a survey that took place in two distinct phases. First, during the period from October 2008 to February 2009, we investigated 454

[3]Two sufficient conditions for this scenario are:

$$(1-h)\left[E(W_u)+\psi-C-a_v\right] \geq a_m \geq 0;\ b\delta E(B)/\delta Q > (1-\alpha)\delta Y/\delta Q$$

[4]Two necessary conditions for this scenario are:
$\left[C+a_v-ha_m-E(W_u)\right]/(1+\beta) \leq \psi \leq (-C-a_m)/\beta$ and $b\delta E(B)/\delta Q > (1-\alpha)\delta Y/\delta Q$.

households residing in eight different Andean (Aymara and Quechua) communities of the Bolivian Altiplano. Second, a year later, we conducted a survey among all the migrant children of the sample households whom we were able to trace back.

The sample communities were randomly chosen in a circle around La Paz/El Alto. The physical distance between this urban centre and a community is a bad proxy for actual distance owing to the paucity of the road infrastructure. Measured in more meaningful travel time, the distance works out to be 3 hours, again on an average. Within each community, between a third and a half of the total household population was randomly drawn. However, we chose to keep only the households in which all the children were aged fifteen or above. This allows us to reasonably assume that the number of children is known with certainty (no future birth is expected), and that at the time of the interview decisions had been made regarding the mobility of all family members. Eventually, the average sample size turned out be about 55 households per community. They stand for about 240 individuals (the total is 1,924 individuals).

In La Paz/El Alto, we interviewed 354 migrants born in our sample rural households. These represent less than half of the total number (765 migrants) declared as living in La Paz/El Alto by these households. Tracing the migrants proved to be an extremely arduous task, indeed. The most important problem arose from the fact that, to our surprise, rural households almost never knew the precise address of their migrant children. To locate the migrants, we had to rely on drawings made by rural family members and/or members of migration networks with the same community origin. The difficulty was compounded because, due to recent and anarchic expansion, most streets in the El Alto quarters do not possess a name and house numbers are randomly attributed. Given the important attrition rate, we cannot rule out the the possibility of sample bias. However, based on the information that we collected at the level of rural family members, we can conclude that unlocated migrants are not statistically different in key aspects from the interviewed migrants (Appendix B).

3.2 Descriptive statistics

3.2.1 Inheritance

Land is the main bequethable asset for families in the Bolivian Altiplano and the average family farm in our sample counts 19 hectares of land. This high average masks however a wide distribution: the biggest landowners, belonging to the highest decile of the land distribution, own more than 40 hectares whereas the smallest family estates, belonging to the first decile, are composed of less than 130 m^2. Scarcity of cultivable land and poor soil quality have been identified as important issues by almost all rural households. Land productivity is indeed very low as only a very limited number of vegetables can be cultivated under the harsh weather conditions of the Bolivian Highlands (at an altitude of 4000 m above sea level)

Inheritance distribution follows an egalitarian norm in the Altiplano and it is very rare that a child living in the community is excluded from inheritance. Among the children who stayed in the community and for whom inheritance did already take place only one biological child was disinherited by the parents. However, this egalitarian rule does not apply to migrant children.

Almost 20 % of the migrants belonging to our rural households have experienced or will experience exclusion from inheritance. Among them only one fifth were not interested in family land according to their parents. During the interviews, parents cited migration, a lack of interest in land and poor attention from their children as the main reasons for exclusion.

Lack of interest in parental land was largely confirmed during interviews of the migrants. As many as 13 % of them declared that they had no interest in family land and conveyed this message to their parents. Another 12 % reported having refused or given away their land bequest. Revealingly, almost one-fourth of the migrants were unable to report the size of their parents' landholdings. The small interest in land can be partly explained by its low productivity and malfunctioning land markets. Yet, there are also important transaction costs associated to landownership. Land access is indeed preconditioned on the fulfillment of different types of community burdens and duties in the Bolivian Highlands. These may prove especially constraining for migrants prompting some of them to voluntarily forgo their land rights.

3.2.2 Migration

At the time of the survey, 84 % of the rural sample households counted at least one migrant, and 57 % of the children belonging to these households had migrated. Migrants leave their community at a rather young age (18 years, on average). With very few exceptions, rural-urban migration in the Altiplano is permanent and only 4 % of the migrants failed to get established in the city and returned to their native community. Yet, it is noteworthy that almost 40 % of the sample migrants were nostalgic about their earlier life and planned to move back to their village in some distant future. Urban centers inside Bolivia are the main destinations for the sample migrants, La Paz/El Alto alone attracting 72 % of them. Important wage differentials make neighboring countries such as Argentina, Chile and Brazil, attractive, but only 7 % of the migrants headed for these more remote destinations. Surrounding rural communities are a third important destination (concerning 14 % of the migrants).

Networks play an important role in the migration decision. They provide the migrants not only with a place to stay upon arrival (73 % initially stayed with an acquaintance) but they also help with job search (60 % of those working as employees found their first job through their family network). Job security is very low: a huge majority of the migrants work in the informal sector and contracts remain rare even in the formal sector.[5] The three main male occupations found in our sample are those of drivers, construction workers, and tailors while women mainly work as shopkeepers, stallholders or domestic servants.

[5]Teachers and police officers, for example, did not possess a formal contract.

More than half of the sample migrants (54 %) were self-employed with 37 % of them owning their (small) business. Job turnover is also relatively high: on average, migrants hold three long term jobs and a multitude of short term employments. Moreover, 21 % suffered from important spells of unemployment. Average monthly earnings are 1350 Bolivianos[6], but the richest 10 % earn more than 2500 Bolivianos while the poorest 10 % earn less than 400 Bolivianos.

3.2.3 Migration decision

Collecting reliable data about the person responsible for the migration decision has proven quite difficult, and serious measurement problems arise. First, answers depend on the respondent's understanding of the situation and the role each actor has played in the decision. In particular, parents and migrants might have different interpretations of their respective roles in the decision. Furthermore, answers may be subject to important respondent biases. Parents and migrants might each be tempted to modify the reporting of their role depending on the relative success of the migration experience. More importantly, in traditional patriarchal societies, it may be difficult to admit that a child migrated against the will of the father, therefore prompting the parents to overstate their weight in the decision. Also, parents may not easily confess that they sent their child away against his/her own will, thus leading to understatement of their role. In order to avoid the first type of problem, in our questionnaire the respondent is not directly queried about the delicate issue of migration responsibility. Instead, we construct our migration decision variable on the basis of detailed questions that try to elucidate whether the parents and/or the child were in favour of migration.

During our rural survey, we gained the impression that parents were unwilling to discuss their role in the migration process, thus creating a risk of bias. By contrast, we did not have a similar impression when interviewing the migrants: they seemed much more ready to discuss the topic freely and did not appear to be embarrassed and self-controlling their answers. We were still keen to avoid prejudiced views of the source of the observed discrepancies. This is why in our migrant survey we included a special set of questions inquiring about the migration of siblings. In this way, answers provided by parents and a child concerned by migration can be checked against the information obtained from a third party. A priori, we believe that the latter is the most reliable source.

The data collected among urban siblings confirm our inkling that the answers provided by the migrants are unbiased (in the sense of being rather close to those provided by their migrant siblings) while those given by the parents are subject to important reporting biases (in the sense of diverging from the same). We thus observe a significant positive correlation (71 %) between the answers of the migrant concerned and his/her siblings, and a negative correlation (-7 %) between those of the parents and the migrant's siblings. Finally, we observe a positive non significant correlation (1 %) between the parents' and the migrants'

[6]1USD = 7 Bolivianos at the time of our survey.

answers. Based on this evidence, in the remainder of the study we will use the data collected at the level of the migrants whenever we address the question of migration responsibility.

Our data allow us to say something about the direction of the reporting bias on the part of the parents. Using the siblings' information as benchmark, we find cases of parents who overstate their role in migration decisions and, revealingly, these parents also overstate their role in the bequest process. More precisely, parents who denied that the child took the decision to migrate were also reluctant to admit that s/he played an active role in the inheritance process through a decision to forego bequest. On the other hand, we have parents who understate their role in the migration decisions, yet in these instances they do not tend to understate their role in bequest decisions.[7]

In Table 1, we present the simple frequencies of the various situations that can arise in matters of migration responsibility. We also attempt to establish a correspondence between these situations obtained from the survey material and the regimes derived in Section 2.

Table 1: Respective roles of parents and children in migration decisions

Parents and the child were in favour of migration and the child took the migration decision willingly (*R1* or *R2*)	46.8%
Parents and child were in favour of migration and the parents took the decision (*R2 or R3*)	6.4%
Parents and the child were in favour of migration and the child took the migration decision to conform to the parental wish *(R3)*	9.0%
Parents wanted the migration of a reticent child who eventually complied (*R3*).	7.4%
The child wanted to migrate but the parents did not (*R7*)	30.4%

Assume that parents are responsible for the migration decision of a migrant child in the three following situations: (i) the parents wanted a child to migrate against the child's will; (ii) both parents and child agreed and the parents took the final migration decision; (iii) both wanted the child to migrate and the child took the migration decision to please his/her parents. Then, we can conclude that 77 % of the migrants themselves made the decision to migrate (see first and last situations) while the remaining children were persuaded or even coaxed

[7]These observations stand if we use a regression framework to control for many personal and family characteristics of the respondents (results not shown).

by their parents to leave. This observation about the dominant role of the migrant children regarding the orientation of their life is further confirmed for the children who stayed in the community: 72 % made the decision while the remaining 28 % submitted to their parents' will (not shown in Table 1).

Moreover, we observe that (a) parents have a higher propensity to send away their first-born children, (b) sent-away children tend to come from larger families, (c) they left the community at a younger age than the children who migrated at their own behest, and (d) the size of the network upon arrival is significantly larger for children who made the migration decision. Results (a), (b), and (c) conform to our theory. Indeed, first-born children have a lower $E(Y)$ for the following reason: if they were to stay on the family farm, they would increase land pressure and lower its productivity, whereas the problem is attenuated for younger siblings whose family is likely to have been reduced following the migration of older members. The same reasoning applies to result (b). As for results (c) and (d), they are according to expectation. Regarding (c), many of the migrants sent away by their parents were recruited at a very young age by specialized urban agents who visited the rural communities to hire domestic servants.

On the other hand, we observe no significant differences in the size of the family farm between the migrants sent away by their parents and those who migrated on their own will. This echoes the lack of predictions of the theory regarding the role of Q in ordering the regimes.

In addition, children who declared having themselves taken the migration decision do not fare significantly better in the job market. This suggests that migrants did not manipulate their answers in the sense of attributing to themselves the responsibility of a successful move. Finally, there is no evidence that parents selectively finance the education of their brightest children with the objective of sending them away while compensating the others trough land inheritance. Indeed, children who were induced to migrate by their parents are not considered to be more able to study by the latter[8] and they are not more educated than children who migrated at their own initiative.

4 Econometric evidence

The econometric analysis proceeds in three successive steps. In the first step, we verify a central implication of the theory: in situations where a child was coaxed to migrate by the parents, the level of care or remittances is smaller than in other situations. In the second step, unlike what is done in most of the economic literature, we estimate a bequest function in which the dependent variable is binary, with value one when a (migrant) child is deprived of land inheritance. In line with our analytical framework, we need to check whether the absence of bequest is the outcome of a decision made by the parents or the child concerned. Both situations arise in our data. As a consequence, when

[8]We assume that if parents regard a child as having high ability for study if they report that (s)he belongs to the top five students of his her class.

studying the interdependence between migration and inheritance, we need to ensure that the bequest decision belongs to the parents. In the third step, we show that in this instance children coaxed to migrate have a smaller probability to be disinherited, and this is true whichever the level of their remittances to their parents. In addition, children who migrated against the will of their parents can maintain their access to land bequest provided that they care for them. Interestingly, they do not seem to receive a different treatment when compared to those children whose migration was jointly decided.

4.1 The remittance function

Ideally, we want to verify the influence of the context of migration decision on the level of remittances or care set in the migration contract, that is, in the beginning of period 1. However, we do not observe contracts (which are unwritten) and the only measure we have is the level of remittances actually paid by migrants after migration, that is, at the end of period 1. Thanks to the sequential nature of the decision-making process (the decision to remit is made once migration has taken place), we are able to estimate a remittance function that matches the time structure of our theoretical model.

Formally, we would like to estimate:

$$\tau^*_{(i,j,v),t} = \lambda + \beta_1 R_{i,t} + \eta_{(i,j,v),t}$$

where $\tau^*_{(i,j,v),t}$ stands for the (unobserved) level of remittances set at period t in the migration contract of migrant child i belonging to family j and community v. Our main variable of interest, $R_{i,t}$, is a discrete variable which measures the respective roles of parents and the child in the migration decision at period t (which corresponds to the various regimes deduced in the theory).

Although we do not measure $\tau^*_{(i,j,v),t}$ but only the remittances actually paid after migration has taken place, $\tau_{(i,j,v),t+1}$, we can use the relationship between these two variables and obtain the following remittance function:

$$\tau_{(i,j,v),t+1} = \lambda' + \beta'_1 \tau^*_{(i,j,v),t} + \gamma_1 Y_i + \delta_1 Z_j + \omega_v + \eta'_{(i,j,v),t+1}$$

where ω_v stands for community fixed effects. Among the controls we have a vector of personal characteristics, Y_i, and a vector of family characteristics, Z_j. Substituting the first equation for $\tau^*_{(i,j,v),t}$ in the second equation, we get the following equation that will be estimated::

$$\tau_{(i,j,v),t+1} = \hat{\lambda} + \hat{\beta} R_{i,t} + \gamma_1 Y_i + \delta_1 Z_j + \omega_v + \varepsilon_{i,j,v}$$

where $\hat{\beta} = \beta_1 \beta'_1$, $\hat{\lambda} = \beta'_1 \lambda + \lambda'$, and $\varepsilon_{i,j,v} = \beta'_1 \eta_{(i,j,v),t} + \eta'_{(i,j,v),t+1}$. In our estimation,$\tau_{(i,j,v),t+1}$ is measured continuously. It consists not only of the monetary payments made and reported during the last twelve months (preceding the interview) by child i belonging to family j and community v, but also the money equivalent value of in-kind gifts as reported by the same. Moreover, we have a measure of exceptional transfers made when a shock hits the parents and the frequency with which a migrant child visits her/his parents. The main explanatory variable, $R_{i,t}$, can take three values depending on whether the child was coaxed to migrate (a situation corresponding to Regime $R3$), decided to leave against the will of the parents ($R7$), or willingly left with the support of the parents ($R1$ or $R2$). In terms of Table 1, the first type of migrant (Type A) corresponds to the frequencies shown in the second, third and fourth lines (summing up to almost 23%), while the second type (Type B) corresponds to the last line (with a frequency of about 30%), and the third type (Type C) to the first line (almost 47%).[9]

Among the controls we have a vector of personal characteristics, Y_i, and a vector of family characteristics, Z_j. The former vector includes a binary variable, Λ_i, which takes value 1 if a child declared to the parents (according to the latter), at the moment of inheritance or prior to the event, that s/he was not interested in the family land or rejected his/her share at the moment of inheritance. This control variable is particularly important to ascertain that the parents and not the migrant are responsible for the decision regarding land inheritance. Additional individual controls are: cattle ownership, gender, education (measured in years), birth order, urban earnings (a continuous variable), and the average duration of an employment spell.[10]

Family controls include the number of migrant and non-migrant siblings, the size of the family landholding, a variable distinguishing between agricultural and grazing land (equal to one when at least a portion of the family landholding is dedicated to agriculture), and the number of sheep. Measures of family wealth must be featured in the regression in order to allow for explanations complementary to the central mechanism suggested in this paper, altruism of the migrant children in particular. However, a problem is likely to arise here because of the interdependence (collinearity) between per capita family wealth and $R_{i,t}$. This would give rise to an estimation bias that could reduce the level of significance of $\hat{\beta}$, our key coefficient.

That this does not happen is evident from Table 2. According to expectation, a child pays a smaller level of remittances (in cash and kind, or in cash only) when s/he is of Type A, that is, when s/he was coaxed to migrate. There is no significant difference between the coefficients pertaining to the other two types. It bears emphasis that in the presence of a shock affecting the parents, the (exceptional) transfers made by children do not any more differ among the three types of migrants. This result suggests an insightful amendment to our theory: variations in remittance requirements depending on the context of migration decision apply only in ordinary circumstances. Finally, when we look at another measure of care, the number of visits, we observe again that children

[9]It is actually debatable whether the case of parents deciding the migration while the child agreed (see line 2 of Table 1) should be included in the third rather than the first type (that is, whether this case falls under $R2$ rather than $R3$), yet our results stand unaffected, and are even strengthened, by such a change of definition.

[10]Cattle ownership is featured because if a migrant owns cattle in the native location, τ could be a remuneration to local relatives for attending to it. Average duration of employment spells, a measure of employment stability, allows for the possible role of an insurance motive.

who were coaxed to migrate visit less their parents. This could indicate that the frequency of visits is also part of the contractual agreement.

Table 2: Remittance function

	Poisson		Probit
	Cash & Kind	Nr. Visits	Shock
Joint Migration Dec.	0.788**	0.555**	0.367
	(0.395)	(0.237)	(0.259)
Mig. Against Par. Will	0.993**	0.757***	0.074
	(0.418)	(0.216)	(0.244)
Controls	Yes	Yes	Yes
Community Fixed Effects	Yes	Yes	Yes
Nr. Obs.	282	270	250
Wald Chi	559.64	316.94	82.67

** significant at 10% level, ** significant at 5% level, *** significant at 1% level. Robust Standard Errors clustered at family level between brackets. Family and Individual Controls included. For the probit estimation we display average marginal effects.*

4.2 The bequest function (I)

We estimate the following bequest function:

$$E_{(i,j,v)t+2} = \theta + \beta_2 R_{i,t} + \varrho \Lambda_i + \gamma_2 YY_i + \delta_2 ZZ_j + \omega'_v + \varepsilon'_{i,j,v},$$

where $E_{t+2} = 1$ when the child did not inherit family land (at period $t+2$). New vectors of individual and family controls are defined, labeled YY_i and ZZ_j, respectively. In YY_i, we now include a variable indicating whether the child is considered by the parents as among the five best pupils of his/her class. This is to allow for the selective education argument following which parents choose to selectively finance the education of some of their children whom they deem particularly able while compensating the other children through land inheritance. We also added the number of children of the migrant. On the other hand, besides removing cattle ownership, we have replaced urban earnings and employment stability, which parents do not well observe, by a dummy equal to one if the migrant owns a house in the destination location. This latter addition is aimed at leaving room for parental altruism beyond internalization of the child's relative preference for the urban environment. The vector ZZ_j has a few more components: the age, education and past migration experience of the household head.

To estimate the bequest function we rely on a probit specification where we control for community effects and cluster errors at family level. In all tables we display average marginal effects.

In a preliminary step, we check whether the absence of bequest is the outcome of a decision made by the parents or the child concerned. This is done by looking at the effect of Λ_i, as shown in Table 3 (regressions (i) and (ii)). We find that the children who have no interest in family land, as perceived by the parents, have a significantly higher probability of being deprived of inheritance (almost 30 percent on average). This suggests that children play an active role in the bequest process. We should nevertheless be wary of such straightforward interpretations to the extent that Λ_i is vulnerable to different biases. Fortunately, we are able to overcome them by exploiting the multilevel structure of our questionnaire design.

A first bias may occur if strong equal sharing norms dictate inheritance, as is the case in the Bolivian Altiplano. In this case, parents may be ashamed to admit that they disinherited a child, preferring to shift responsibility to the latter. In our survey area, however, this scenario is rather implausible: an important number of parents actually expressed a genuine disarray in front of the lack of interest of their migrant children in the family land. Some parents even confessed that they did not know to whom they will be able to bequeath their land because all their children had migrated and none of them was interested in their land.

True, these statements do not completely preclude the possibility of the use of a shifting-the-blame tactic by the parents. To check this possibility, we run another regression where we use data that were collected at the migrant's level and report whether a lack of interest in land was expressly mentioned by the child (see equation (iii) in Table 3). We again observe a significant positive coefficient associated to the migrant's disinterest variable, thus confirming the results of the first regression. The smaller size of the coefficient in this new regression can be explained by the fact that migrants have a stronger tendency than family members to report having conveyed their disinterest to their parents. This is because parents may have forgotten their child's expression of disinterest or did not take it seriously (perhaps because they did not want to, or thought the child's disinterest was not definitive).[11]

A second source of bias arises from reverse causality: a child who did not inherit or does not expect it may feel ashamed and pretend to have no interest in the family land. Fortunately, we are able to rule out this possibility by using the twofold structure of our data. Since we have collected information about the migrants' taste or distaste for rural land from both the children concerned and family members who stayed in the community of origin, we can use the discrepancies in the answers obtained to test for reverse causality. If the shame effect is present, the probability of exclusion from bequest should be significantly higher

[11]There are also cases where parents wrongly justify exclusion from inheritance by their children's lack of interest in land. We observe, indeed, that a few children get excluded on the pretext that they expressed disinterest to their parents while this was not actually confirmed by the children concerned (see Table 3, regression (iv)).

for children who admitted to being uninterested in land, and this regardless of whether their statement has been confirmed by other family members. If, on the other hand, the parents are eager to bequeath land to the child but the latter does not want it, we should only observe exclusion when the child's statement of disinterest has been confirmed by the parents. This is actually what we find in our data, thus disproving the existence of the shame effect (see Table 3, regression (iv)).

We can therefore conclude that migrant children may play an active role in the inheritance process.

Table 3: Child's role in the bequest decision

	Probit – Exclusion from bequest Average Marginal effects			
	(i)	(ii)	(iii)	(iv)
Child has no interest (as stated by parents)	0.388*** (0.084)	0.278*** (0.668)		
Child has no interest (as stated by the child)			0.070** (0.034)	
Child has no interest (as stated by the child yet not by the parents)				0.013 (0.026)
Child has no interest (as stated by the parents yet not by the child)				0.201*** (0.073)
Child has no interest (as stated by both)				All excluded
Joint Migration Dec.	0.092*** (0.030)	0.096*** (0.031)	0.096** (0.041)	0.138*** (0.045)
Mig. Against Par. Will	0.086** (0.040)	0.086*** (0.035)	0.091* (0.047)	0.130*** (0.046)
Controls	Yes	Yes	Yes	Yes
Community Fixed Effects	No	Yes	Yes	Yes
Nr. Obs.	263	246	246	243
Wald Chi	123.4	161.54	130.44	147.03

** significant at 10% level, ** significant at 5% level, *** significant at 1% level.*
Robust Standard Errors clustered at family level between brackets.

4.3 The bequest function (II)

A major consequence of the interdependence between the inheritance and migration decisions, as highlighted by our theory, is that children who have been coaxed to migrate by their parents receive a special treatment regarding land access. More precisely, for them, land access is not conditional upon providing care (remittances) to their parents, as the mainstream theory of strategic bequest would have predicted. We now set out to check that this implication of the model expounded in Section 2 is supported by the data at hand. We know that children who have not been coaxed to migrate pay larger amounts of remittances (Subsection 4.2), yet we have to establish that their caring behaviour allows them to secure their inheritance rights. In doing so, moreover, we have to make sure that the bequest decision is made by the parents and not by the migrant child (see Subsection 4.1). In all the estimates, since we look at the parents' bequest decisions, we rely on their own statements about the child's interest in family land.

Obviously, we cannot pretend to establish causality since we cannot think of any instrument that would satisfy the exclusion constraint. Our results must therefore be interpreted with the necessary caution. The major purpose of the following estimations is to present evidence that is strongly suggestive in the sense of being compatible with, and illustrating, key implications of the theory.

Table 3 actually provides information about the separate effects of regimes. We see that the probability of bequest exclusion is significantly smaller, almost 10 percent on average, for children who have been coaxed to migrate (*R3*). In addition, children who have migrated against the will of the parents are not treated differently by the parents when they are compared to the children whose migration has been jointly decided or at least agreed upon. In the following we therefore merge the latter two categories so that the variable R_i becomes a binary variable. What remains to be done is the task of adding an interaction term to the bequest function :

$$E_{(i,j,v),t+2} = \theta + \beta_3 R'_{i,t} + \varphi\tau_i + \eta R'_{i,t} * \tau_{i,t+1} + \varrho\Lambda_i + \gamma_3 YY_i + \delta_3 ZZ_j + \omega"_v + \varepsilon"_{i,j,v},$$

where R'_i is a dummy equal to one when the child has been coaxed to migrate, and to zero when the child's migration has been decided against the will of the parents or jointly agreed. The variable Λ_i provides the control for the locus of the bequest decision. We expect β_3 and φ to be negative, and $\varphi + \eta$ to be equal to zero. Note carefully that the remittance variable is not measured in the same way as for the remittance function. It is now the remittances reported by the parents that are used as regressors. Since the bequest decision belongs to the parents, it is logical to use their own perception of the amount of remittances received as a determinant of land bequest. This choice has to be made because, as has been repeatedly mentioned in the literature (see Comola and Fafchamps, 2017), the transfer amounts reported by senders and receivers diverge, and often significantly so. In our case, we know that an important source of the divergence arises from different perceptions of what constitutes a transfer from child to parents: unlike children, parents seem to consider that gifts in-kind are not genuine transfers. In our data this is partly reflected in the following observation: in the cases where parents pretend not to have received any transfer while children disagree (which represent 25% of all the statements about transfers), gifts in-kind are much more prevalent than in the other cases.

The estimate, reported in Table 4 (regression viii), confirms all the predictions.

Table 4: Child's role in the bequest decision

	Probit – Exclusion from bequest			
	Average Marginal Effect			
	(v)	(vi)	(vii)	(viii)
Child has no interest	0.277***	0.192***	0.290***	0.318***
(as stated by parents)	(0.071)	(0.070)	(0.682)	(0.079)
Child coaxed to migrate	-0.113***			-0.162***
(as stated by the migrant)	(0.040)			(0.043)
Child coaxed to migrate		0.096**		
(as stated by the parents)		(0.039)		
Child coaxed to migrate			-0.082**	
(as stated by the siblings)			(0.040)	
Amount remittances				-0.002***
				(0.001)
Amount Remittances*				0.002***
Child coaxed to migrate				(0.001)
Controls	Yes	Yes	Yes	Yes
Community Fixed Effects	Yes	Yes	Yes	Yes
Nr. Obs.	246	241	237	244
Wald Chi	164.01	203.82	170.06	149.24

** significant at 10% level, ** significant at 5% level, *** significant at 1% level. Robust Standard Errors clustered at family level between brackets.*

It bears emphasis that in the above estimates the regime variable has been defined based on the statements of the migrants themselves. If we instead use the same variable by using the information provided by the siblings of the migrants, the results do not differ (Table 4 regression (vii)).[12] However, when the regime variable is defined by statements made by the parents, the coefficient β_2 in Table 4 changes sign and remains statistically significant (Table 4 regression (vi)). This

[12]Note that we use the information provided by siblings who themselves migrated.

difference is explained by the aforementioned observation that parents may lie about the migration decision context: typically, they may refused to admit that they have coaxed their child to migrate. Another, more explicit way to check the influence of distorted statements about migration responsibility consists of distinguishing between parents who correctly stated their responsibility, those who understated it, and those who overstated it. What we find is that the effect is driven by the category of understating parents.

As a robustness check of the bequest function estimation, we may go beyond the simple dichotomy between exclusion and non-exclusion. We thus define a new variable which can take on three values depending on whether the child received an unprivileged, a fair (that is, equal), or a privileged treatment in the bequest process. Our theory predicts that a child who has been coaxed to migrate should have a lower probability to receive an unprivileged treatment but should not be more likely to benefit from the privileged treatment. This is precisely what we find in Table 8 (see Appendix C).

Finally, while we have seen above that children who have not been coaxed to migrate visit their parents more often, there is no evidence that the frequency of visits affects differently the probability to inherit land for these children. The probability of inheritance increases with the frequency of visits for all types of migrants (see Appendix C). Non monetary care thus does not appear to be part of a contractual agreement.

5 Conclusion

If the interdependence between migration and land inheritance is at the core of any system of unigeniture, it is less in evidence under rules of partible inheritance. This largely explains why it has been essentially ignored in the economics literature dedicated to such rules. The present paper has attempted to remedy this lacuna by proposing a theoretical framework that is explicitly based on the interlinking of migration and bequest decisions. Inspired by empirical material collected in the Bolivian Altiplano, our theory accounts for a wide variety of situations that include the possibility for children to migrate against the will of their parents and for parents to coax children to migrate.

Like in the strategic bequest theory or many exchange models, access to inheritance is conditioned on the fulfillment of remittance or care obligations. In our setup, these obligations are used by the parents as an instrument not only to extract care but also to prompt a child to migrate or to stay on the family farm. An interesting implication of that perspective is obtained when a child is sent for migration against his/her own will, in which case the duties conditioning access to land bequest are absent. This outcome is the exact opposite of what obtains under unigeniture where a child who is forced to migrate is automatically deprived of a share in the family land.

It is also possible that the parents fail to obtain the outcome that they want, like when a child migrates while the parents wanted him/her to stay on the family farm. In this instance, the model does not predict that the dissenting child will be disinherited. Another interesting feature lies in the possibility that a child rejects a bequest to which he/she is entitled to, and this rejection is not determined by the (excessive level of) c are obligations set by the parents.

Situations of potential disagreement between parents and children about migration are actually important in our sample drawn from the Bolivian Altiplano: they account for as much as half of the cases observed. In addition, a significant proportion of the children were not interested in owning their share of the family land and made it clear to the parents.

The central finding of our empirical foray is that many possible regimes predicted by the theory are indeed observed in our data. In particular, not only are the remittances smaller for migrants who have been coaxed to migrate than for other migrants but also this does not affect their access to land bequest. Moreover, those children who migrated against the parental will are not sanctioned on the level of bequest if they have made transfers to their parents.

Appendix

Appendix A

Comparative statics on $E(W_u)$

To analyze the effect of $E(W_u)$ we distinguish between three different cases according to the parents participation constraint which is independent of $E(W_u)$.

Case 1: $(1-\alpha)E(Y) - C - \beta\psi < 0$

The first case corresponds to the situation where parents want a child to migrate even if $\tau = 0$.Under this case four different sub-cases can arise depending on the level of the child's participation constraint.

i. The first sub-case corresponds to a situation where the child participation constraint (5) is not satisfied for low levels of $E(W_u)$ and where, even for those low levels of $E(W_u)$, it is optimal for the parents to coax the child into migration:
$\psi - C - \alpha E(Y) + (ha_m - a_v) - (1-h)bE(B) < 0$ and
$(\beta+\mu)\psi - [1+\alpha(\mu-1)]\, E(Y) - (\mu-1)C + \mu(ha_m - a_v) - \mu(1-h)bE(B) \geq 0$

The first inequality implies that the participation constraint of the child is not satisfied for $E(W_u) = 0$, the minimum value of $E(W_u)$. The child thus wants to remain in the community. The second inequality implies that it is optimal for the parents to coax the child into migration for $E(W_u) = 0$. We thus observe *R3* for low levels of $E(W_u)$. As $E(W_u)$ increases the utility gain from migration increases until $E(W_u)$ reaches $E(W_u) = C + \alpha E(Y) - \psi - (ha_m - a_v) + (1-h)bE(B)$ and the child's PC (5) is satisfied for $\tau \geq 0$, which corresponds to R2. Eventually, $E(W_u)$ will reach $E(W_u) = C + \alpha E(Y) - \psi + a_v + bE(B)$ and the level of τ required to satisfy the child's PC (5) will become greater than level of τ required to satisfy his/her IC(6)[13] , and we are in *R1.*

ii. $\psi - C - \alpha E(Y) + (ha_m - a_v) - (1-h)bE(B) < 0$ and $(\beta+\mu)\psi - [1+\alpha(\mu-1)]\, E(Y) - (\mu-1)C + \mu(ha_m - a_v) - \mu(1-h)bE(B) < 0$

The first inequality implies again that the child's participation constraint (5) is not satisfied for $E(W_u) = 0$ but unlike under the previous subcase, the costs of punishment are too high for $E(W_u) = 0$. We will thus observe *R6* for very low values of $E(W_u)$ followed by R3 once $E(W_u)$ increases beyond $+\mu E(W_u) = [1+\alpha(\mu-1)]\, E(Y) + (\mu-1)C - (\beta+\mu)\psi - \mu(ha_m - a_v) + \mu(1-h)bE(B)$ and consequently punishment becomes optimal. Further rises in $E(W_u)$ will increase the utility gain from migration until the child's PC (5) becomes satisfied for $\tau \geq 0$, which corresponds to *R2*. For high levels of $E(W_u)$, the level of level of τ required to satisfy the child's PC (5) will become superior to level of τ required to satisfy his/her IC(6) which corresponds to *R1.*

iii. $0 \geq \psi - C - \alpha E(Y) - a_v - bE(B) \geq -h\,[a_m + bE(B)]$[14]

[13] which is independent of $E(W_u)$

[14] equivalent to $h\,[a_m + bE(B)] \geq \psi - C - \alpha E(Y) + (ha_m - a_v) - (1-h)bE(B) \geq 0$

Under this subcase, there is no conflict between the parents and the child on migration. It is possible to find a level of $\tau \geq 0$ which satisfies the child's PC (5) even if $E(W_u) = 0$ since $\psi - C - \alpha E(Y) - a_v - bE(B) \geq -h\left[a_m + bE(B)\right]$ is equivalent to $(E(W_u) + \psi - C - \alpha E(Y) + (ha_m - a_v) - (1-h)bE(B) \geq 0)$. Moreover, $0 \geq \psi - C - \alpha E(Y) - a_v - bE(B)$, implies that, for low levels of $E(W_u)$, the level of τ required to satisfy the child's IC (6) is superior to level of τ required to satisfy her/his PC (5) corresponding to *R2.* As $E(W_u)$ increases further, the level of level of τ required to satisfy the child's PC (5) will increase beyond the level of the IC(6) and we are under *R1.*

iv. $\psi - C - \alpha E(Y) - a_v - bE(B) > 0$

Under this subcase, the level of level of τ required to satisfy the PC (5) is higher than the level of τ required to satisfy the IC (6) for all levels of $E(W_u)$. *R1* is thus observed for the whole distribution of $E(W_u)$.

Case 2: $h\left[a_m + bE(B)\right] \geq (1-\alpha)E(Y) - C - \beta\psi \geq 0$

Under this case parents want a child to migrate iff $h\tau \geq (1-\alpha)E(Y) - C - \beta\psi$. Three subcases might arise depending on the level of τ required to satisfy the childs PC (5). It is noteworthy that all of these subcases are non conflictual.

i. $\psi - C - \alpha E(Y) + (ha_m - a_v) - (1-h)bE(B) < (1-\alpha)E(Y) - C - \beta\psi$

Under this subcase, the child and the parents agree on non migration for $E(W_u) = 0$, which corresponds to *R4b*. As $E(W_u)$ increases the utility gain from migration and thus the level of τ the child is ready to pay under migration increases. This is up to the point where $E(W_u) = E(Y) - (1+\beta)\psi + a_v + (1-h)bE(B)$ and the level of τ required to satisfy the child's PC (5) becomes equal to the level of τ required to satisfy the parent's PC (9), which corresponds to *R2.* Eventually, $E(W_u)$ will increase until it reaches $E(W_u) = C + \alpha E(Y) - \psi + a_v + bE(B)$ and the level of τ required to satisfy the childs PC (5) is superior to the level of τ required to satisfy the IC(6) and the latter becomes binding, which corresponds to *R1.*

ii. $bE(B) > \psi - C - \alpha E(Y) - a_v - (1-h)bE(B) > (1-\alpha)E(Y) - C - \beta\psi - ha_m$

There is again no conflict between the parents and the child on migration. Yet, unlike under the previous subcase, migration will be observed over the whole distribution of $E(W_u)$. It is indeed always possible to find a level of $\tau \geq 0$ which satisfies the child's PC (5) since $\psi - C - \alpha E(Y) - a_v + ha_m - (1-h)bE(B) > (1-\alpha)E(Y) - C - \beta\psi \geq 0$. Furthermore, $0 > \psi - C - \alpha E(Y) - a_v - bE(B)$, implies that level of τ required to satisfy the childs IC (6) is higher than the level of τ required to satisfy his/her PC (5) for $E(W_u) = 0$ which corresponds to *R2.* As $E(W_u)$ increases, the benefits of migration increase until the level of τ required to satisfy the childs PC (5) is superior to the level of τ required to satisfy the IC(6), which is independent of the level of τ required to satisfy the childs PC (5) is superior to the level of τ required to satisfy the IC(6) which corresponds to *R1.*

iii. $\psi - C - \alpha E(Y) + a_m - a_v > a_m + bE(B)$

The above inequality implies that the level of τ required to satisfy the childs PC (5) is superior to the level of τ required to satisfy her/his IC (6) for all levels of $E(W_u)$ and *R1* is thus observed for the whole distribution of $E(W_u)$.

Case 3: $h\left[a_m + bE(B)\right] < (1-\alpha)E(Y) - C - \beta\psi$

Under this last case parents do not want the child to migrate since the maximum amount of transfers they can get from their children $\tau = a_m + bE(B)$ is inferior to the level required to satisfy their participation constraint (9). Three subcases might arise depending on the level of the child's participation constraint and the costs of coercion.

i. $\psi - C - \alpha E(Y) - a_v - bE(B) < 0)$

Under this subcase, the child and the parents agree on non migration for $E(W_u) = 0$, which corresponds to *R4a*. As $E(W_u)$ increases the utility gain from migration increases until $E(W_u) = \alpha E(Y) - \psi + C + a_m + bE(B)$ which implies that the child is ready to migrate even without a contract. Parents will then choose to coax their child into staying in the community which corresponds to *R5*. Indeed, given $h\left[a_m + bE(B)\right] < (1-\alpha)E(Y) - C - \beta\psi$ the inequality $\left[1+\alpha(\mu-1)\right]E(Y) + (\mu-1)C - (\mu+\beta)\psi - \mu E(W_u) + (\mu-h)bE(B) - ha_m + \mu a_v \geq 0$ is satisfied for $E(W_u) = \alpha E(Y) - \psi + C + a_m + bE(B)$. Since the costs of coercion increase with $E(W_u)$ parents will eventually find punishment to costly and let the child migrate against their will once $\mu E(W_u) \geq \left[1+\alpha(\mu-1)\right]E(Y) + (\mu-1)C - (\mu+\beta)\psi + (\mu-h)bE(B) - ha_m + \mu a_v$, which corresponds to R7a which will be followed by R7b once $E(W_u) \geq E(Y) - (1+\beta)\psi - ha_m + a_v + (1-h)bE(B)$.

ii. $bE(B) \leq \psi - C - \alpha E(Y) - a_v - (1-h)bE(B) < (1-\alpha)E(Y) - C - \beta\psi - ha_m$

Under this subcase, we observe *R5* for low levels of $E(W_u)$, which will be followed by *R7a* and *R7b* once $E(W_u)$ and thus the costs of punishment increase.

iii.$bE(B) \leq (1-\alpha)E(Y) - C - \beta\psi - ha_m \leq \psi - C - \alpha E(Y) - a_v - (1-h)bE(B)$

Under this last subcase, we observe R7b over the whole range of $E(W_u)$.

Comparative statics on ψ

To analyze the effect of ψ we distinguish between eight different cases depending on the levels of $E(Y)$ and $E(W_u)$:

Case 1:

$\left[1+\alpha(1+\beta)\right]E(Y) \leq (1+\beta)C - \beta\left[E(W_u) + ha_m - a_v - (1-h)bE(B)\right]$

The first case corresponds to a situation where the parents own a very small plot of land and the parents and the child participation constraints intersect for $\tau \leq 0$.

Under this case, for $\psi \to -\infty$, the level of τ required to satisfy the parent's PC (9) is superior to the level of τ required to satisfy the child's IC (6) which is superior to level of τ required to satisfy her/his PC(5).This corresponds to *R4a*. As ψ increases the benefits of migration increase for both the parents and the child until $\beta\psi \geq (1-\alpha)E(Y) - C - h\left[a_m + bE(B)\right]$ and the level of τ required to satisfy the parents PC falls below the level of τ required to satisfy the child's IC. The former remains however superior to the level of τ required to satisfy the child's PC since the parents and the childs participation constraints intersect for $\tau \leq 0$ by definition of case 1. We are thus under *R4b*. Further increasing ψ will further rise the benefits of migration and thus decrease (increase) the level of τ required to satisfy the parent's (child's) PC until $\beta\psi \geq (1-\alpha)E(Y) - C$ and parents want their child to migrate even if $\tau = 0$. Two subcases can then arise depending on whether the parents and the childs participation constraints intersect for $\tau = 0$ or $\tau < 0$.

i.$[1+\alpha(1+\beta)]\,E(Y) = (1+\beta)C - \beta\,[E(W_u) + ha_m - a_v - (1-h)bE(B)]$

Under this subcase, there in no conflict on the migration outcome between the parents and the child since their participation constraints intersect for $\tau = 0$. Once $\beta\psi \geq (1-\alpha)E(Y) - C$ both agree on migration and we are under *R2*. As ψ increases further the benefits of migration increase for both the parents and the child until $\psi \geq \alpha E(Y) - E(W_u) + C + a_v + bE(B)$ and the level of τ required to satisfy the child's PC becomes superior to the level of τ required to satisfy the her/his IC and we are under *R1*.

ii $[1+\alpha(1+\beta)]\,E(Y) < (1+\beta)C - \beta\,[E(W_u) + ha_m - a_v - (1-h)bE(B)]$

Under this subcase the level of τ required to satisfy the child's PC is inferior to the level of τ required to satisfy the parent's PC for $\beta\psi = (1-\alpha)E(Y) - C$. The parents and the child thus disagree on migration yet it is never optimal for the parents to coax their child into migration when $\beta\psi = (1-\alpha)E(Y) - C$ since $[1+\alpha(1+\beta)]\,E(Y) < (1+\beta)C - \beta\,[E(W_u) + ha_m - a_v - (1-h)bE(B)]$ and we are thus under *R6*. As ψ increases the costs of punishment decrease until $(\beta + \mu)\psi \geq [1+\alpha(\mu-1)]\,E(Y) + (\mu-1)C - \mu(ha_m - a_v) - \mu E(W_u) + \mu(1-h)bE(B)$ and we are under *R3*. Further rises in ψ increase the benefits of migration for both the parent's and the child until $\psi = \alpha E(Y) + C - (ha_m - a_v) - E(W_u) + (1-h)bE(B)$ and the child's PC is satisfied for $\tau = 0$ and both agree on migration. This corresponds to *R2*. As ψ increases further the benefits of migration increase for both the parents and the child until $\psi \geq \alpha E(Y) - E(W_u) + C + a_v + bE(B)$ and the level of τ required to satisfy the child's PC becomes superior to the level of τ required to satisfy the her/his IC and we are under *R1*.

Case 2:

$h\,[a_m + bE(B)] \geq$

$[1+\alpha(1+\beta)]\,E(Y) - (1+\beta)C + \beta\,[E(W_u) + ha_m - a_v - (1-h)bE(B)] > 0$

The first case corresponds to a situation where the parents own a larger plot of land and the parent's and the child's participation constraints intersect for $a_m + bE(B) \geq \tau \geq 0$. Under this case there is no conflict on the migration outcome.

We observe again that for $\psi \to -\infty$, the level of τ required to satisfy the parent's PC (9) is superior to the level of τ required to satisfy the child's IC (6) which is superior to level of τ required to satisfy her/his PC(5).This corresponds to *R4a*. As ψ increases the benefits of migration increase for both the parents and the child until $\beta\psi = (1-\alpha)E(Y) - C - h\,[a_m + bE(B)]$ and the level of τ required to satisfy the parents PC falls below the level of τ required to satisfy the child's IC. Two subcases can then arise depending on whether the parents and the childs participation constraints intersect for $\tau = a_m + bE(B)$ or $\tau < a_m + bE(B)$.

i.$[1 + \alpha(1 + \beta)]\, E(Y) - (1 + \beta)C + \beta\, [E(W_u) - a_v - bE(B)] = 0$

Under this subcase the parents and the childs participation constraints intersect for $a_m + bE(B) = \tau$. And the three constraints are thus satisfied and we are which corresponds to *R1* for l $\beta\psi \geq (1 - \alpha)E(Y) - C - h\, [a_m + bE(B)]$.

ii. $[1 + \alpha(1 + \beta)]\, E(Y) - (1 + \beta)C + \beta\, [E(W_u) - a_v - bE(B)] < 0$

Under this subcase the parents and the childs participation constraints intersect for $a_m + bE(B) \geq \tau$. The level of τ required to satisfy the parents PC remains thus superior to the level of τ required to satisfy the child's PC which corresponds to *R4b*. Further increasing ψ will further rise the benefits of migration and thus decrease (increase) the level of τ required to satisfy the parent's (child's) PC until $(1 + \beta)\psi = E(Y) - E(W_u) - ha_m + a_v + (1 - h)bE(B)$ and the parent's and child's PC becomes satisfied for $\tau = 0$. We are thus under *R2*. As ψ increases further the benefits of migration increase for both the parents and the child until $\psi \geq \alpha E(Y) - E(W_u) + C + a_v + bE(B)$ and the level of τ required to satisfy the child's PC becomes superior to the level of τ required to satisfy the her/his IC which corresponds to *R1*.

Case 3:

$[1 + \alpha(1 + \beta)]\, E(Y) - (1 + \beta)C + \beta\, [E(W_u) - a_v - bE(B)] > 0$

The first case corresponds to a situation where the parents own a large plot of land and the parent's and the child's participation constraints intersect for $\tau > a_m + bE(B)$.

We observe again that for $\psi \to -\infty$, the level of τ required to satisfy the parent's PC (9) is superior to the level of τ required to satisfy the child's IC (6) which is superior to level of τ required to satisfy her/his PC(5).This corresponds to *R4a*. As ψ increases the benefits of migration increase for both the parents and the child until $\psi \geq \alpha E(Y) - E(W_u) + C + a_v + bE(B)$ and the child wants to migrate even without a contract. Yet, the parents are against migration since their participation constraint is not satisfied for $\tau = a_m + bE(B)$. Indeed, under Case 3 the parent's and the child's participation constraints intersect for $\tau > a_m + bE(B)$. Two subcases will then arise depending on whether it is optimal for the parents to coax their children into staying in the community.

i. $[1 - \alpha(1 + \beta)]\, E(Y) - (1 + \beta)C + \beta\, [E(W_u) - a_v] - ha_m - (1 + \beta)bE(B) \geq 0$

Under this it is optimal for the parents to coax their children into remaining in the community which corresponds to *R5*. As ψ increases further the benefits of migration and thus the costs of punishment increase until $(\mu + \beta)\psi \geq \mu E(W_u) - [1 + \alpha(\mu - 1)]\, E(Y) - (\mu - 1)C - (\mu - h)bE(B) + ha_m - \mu a_v$ and punishment becomes too costly for the parents and the child migrates against their will. This situation corresponds to *R7*a. This regime will be followed by *R7b* once $(1 + \beta)\psi = E(Y) - E(W_u) - ha_m + a_v + (1 - h)bE(B)$. Finally, we will observe R1 once $\psi \geq (1 - \alpha)E(Y) - C - h\, [a_m + bE(B)]$.

ii. $[1 - \alpha(1 + \beta)]\, E(Y) - (1 + \beta)C + \beta\, [E(W_u) - a_v] - ha_m - (1 + \beta)bE(B) < 0$

Under it is not optimal for the parents to coax their children into remaining in the community which corresponds to *R7*a. This regime will be followed by *R7b* once $(1+\beta)\psi = E(Y) - E(W_u) - ha_m + a_v + (1-h)bE(B)$. Finally, we will observe R1 once $\psi \geq (1-\alpha)E(Y) - C - h\left[a_m + bE(B)\right]$.

Appendix B

To ascertain whether our final household sample is biased because of the important attrition rate in the second step of our survey we can use data collected on all migrants living in La Paz/ El Alto at the level of the family members living in the community of origin.

Table 5: T-test

	Migr. Surveyed Mean	Migr. not Surveyed Mean	Difference
Age			
Nr. of Children	38	38.71	-0.71
Years of Educ	7.97	7.84	-0.13
Birth Order[i]	3.26	3.23	0.03
Age at Migration	19.15	19.13	0.02
Amount Remittances	18.65	25.23	-6.58
Family Size	5.76	5.82	-0.05
Land Size	2.02	2	0.02
Nr of Sheep	32.81	31.33	1.48

i family members living in the community did not provide reliable data concerning the migration decision and we can thus not provide a comparison concerning this variable between the two samples. However, we observe that the identity of the person responsible of the migration decision is correlated with the migration age and birth order and we will thus perform our test on these two variables.

Table 6: Pearson Chi square test

	Pearson Chi square
Best Student	0.008
Knew someone at the first migration destination	0.085
Frequency of visits	4.619
Child has no interest (as declared by the parents)	4.468**
Exclusion from land inheritance	3.287*

We observe that there is no statistical difference between the two samples concerning the main migrant characteristics (Table 5 and 6). Yet, a higher proportion of migrants was declared as not being interested in family land in our sample. Moreover, we find a slight difference in the proportion of migrants excluded from land inheritance between the two samples (Table 6). Indeed, this proportion is lower in our sample compared to the sample composed of migrants, living in La Paz/El Alto, who were not interviewed in the second round. However, the above tests are simple unconditional mean comparison tests and the results of the following regression (Table 7) allow as to rule out the possibility of a sample bias. Furthermore, our result concerning the child's disinterest in land also holds for the whole sample.

	Probit – Exclusion from land inheritance
Migrant surveyed	-0.235
	(0.177)
Child's declared disinterest	2.022***
	(0.502)
Controls (including land size, family size, number of children, education, gender)	
Nr. Obs.	638
Wald Chi	165.07
Pseudo R^2	0.4251

** significant at 10% level, ** significant at 5% level, *** significant at 1% level.*
Robust Standard Errors clustered at family level between brackets.

Appendix C

Table 7: Determinants of the parents' bequest decision

	Probit	Generalized ordered probit	
		Equal & privileged vs unprivileged	Privileged vs. unprivil. & equal
	(a)	(b)	(c)
Child declared disinterest	0.305***	-2.925***	-1.605**
	(0.079)	(0.791)	(0.807)
Mig. decision (Parents)	-0.116***	0.639**	-0.296
	(0.042)	(0.279)	(0.273)
Frequency of visits	-0.074*	0.092	-0
	(0.041)	(0.360)	
Parents dec.* Freq. of visit	-0.023		
	(0.068)		
Controls	Yes	Yes	Yes
Community fixed effects	Yes	Yes	Yes
Nr obs.	244	260	
Wald Chi	230.47	1050.41	

** significant at 10% level, ** significant at 5% level, *** significant at 1% level.*
Robust Standard Errors clustered at family level between brackets.

Chapter 2

Explaining Remittances in the Bolivian Altiplano: Limited Altruism and the Adverse Effects of Kinship Networks

Anne Michels

Abstract

Remittances play a crucial role in the life of many families in the developing world. They are however subject to important moral hazard problems when they are not motivated by altruism. The threat of exclusion from community and family based migrant networks can act as an important enforcement device under these circumstances. Based on a unique dataset collected at both sides of the migration link we show that this is not true in the context of rural-urban migration in the Bolivian Altiplano. The migrants who are the most dependent on family and community based networks in the city are also those who remit the least. Family based networks appear to be especially detrimental. These paradoxical findings can be explained by important sharing pressure from the kinship network, including the one in the city. We observe indeed that the negative relation between remittances and dependence from family and community networks is particularly pronounced for migrants with large family and community networks within the city. Moreover, the smaller transfers to the immediate family are associated with higher financial participation in community projects. Finally, we find evidence that migrants underreport their earnings to avoid demands from their wider kinship network with the objective to increase transfers to their close family. Migrants would like to transfer larger amounts to their poorer parents but are prevented from doing so by predatory demands stemming from their larger family and community network.

Keywords: Remittances, Migrant Networks, Asymmetric Information, Redistributive Pressure

JEL Classification: F24, D82, D13

1 Introduction

Remittances play a crucial role in the life of many families in the developing world and the motivations to remit have been extensively studied in the economic literature. Scholars have highlighted four main determinants behind remittances: altruism, exchange (Cox, 1987; Cox and Rank, 1992), investment (Poirine, 1997; Ilahi and Jafarey, 1999) and insurance (Stark and Levhari, 1982; Rosenzweig, 1988). The latter three motivations refer to exchange models featuring an implicit contract between the migrant and her parents. This contract is however subject to important moral hazard problems because of the temporal structure of the exchanges between migrants and family members. The services rendered by the families in the communities of origin are indeed generally provided in the early stages of the migration process and once the migrants are successfully established they might decide not to respect their part of the contract and break all ties with their family. This moral hazard problem is further reinforced by the asymmetries of information intrinsic to the interaction between actors living at an important physical distance from each other. Migrants can indeed use these asymmetries strategically and lie on their employment situation and living standard to eschew their obligations.[15] Seshan (2013) observes indeed that greater underreporting by Indian wives of their husband's income in Qatar is associated with lower remittances. Ambler (2015) shows that in an experimental setting, migrants living in the US remit less to their families in El Salvador when they have the opportunity to hide their income. De Weerdt and al. (2014), on the other hand, observe that while asymmetries of information are substantial in a context of rural-urban migration in Tanzania there is no evidence of large systematic under- or overestimations.

To overcome the migrants' opportunistic behaviour, families have implemented different enforcement mechanisms. A first well studied enforcement device is the use of strategic bequest or threat of disinheritance (Bernheim et al., 1985; Lucas and Stark, 1985; Hoddinott, 1992; de la Bière et al., 2002; Goetghebuer and Platteau, 2010). Yet, if land is not very valuable in the communities of origin and if the migrant is well established in her migration destination the fear of losing her share of inheritance might not be sufficient to overcome the moral hazard problem. Community and family networks on the other hand will have a much higher value for migrants. They provide insurance in times of hardship (Menjvar, 2002; Mazzucato, 2009) and information about job opportunities (Lin, 1999; Bertrand et al., 2000; Topa, 2001; Edin et al., 2003; Mouw, 2002; Munshi, 2003; Aguilera, 2002; Aguilera, 2005; Patel and Vella, 2007; Drever and Hoffmeister, 2008). The threat of exclusion from these networks, which are based on family or community links, could therefore be used by community members to ensure that migrants abide by their obligations. Community mem-

[15] Parents can also adopt a strategic behaviour and paint a grimmer picture of their living conditions to increase remittances from their children. Batista and Narciso (2013) show that migrants are well aware of this problem. Based on a sample of migrants living in Ireland, they show that migrants who received improved information, through the provision of free phone cards, send higher remittances.

bers could indeed put pressure on the members of the community and family networks to punish deviant migrants. In addition, they could request detailled information about the migrants professional situation from their network within the city making it more difficult for the migrants to eschew their obligations. Finally, the networks themselves might be interested in controlling the behaviour of their members. Misbehaviour will indeed not only tarnish the reputation of all the members but might also induce high monetary costs since demands that are not fulfilled by one member will probably lead to more demands addressed to the other network members. Community based migration networks might thus act as an informal institution which first enables transactions between migrants and the rural community members and later regulates the behaviour of the migrants.

The idea that migrant networks play a crucial role in enforcing remittances has first been put forward by Philpott (1968) in his anthropological work on Montserratian migrants in Britain. This was followed by a study on Mexican migration to the US by Roberts and Morris (2003) who find that remittances increase with network strength and diversity. Finally, based on data on Senegalese migrants in Europe, Chort et al. (2012) find mixed results. They observe again a positive relation between community networks and remittances but only for community networks and for migrants who are unemployed or in precarious working conditions. Concerning family networks, they find the opposite: a negative significant correlation between the size of family networks and remittances for unemployed migrants whom they argue are the most dependent on family networks. This literature is however based exclusively on international migration and we want to verify in this study whether the argument that family and community based networks act as an enforcement device for remittances sent to the parents holds also in a context of rural-urban migration.

To analyze the relationship between remittances and family or community based networks we propose to use a unique dataset collected at both sides of the migration link which provides us with original data on asymmetries of information within migrant households and the composition of the migrants networks within the city. In particular, we are able to distinguish between family, community and what we call urban networks, where members have no link to the family or community. We anticipate that misperceptions of the migrants' professional situation should decrease with the size of the family and community networks and that remittances will decrease with the migrants' independence from the latter. We observe however the opposite. Misperception is significantly positively correlated with the size of the migrants community based network and parents underestimate the migrants professional situation more frequently when their family network in the city is larger. Moreover, we observe a positive significant correlation between independence and remittances sent to the parents, where we measure independence as the share of the urban network in the total network. Community and family networks provide neither better information nor do they enforce remittances sent to the parents. They appear rather to be detrimental to these remittances.

These, at first, counter intuitive and rather paradoxical results become more coherent once we account for sharing pressure from the network as a whole instead of only the parents. In the context of the Bolivian highlands, Godfrey-Wood and Mamani-Vargas (2016) state that " frequently, the most significant expenditures (related to social events) are primarily covered by wealthier family members living in urban areas of Bolivia or in Brazil or Argentina". This observation is also confirmed by Lazar (2008) who notes further that wealthier family members, especially migrants, will be asked more often to become godparents to a relative or a community member, which entails important expenditures since godparents have to participate in the wedding costs and cover frequently other expenses such as schooling costs. Membership to family and community networks within the city might thus be conditional on transfers to a much wider group than just the parents, among others the members of the network itself. Higher sharing pressure from individuals associated to these family and community networks might then leave the migrant with less income to spare for her close family. This would then explain why remittances sent to the parents are lower when the migrants are more dependent on family and community based networks, and thus more vulnerable to sharing pressure.

Furthermore, when these demands from the wider network enter into conflict with the migrants altruistic desire to send transfers to her parents she might be induced to understate her income vis-à-vis of her network including her parents. Underreporting to the parents then serves a double purpose. First, it decreases directly demands from the parents and all those who rely solely on the parents for information. Second, it confirms the erroneous information provided by the migrants to other network members. Indeed, if migrants try to avoid demands from a large number of acquaintances, they will have to lie consistently to all of them. Lying to the parents has then however a completely different purpose than what is generally assumed in the literature. Migrants do not lie to their parents because they wish to avoid remitting but rather because they want to decrease demands from the community and family network with the purpose of being able to remit a higher amount to the parents. This is what we observe in our data. Not only do parents underestimate their migrant child's professional situation more frequently when the family network within the city is large (and the migrant is thus subject to more solicitations) but underestimation also increases remittances when the family and community based networks within the city are large.

The importance of sharing pressure from the wider kinship network is recognized in a growing literature on economic development. Lewis (1954) describes successful kinship members as being "besieged by increased demands for support from a large number of distant relatives" and sharing norm pressures have been identified as an important deterrent to economic development (Platteau, 2000, 2014; di Falco and Bulte 2011; Fafchamps et al., 2011; Hadnes et al., 2013; Grimm et al., 2013). It has been shown that individuals have developed sophisticated and sometimes costly strategies to circumvent these sharing obligations. Baland et al. (2011) find that individuals in Mali take up credit even when they do not suffer from a liquidity constraint to signal that they are unable to provide financial assistance. Jakiela and Ozier (2016) show that, in a lab-in-field experiment in Kenya, women adopt less profitable investment strategies to conceal the size of their initial endowment when relatives attend the experiment. Based also on a lab-in-field experiment in rural Liberia, Beekman et al. (2015) find that individuals with larger family networks are more likely to pay to hide their earnings from the experiment. Finally, Boltz et al. (2015) observe that a large majority of participants in a lab-in-the-field experiment in Senegal are ready to forego an important share of their gains to keep them private. Moreover, they observe that allowing participants to hide their gains does not affect intra-household transfers but decreases substantially the transfers to the wider family, which is line with our idea that migrants try to eschew demands from the wider kinship network but not from their close family. In a context of migration, Hoff and Sen (2006) note that successful members might be required to remit money, find jobs or host relatives in the city home while Chauvet et al. (2015) observe that migrants contribute significantly to community projects. Finally Ambler (2015) concludes that migrants from El Salvador are already sending home more remittances then they would choose to altruistically because of sharing norm pressure.

The remainder of this paper is organized as follows: In Section 2, we describe our dataset, drawing attention to a number of key features of the sampled Bolivian communities, in particular the characteristics of migratory moves, migrants' networks and remittances. Section 3 presents the estimation strategy while results are presented in Section 4. Section 5 concludes.

2 The dataset

A detailled household survey was conducted at both ends of the migration link. Community surveys have first taken place in eight Aymara communities in the Bolivian Altiplano from October 2008 to February 2009 followed a year later by a migrant survey in La Paz and El Alto during the same period.

The eight communities of our sample have been randomly selected in a circle around La Paz/El Alto, the two main attraction poles for migrants from the Bolivian Altiplano. Distance, measured in traveltime - which is more meaningfull owing to the paucity of public transports and the bad conditions of the rural roadnetwork - is 3 hours on average. There are however important differences between, and even within, communities: 15 percent of the migrants need one hour or less to return to their community, while the 15 percent with the longest journeys need 5 hours or more.

During the rural survey, data was collected at both household and community levels. Concerning the former, between one third and one half of the total household population were randomly drawn in each community. However, we decided to survey only households in which all the members were aged 15 or above to ensure that the migration decision was taken for all household members at the time of the interview. Our final rural household sample is composed of 454 households, about 55 households per community, representing 1,924 individuals. In addition to the household surveys, three community authorities, the head and two council members, were queried about local norms regarding customary land rights, inheritance rules, migration, and governance structures.

In a second step, migrant children themselves were surveyed in La Paz/El Alto. The corresponding sample is exclusively composed of persons belonging to households interviewed during the rural household survey. Tracing the migrants proved to be an extremely difficult task because the family members living in the communities of origin almost never knew the address of their migrant children. Furthermore, due to its rapid expansion, most streets in El Alto do not possess a name and house numbers are randomly attributed making it even more difficult to locate someone. We had thus to rely in most cases on hand drawings from family members to trace the migrants. As a result, we were only able to meet 354 out of 765 migrants declared as living in La Paz or El Alto by the sampled rural households. Given the important attrition rate, a problem of sample bias might arise in our data. Yet, based on information collected from family members in the community of origin, it appears that the migrants whom we failed to interview are not statistically different from those we surveyed during the second round, at least concerning the key aspects of the study (see Michels, 2019).

3 Key Variables and Descriptive Statistics

3.1 *Migration*

Because of the difficult living conditions in the Bolivian highlands, many young adults have chosen or were forced to leave their communities. Land productivity is indeed very low in these communities since only a very limited number of vegetables can be cultivated at an altitude of 4,000 m above sea level. Consequently, at the time of the survey, 84 percent of the families interviewed in the first round counted at least one migrant, and 57 percent of the children belonging to the rural household sample had migrated. In the Altiplano, migration is with very few exceptions permanent yet migrants maintain very strong links with their communities of origin (Ströbele-Gregor, 1994; Lazar 2008, Godfrey-Wood and Mamani-Vargas, 2016). Tellingly, most migrants only accepted to be interviewed once we showed them an authorization from the village leaders of their communities of origin. The migrants held often an idealized view on life in the community and almost 40 percent declared that they planned to move back to their community in some distant future.

Migration generally starts at a rather young age (18 years on average) and the responsibility for the migration decision lies mainly with the migrant children themselves. In our sample, only 23 percent of the migrants were persuaded or forced by their parents to leave their community while 30 percent of the children chose to migrate against their parents will. For the remaining 47 percent, the migration decision was taken jointly by the migrant and her parents.

Urban centers within Bolivia are the main destination for migrants: La Paz and El Alto together attract 72 percent of the migrants of our sample[16]. Upon arrival almost all migrants started to work immediately and, at the time of the survey, 54 percent were self-employed (among whom 37 percent owned their own small business). The three main occupations for men are drivers, construction workers and tailors while women mainly work as shopkeepers, stallholders or domestic servants. Average monthly earnings amount to 1,350 Bolivianos per month[17], yet this average conceals important inequalities: the richest 10 percent earn more than 2,560 Bolivianos while the poorest 10 percent earn less than 400 Bolivianos. Job security is also relatively low: a huge majority of the migrants work in the informal sector and, even among those working for an employer, only 12 percent are in the possession of a written labour contract. Job turnover is also relatively high with the average migrant holding three long term jobs and a multitude of short term employments. Finally, 21 percent suffered from rather long spells of unemployment. In this context of low employment stability, we expect networks to play a crucial role since they might not only provide information about work opportunities but also insurance in times of unemployment.

3.2 *Networks*

Migration networks play a crucial role in every step of the migration process in the Bolivian highlands. First, concerning the migration decision itself, a lack of family or community networks within the city was cited during the interviews as one of the main deterrents to migration. Also, revealingly, children who decided to migrate against their parents will had significantly larger premigration networks. Most migrants (85 percent) knew indeed someone in their first place of destination, usually a family member. Their premigration network was composed, on average, of three family members, less than one community member and almost no one external to their kinship and community circle (Table 1). A majority of migrants (68 percent) stayed with a family member upon arrival and 60 percent of those working for an employer found their first job through their family network. The importance of family networks in finding work diminishes however with the length of the stay, only 36 percent of the migrants found their second job trough this channel and this decreases even further to 19 percent for their third job.

To measure the size of migrant networks we included a special network module in our migrant survey where we distinguished between their network upon arrival and at the time of the interview. Concerning the former, migrants were asked to provide an exhaustive list of family members living in La Paz and El

[16] Other sought after destinations (representing 7 percent of the migrants) are neighboring South American countries such as Argentina,Chile and Brazil which are especially attractive due to important wage differentials. Finally, surrounding communities constitute a third important destination for the migrants of our sample (14 percent).

[17] At the time of the survey, the exchange rate was: 7 Bolivianos = 1 US dollar.

Alto as well as a list of all community and non community members they knew before moving to the city.

Table 1: Network

	Family	Community	Non Community
Upon Arrival			
Knew at least one member	81 %	27 %	9 %
Average Number	3.12	0.63	0.13
First Accommodation	67.58%	1.21%	3.64%
At the Moment of the Interview			
Knows at least one member	98 %	76 %	48 %
Average Number	9.58	3.86	1.45

Concerning their current network, we asked them again to report all family members living in La Paz and El Alto. Furthermore, we asked them to enumerate all individuals exterior to their kinship network on whom they could rely for help distinguishing between community and non community acquaintances. Our data on the different networks is thus entirely based on the views of the migrants themselves. As a result, we have only a series of disconnected individual specific partially observed networks where each network is reduced to a set of direct links to one particular node, the position of the migrant within the network. We are thus unable to provide a comprehensive view of the whole network.

The distinction between family, community and non community networks is crucial for our analysis since we anticipate that membership in these different types of networks will be associated with different remittance behaviours.

Furthermore, being a member of one particular type of network might be related to different outcomes on the labour market. On the one hand, family, community and urban networks might give access to different types of income earning opportunities. We observe that migrants with larger community networks have a higher probability to be self-employed while migrants with more important urban networks tend to work in less well paid jobs and migrants with larger family networks hold more unstable jobs (Table 2). These at first surprising negative labour market outcomes associated to larger networks, in particular those associated to family and community networks, could be explained by important sharing pressures exerted by kinsfolk (see Fafchamps (2002), Hadnes et al. (2011), Jakiela and Ozier (2016) and Baland et al. (2011). But, on the other hand, migrants with less stable or less paid jobs might invest more in their networks because they are in greater need of the insurance provided by the network or because they are looking for a better job. Interestingly, when we proxy the dependence on one particular type of network by the proportion of links of that type of network in the total network, we do not observe any significant correlation except a negative correlation between dependence on urban networks and income.

Table 2: Labor Market

	OLS			
	Wage	Job Length	Unemployed	Employee
Estimation 1: Network Size				
Family Network	0.005	-0.047*	0.004*	-0.003
	(0.004)	(0.027)	(0.002)	(0.002)
Community Network	0.027	0.049	0.009	-0.014**
	(0.018)	(0.138)	(0.008)	(0.006)
Urban Network	-0.061**	-0.193	-0.013	0.019
	(0.030)	(0.234)	(0.015)	(0.013)
Years of Education	0.036*	0.252*	-0.004	0.028***
	(0.020)	(0.144)	(0.009)	(0.008)
Gender	-0.650***	0.816	0.044	-0.157
	(0.145)	(0.882)	(0.061)	(0.056)
Age	0.001	0.392***	-0.002	-0.008
	(0.012)	(0.120)	(0.006)	(0.005)
Estimation 2: Dependence				
Urban/Total	-0.896**	-3.904	-0.283	0.181
	(0.427)	(4.260)	(0.216)	(0.231)
Family/Total	0.037	0.442	0.082	0.037
	(0.295)	(2.003)	(0.126)	(0.106)
Community/Total	0.307	0.755	0.001	-0.118
	(0.355)	(2.154)	(0.139)	(0.116)

** significant at 10% level, ** significant at 5% level, *** significant at 1% level. Robust Standard Errors clustered at family level between brackets.*

3.3 *Transfers*

A large majority of migrants in our sample (65 percent) reported sending transfers in cash or in kind to their parents during the last year. Those sending remittances sent on average 374 Bolivianos (Table 3), which is rather low and corresponds on average to one week of earnings. This low level masks however a wide distribution: 5 percent of our sample remit more than one month of earnings while 10 percent send less than 40 Bolivianos. In addition to the unconditional transfers most migrants also supported their parents when they suffered a severe negative income shock. Almost half of the migrants supported their parents in case of illness (42 percent) and a third during droughts or in the event of social events such as weddings, funerals or community festivals. Unfortunately, it was impossible to obtain reliable information on the amount of transfers sent on these occasions.

Table 3: Transfers

Parents	
Transfers in cash and kind (%)	64.74
Average amount	373.91
St.Dev.	(1,349.41)
in cash (%)	27.96
Average amount	381.82
St.Dev.	(751.39)
Gifts (%)	56.84
Average amount	241.98
St.Dev.	(1,210.28)
Help in cash or kind in case of drought (%)	32.73
Help in case of illness (%)	42.12
Help social event (%)	30.9
Community	
Money sent to community (%)	6.36

Besides remittances sent to their parents, migrants might be required to send transfers to other family or community members. As noted above, wealthy community members, especially migrants, are for example expected to cover the most significant expenditures of social events and will be frequently asked to become godparents to a relative or a community member. Unfortunately, we have no data on transfers other than to the migrant's parents. There is an exception, though: we know the transfers made by the migrant to her community of origin. Among the migrants, 6 percent made monetary transfers and 18 percent labour contributions to projects undertaken in their community (Table 3).

3.4 *Asymmetries of Information*

If the transfers to the parents are not motivated by altruism, the migrant children might want to eschew them. One possibility to do so is by lying on their work situation and thus their earnings. This should however be more difficult for migrants with important family and community networks in the city since these latter might inform the parents on the migrants employment situation.

Using cross-reports on the type of work performed by the migrant, collected at both the level of the migrant and the household members remaining in the community, we construct a measure of misperception which can take three values depending on whether the family members correctly report, over- or underestimate the employment situation of the migrant. We are very conservative in the construction of this variable and consider only that there is misreporting when there is no doubt about the misperception. We assume, for example, that there is underestimation when the parents declare that their migrant child works as a domestic servant while the migrant actually works in an office as a secretary. On the other hand, we do not consider as misreporting a case where parents declare that the migrant works as a security guard while he actually works as a police officer. Finally, we take into account the fact that there might exist a delay in the updating of parental beliefs and we always verify the previous employment of the migrant. In spite of all these precautions, we still observe that almost half of the household members interviewed in the communities were unable to correctly state the type of work held by the migrant in the city. Almost one third underestimated the migrants type of job while 12 percent overestimated it.

As we would expect, misperception is associated with lower job stability and a longer migration period. Moreover, parents have a lower probability to underestimate the work situation of their children if the latter earn higher wages, which is again according to expectations.

The signs of the coefficients associated to our network variable are however unforeseen. We find that bigger community based networks within the city are associated with greater misperceptions about the earning situation. Even more surprisingly, we observe that parents have a higher probability to underestimate the professional situation of their children when their family network in the city is large. This is the opposite of what we should observe if networks provide information to the parents about their migrant child. Yet, as we have noted above migrants might also face demands from other family and community members, including from those living in the city. The number of solicitors, and consequently the incentives to underreport earnings, probably increases with the size of the network and this could explain the at first counter intuitive coefficients associated to the network variables. In this context, migrants will underreport their earning situation not only to the parents but to their whole network. Underreporting to the parents then serves a double purpose. First, it decreases directly demands from the parents and all those who rely solely on the parents for information. Second, it will confirm the erroneous information provided by the migrants to other network members. Indeed, if migrants try to avoid demands from a large number of acquaintances, they will have to lie consistently to all of them.

Table 4: Misperception of the migrant's occupation

	Goprobit	
	Overestimate vs Correct & Underestim.	Underestimate vs Correct and Overestim.
Family Network Size	0.030	0.130***
	(0.020)	(0.33)
Community Network Size	0.045*	0.070*
	(0.025)	(0.39)
Urban Network Size	0.022	-0.022
	(0.045)	(0.063)
Frequency of Visits	0.005	0.027*
	(0.004)	(0.016)
Migration Duration	0.068***	0.44
	(0.022)	(0.031)
Last Wage	0.000	-0.001***
	(0.000)	(0.000)
Job Duration	0.011	-0.039***
	(0.011)	(0.017)
Land Size	0.008	0.012**
	(0.005)	(0.005)
Ayllu community	0.066	1.167***
	(0.233)	(0.425)
Controls	Yes	
Nr. Obs.	254	
Wald Chi	145.57	

** * significant at 10% level, ** significant at 5% level, *** significant at 1% level. Robust Standard Errors clustered at family level between brackets. Other controls include birth order, family size, nr. of children, years of education, nr. of sheep owned by parents, interest in family land, who is responsible for the migration decision and if the migrant wants to move back to the community in the future.*

The positive and significant coefficient associated to the ayllu variable in the second column could be another indication that migrants act strategically and lie about their professional situation to avoid demands for transfers from their wider network. The communities of the Bolivian Altiplano can indeed be of two types: "ayllu" communities which exist since precolonial times and "ex-haciendas" which emerged from the dissolution of highland haciendas during the agrarian reform of 1953. Traditional norms of redistribution exist in both types of communities. Yet, traditions and norms have remained particularly alive in ayllu communities (Albó X., 1988, Rasnake R., 1988). We thus expect that migrants will face more demands and thus underreport their situation more frequently in the latter type of communities. This is exactly what we observe in our data.

4 Empirical Strategy and Results

The econometric analysis proceeds in two steps. In a first step, we present empirical evidence on the relationship between remittances and family, community and urban networks. We want to verify in particular whether the threat of exclusion from family and community based networks within the city acts as an enforcement device for remittances sent to the parents in a context of rural-urban migration. We find that this is not the case in the Bolivian highlands. Greater independence from family and community based networks in the city is associated with larger remittances for the parents. To explain this at first paradoxical result we explore some alternative mechanisms. Limited altruism, in the sense that it is directed towards the parents only, and sharing pressure from the family and community network within the city appear to drive our results. This mechanism is supported by important evidence based on our original data, including the data on misreporting of the earning situation. Yet, we are unable to present causal relationships because of the cross-section nature of our data.

4.1 Benchmark Regressions

4.1.1 Network size

The standard assumption in the literature is that migrant networks play an important role in regulating the behaviour of migrants vis-à-vis their communities of origin including remittances. Migrants rely on their networks for insurance in case of unemployment as well as for finding new jobs. The threat of exclusion from these networks should then act as an important enforcement device for remittances. This reasoning should however only hold for family or community based networks in the city and not for what we will call urban networks which are composed of acquaintances, unrelated to the migrants community and to whom the migrant could turn to for help in times of need. To assess the impact of the different types of networks on remittances we propose to estimate in a first step the following equation where we distinguish between urban, rural and family networks.

$$T_{i,j,c} = \alpha + \beta_1 FN_i + \beta_2 CN_i + \beta_3 UN_i + \delta X_i + \eta Z_j + \tau_c + \varepsilon_{i,j,c} \qquad (1)$$

where $T_{i,j,c}$ represents the total amount of remittances in cash or kind sent by migrant i to her parents during the 12 months preceding the interview, FN_i corresponds to the total number of family members living in the city, CN_i to the number of community members on whom the migrant could rely in times of hardship while UN_i represents the number of new acquaintances, unrelated to the migrants community and to whom the migrant could turn to for help in times of need. There are two vectors of controls, a vector of personal characteristics, X_i, and a vector of family characteristics, Z_j, which are likely to affect remittance behaviour. Family level controls include the age of the father and parental wealth indicators such as number of sheep owned by the parents, size of the parental land and whether the parents own arable plots, to control for altruism. A further family characteristic included in our estimation is the number of siblings, where we distinguish between migrant and non migrant siblings.

Migrant characteristics include a dummy variable which indicates whether the migrant told her parents that she was not interested in inheriting the family land. This variable should be of particular importance if the threat of disinheritance acts as an enforcement device. In addition we included a dummy variable indicating whether the parents coaxed a child to migrate since these latter children are not expected to send remittance to maintain land access (Michels 2019). We also include a binary variable measuring whether the migrant owns cattle to ascertain that remittances are not simply a payment for the care of the animals. Finally, we included birth, gender and measures of the employment situation of the migrant in our estimation: earnings and length of time in the current job.

Before discussing the results of this first estimation it is important to note that the decision to invest in one particular network is endogenous. Migrants who want to eschew the demands from their parents might indeed try to diversify their network and increase the size of their urban network. Yet, building relations of trust takes time and we can reasonably assume that it takes more than one year of acquaintance before a person declares that he would rely on another person in times of needs, especially if this person has no links with his previous network. This seems also to be confirmed by the low numbers of urban network members. If it is true that building trustful relationships takes more than a year, then the network measured at time t is an outcome of decisions taken at t-n where n>1. This means that transfers measured over the period $[t-1, t]$ were made after the decision on network composition was taken.

A first interesting observation from our first regression (Table 5, regression (1)) which casts some doubts about the role of the networks as an enforcement device is the negative but not significant correlation between the size of the family network and the amount of transfers. Yet, the negative correlation could be explained by the fact that migrants coordinate their remittances. If the urban family network is big there migth be more contributors and each one could send

Table 5: Benchmark Regressions

	Cash & Kind (1)	C. & K. (2)	IRR (3)	C. & K. (4)	Shock (5)
Family NW	-0.006				
	(0.005)				
Com. NW	0.104***				
	(0.016)				
Urban NW	0.160***				
	(0.034)				
UN/Total NW		0.030***	1.030***	0.033***	0.024**
		(0.008)	(0.008)	(0.008)	(0.010)
Total NW		0.025***	1.025***		0.010
		(0.009)	(0.009)		(0.014)
Mig. Siblings	0.425	0.357	1.429	0.386	0.555**
	(0.265)	(0.301)	(0.430)	(0.330)	(0.278)
Non Mig. Sib.	0.229**	0.210*	1.234*	0.243	0.193
	(0.100)	(0.112)	(0.138)	(0.113)	(0.124)
Birth Order	0.014	-0.194**	0.824**	-0.158*	-0.103
	(0.061)	(0.081)	(0.067)	(0.090)	(0.070)
Arable Land	-0.909***	-1.168***	0.311***	-1.241***	0.514
	(0.263)	(0.310)	(0.096)	(0.345)	(0.346)
Sheeps	-0.013***	-0.011**	0.989**	-0.014***	-0.000
	(0.004)	(0.005)	(0.005)	(0.004)	(0.005)
Not int. in land	0.491*	0.313	1.368	0.315	0.820**
(stated by migr.)	(0.258)	(0.282)	(0.386)	(0.305)	(0.374)
Land Size	-0.006	-0.007	0.993	-0.006	-0.000
	(0.005)	(0.006)	(0.006)	(0.006)	(0.003)
Joint Mig. Dec.	1.015*	1.327**	3.768**	1.652***	0.656
	(0.535)	(0.528)	(1.989)	(0.535)	(0.490)
Child Mig. Dec.	1.133**	1.553***	4.727***	1.756***	0.492
	(0.527)	(0.533)	(2.519)	(0.548)	(0.490)
Last Wage	0.0003***	0.0003***	1.0003***	0.0003*	0.0002*
	(0.0001)	(0.00001)	(0.0001)	(0.0000)	(0.0001)
Job Duration	-0.023*	-0.030**	0.970**	-0.033**	-0.016
	(0.012)	(0.012)	(0.012)	(0.015)	(0.016)
Gender	0.832***	0.818***	2.265***	0.844***	0.0496
	(0.234)	(0.222)	(0.502)	(0.235)	(0.285)
Owns Cattle	0.243	0.347	1.414	0.227	-0.837***
	(0.145)	(0.229)	(0.325)	(0.210)	(0.291)
Years Educ.	0.075**	0.037	1.038	0.073**	-0.004
	(0.030)	(0.033)	(0.034)	(0.033)	(0.036)
N	258	254	254	254	225
Wald Chi	967.06	684.70	684.70	700.82	97.85

** significant at 10% level, ** significant at 5% level, *** significant at 1% level. Robust Standard Errors clustered at family level between brackets. Family and Individual Controls included.*

less without decreasing the total amount of transfers to the parents. These two effects, higher enforcement vs more contributors, might then cancel out.

Concerning the community network, we observe as expected a positive significant correlation with remittances. But, we also observe a positive significant correlation between remittances and urban networks, where the latter coefficient is even larger than the former. This latter correlation, can certainly not be explained by the fact that parents use networks to ensure that migrants comply with their remittances duties since the members of the urban network are by definition not linked to the parents.

4.1.2 Independence from family and community networks

To disentangle the effect of network size from the enforcement effect we propose to use a measure of relative dependence on one particular type of network in the regression. Family and community based networks in the city can indeed only exercise pressure on the migrant to comply with her/his obligations to the extent that the migrant is dependent on these networks. We propose to measure independence from these latter networks by the proportion of links to the urban network in the total number of links to any network. The idea behind this measure is that, when the urban network is important within the total network the threat of exclusion from family and community networks is less powerful.

We thus propose to estimate the following equation in a second step:

$$Transfer_{i,j,c} = \alpha + \beta_1 Independence_i + Total\,NW + \delta X_i + \eta Z_j + \tau_c + \varepsilon_{i,j,c} \quad (2)$$

where $Transfer_{i,j,c}$ can be either binary, being equal to 1 or 0 depending on whether the migrant supported or not her parents in case of an earning shock, or continuous, the amount of transfers in cash and kind. Our main variable of interest, $Independence_i$ can take different forms. The benchmark case is $Independence_i = UN/(Total\,NW)$. A second set of measures is obtained when we include simultaneously three independence measures to distinguish between the effects of family and community networks : $Independence_{UC} = UN/(UN+CN)$, $Independence_{UF} = UN/(UN+FN)$ and $Independence_{CF} = CN/(CN+FN)$. The results of this last regression should however be taken with caution since we lose all migrants who rely exclusively on one type of network in this regression.[18]

In accordance with the above discussion, and the existing literature, we anticipate a negative coefficient for β_1. But, we observe the opposite: a positive and significant coefficient is associated to the share of urban networks in total networks (Table 5 regression (2)). The migrants who are the most independent from their family and community networks in the city are also those who remit the most to their parents. An increase of 1 percent in the share of urban networks

[18] $Independence_{UC}$ = UN/(UN + CN) will for example be reported as a missing value for all the migrants who rely solely on family networks. Indeed, for those migrants the denominator will be equal to zero. Other specifications which account for the differential impact of community and family networks are included in Annex 1

in the total network is associated with an increase of 3 percent in remittances. Consequently, the assumption that the threat of exclusion from community and family networks acts as an enforcement mechanism for remittances does not hold in our context.

Furthermore, we find a substantive body of evidence in favour of altruism as an important motivation behind remittances. Not only do poorer parents, who own less cattle and less arable land, receive more remittances but richer migrants send also more remittances. If altruism is the main driving force behind remittances to the parents our result on the independence of networks is also much less surprising. Indeed, there is no need for enforcement of remittances which are sent for altruistic motivations.

Note however, that altruism is not the exclusive motivation for remittances. We find some evidence that remittances are also sent to ensure access to family land trough inheritance. Children who were not coaxed to migrate sent more remittances than children who were pushed or even forced to migrate. We find however no evidence for the investment motive. The number of years of education is not significantly correlated with remittances. Nor do we find evidence that remittances are payments for services such as taking care of the migrants' cattle.

An interesting result from the tobit specification (Table 6 regression (6) and (7)) is that independence from community and family based networks is significantly correlated with the amount of remittances but has no impact on the probability to remit. Membership to large family and community based networks seems thus not to be linked to the willingness to remit but rather to the amount a migrant chooses or is able to remit.

When we distinguish between family and community networks (Table 6 regression (8)) we find that our results are mainly driven by family networks. We observe indeed that greater independence from family networks is associated with higher remittances while greater independence from community networks as measured by the share of urban networks in non family networks has a positive but non significant coefficient. Yet, we need to be cautious in our conclusions since we loose all the migrants who rely only on one particular type of network in this regression. The regressions presented in Annex 1 indicate that while community networks have a weaker impact they still behave in a similar way to family networks.

Table 6: Alternative channels I

	Tobit Prob. Rem. (6)	Tobit Amount (7)	C. & K. (8)	C. & K. (9)	C. & K. (10)
UN/Total NW	0.001	130.86*			
	(0.008)	(69.463)			
UN/(UN+CN)			0.006	0.006	-0.003
			(0.007)	(0.007)	(0.008)
UN/(UN+FN)			0.017**	0.010	0.005
			(0.009)	(0.010)	(0.010)
CN/(CN+FN)			0.023***	0.005	0.019***
			(0.007)	(0.009)	(0.007)
{UN/(CN+UN)}*CN				0.002*	
				(0.001)	
CN				0.074*	
				(0.042)	
{UN/(FN+UN)}*FN					0.004***
					(0.001)
FN					-0.001
					(0.006)
Arable Land	0.189	-6373.60**	-0.760**	-0.610*	-0.737**
	(0.330)	(3226.445)	(0.308)	(0.315)	(0.303)
Nr. of Sheep	-0.004	-85.04*	-0.014***	-0.014***	-0.014***
	(0.003)	(46.683)	(0.005)	(0.005)	(0.004)
Not int. in land	0.066	3377.43	0.927***	0.801***	0.744***
(stated by migrant)	(0.303)	(2450.842)	(0.244)	(0.251)	(0.229)
Joint Mig. Dec.	0.628	5288.30	1.743***	1.546**	1.663***
	(0.388)	(5973.899)	(0.634)	(0.631)	(0.633)
Child Mig. Dec.	0.748*	4216.24	2.071***	1.724***	1.845***
	(0.401)	(5642.236)	(0.617)	(0.620)	(0.605)
Last Wage	-0.0001	50.50***	0.0004***	0.0003***	0.0003***
	(0.00008)	(49.621)	(0.0001)	(0.00006)	(0.00007)
Job Duration	-0.009	9.49	-0.009	-0.011	-0.010
	(0.010)	(97.838)	(0.012)	(0.013)	(0.013)
N	248	248	214	214	214
Wald Chi	99.31	99.31	1,177.43	2,124.40	1,591.93

** significant at 10% level, ** significant at 5% level, *** significant at 1% level. Robust Standard Errors clustered at family level between brackets. Family and Individual Controls included.*

4.2 Alternative channels

Five alternative mechanisms could explain the positive correlation between our measure of independence and remittances. The first three are related to the role of networks in finding work and insuring the migrant during periods of unemployment:

(i) Urban networks are associated with better outcomes on the labour market. They are more efficient in providing employment, they give access to better paid or more stable jobs and migrants who are more dependent on those networks have therefore more income to share with their family members.

(ii) Urban networks provide better unemployment insurance and migrants who rely more on these networks have again more income left to remit to their family members.

(iii) Urban networks are less efficient in finding jobs, give access to less stable, less paid employment or do not offer insurance in case of unemployment and migrants who are more dependent on this type of networks have to rely more on their families in their communities of origin for insurance. As a result, they remit more money to stay in their family-based insurance group.

(iv) Migrants are altruistic towards their parents and want to send them transfers. But, continued participation in family and community based networks is not only conditional on the fulfillment of obligations towards the parents but also on transfers to a much wider network. In particular, migrants are expected to help other migrants from their family and community within the city. This implies that the migrant has to remit to a larger group of individuals and has consequently less income left to share with her/his parents. Participation in urban networks will also entail costs but these networks are smaller and there are fewer individuals with indirect links to these networks who could reasonably claim transfers from the migrant.

(v) Migrants who have invested in larger urban networks have some unobserved characteristics which make them more altruistic in general and not only toward their parents. As a result, they derive a higher utility from giving in general and consequently transfer more, not only to their parents, but to their entire network.

The first alternative explanation can be ruled out based on our descriptive statistics which clearly indicate that dependence on urban networks is negatively associated with labour market outcomes. Moreover, we control for income, job length and type of work in our estimation. The second explanation can also be rejected since less than two percent of the migrants declared that they received support from their urban network in periods of unemployment.

If the third mechanism is behind the positive correlation in our sample, we should observe that among the migrants relying more on urban networks, those migrants with low community and family networks are the most in need of the insurance provided by their rural family members. Consequently, we should observe that the relation between independence and remittances is stronger for migrants with smaller community and family networks. If, on the contrary, the positive correlation is due to lower pressure from urban network members for transfers we should observe the opposite: the benefits of independence are higher for migrants with important community networks. To test for these alternative explanations, we estimate the following equation:

$$T_{i,j,c} = \alpha + \beta_1\, Ind_i + \beta_2 NW_i + \beta_3 Ind_i * NW_i + +\delta X_i + \eta Z_j + \tau_c + \varepsilon_{ij} \quad (3)$$

The central result of these estimations (Table 6 regressions (9) and (10)) is that the positive correlation between remittances and independence is significantly higher for migrants with bigger community and family networks within the city. This result is in line with the presence of sharing pressure but not with the hypothesis that a greater need of insurance motivates the higher remittances associated to greater independence from community and family networks. We can thus reject this latter explanation.

Furthermore, we are able to rule out explanation (v), namely that more independent migrants are more altruistic in general and thus more prone to giving to everyone, by assessing the relation between independence and monetary contributions to community projects. We should indeed observe a positive correlation between independence and monetary contributions to community projects if independent migrants are more prone to giving in general while the opposite should be true if the sharing pressure argument holds. In this latter case, independent migrants would be less prone to receive and to succumb to monetary demands from their community. The significant negative correlation observed in equation (14) Table 7 allows us to reject the idea of greater general altruism and reinforces the argument on sharing pressure. Note also that we observe no significant correlation between independence from family and community networks and non monetary contributions to community projects (Table 7 regression (15)). This is again in line with the sharing pressure argument.

The sharing pressure argument can be further corroborated and even refined by using our data on misperceptions of the migrants earning situation. We have indeed shown in Section 3 that parents underreport the earning situation of their migrant child more frequently when the latter comes from an ayllu community and has large family and community based networks within the city. As we have noted above, this could be indicative for the fact that migrants do not make transfers to these latter willingly and thus out of altruism. If it is true that altruism is only directed towards the close family, what we call limited altruism along the distinction made by Platteau (2000) on limited trust versus generalized trust, and if migrants are prevented from sending transfers to their parents by pervasive claims from their wider network then migrants might underreport their earning with a view of decreasing demands from the wider network and increasing transfers to the parents. In this case, the purpose of lying to the parents is the opposite of what is generally assumed in the literature. Moreover, migrants will probably not only lie to their parents but rather to their whole network including the parents. Lying to the latter remains however crucial since it will decrease the demands of the network members relying directly on the parents information and it will corroborate the false information provided to the others.

Table 7: Alternative channels II

				Community	
	C. & K.	C. & K.	C. & K.	Money	Work
	(11)	(12)	(13)	(14)	(15)
UN/Total NW	0.035***	0.031***	-1.255	-0.002**	0.001
	(0.009)	(0.007)	(1.545)	(0.001)	(0.002)
Ayllu			-1.009**		
			(0.435)		
Ayllu*(UN/Tot. NW)			5.969***		
			(1.802)		
Overestimation	-1.580**	-2.198**			
	(0.643)	(0.960)			
Underestimation	0.121	-1.794***			
	(0.181)	(0.320)			
(CN+FN)		0.002			
		(0.006)			
Over. * (CN+FN)		0.090			
		(0.084)			
Under. * (CN+FN)		0.115***			
		(0.017)			
Not int. in land	0.164	0.123	0.365	-0.005	0.074
(stated by migrant)	(0.279)	(0.271)	(0.258)	(0.041)	(0.069)
Land Size	-0.004	-0.004	-0.008	0.001*	0.000
	(0.006)	(0.005)	(0.006)	(0.001)	(0.001)
Joint Mig. Dec.	1.821***	1.711***	1.125**	-0.058	0.043
	(0.523)	(0.584)	(0.540)	(0.036)	(0.072)
Child Mig. Dec.	2.063***	1.917***	1.383**	-0.012	0.187**
	(0.527)	(0.575)	(0.548)	(0.037)	(0.075)
Last Wage	0.0003***	0.0003***	0.0003***	0.000	0.000
	(0.00007)	(0.00007)	(0.00008)	(0.000)	(0.000)
Job Duration	-0.025*	-0.008	-0.025**	0.000	-0.001
	(0.014)	(0.011)	(0.012)	(0.002)	(0.004)
N	249	249	254	254	249
Wald Chi	839.08	1677.74	639.90	639.90	639.90

** significant at 10% level, ** significant at 5% level, *** significant at 1% level. Robust Standard Errors clustered at family level between brackets. Family and Individual Controls included.*

The relation between the underestimation of the income by the parents and remittances would then go in the opposite direction of what is generally assumed in the literature: underestimation is positively correlated with remittances, especially for big community and family networks. This is what we find in our data (equations (11) and (12) Table 7): parents who underestimate their migrant children's employment situation receive higher amounts of remittances when their community and family network is large while the opposite holds for small community and family networks. This indicates that while lying to avoid transfers to the parents is not completely absent in our sample, lying to eschew demands from the wider community and family networks seems to be present especially for migrants with large family and community networks.

Concerning the remittances of migrants who overstate their professional situation because they are ashamed to admit that they did not succeed on the urban labour market we were ex ante rather agnostic once we controlled for real earnings. We could indeed observe a positive correlation if they try to confer greater credibility to their lie through higher remittances. Yet, we could also observe a negative relation if they pretend in general to be wealthier than they really are and live above their means to give the image of someone who has succeeded. The latter explanation seems to hold in our data

Final evidence for our argument on limited altruism and sharing pressure stems from the distinction between ayllu and ex-hacienda communities. As noted above, traditional norms are much more alive in the former communities and we can thus expect that sharing norms have also remained more powerful in ayllu communities. This is confirmed by our data on underreporting. Moreover, most community institutions have been replicated within the city (Ströbele-Gregor, J., 1994; Lazar 2008) and sharing pressure should thus also be higher among migrants within the city stemming from ayllu communities. These latter might consequently be prevented from sending high amounts of transfers to their parents because of the numerous demands emanating from their family and community network. If this is true, the positive effect associated to independence from community and family networks should be particularly high for migrants from ayllu communities. This is what we observe in our data (Table 7 equation (13)). Migrants from ayllu communities remit significantly less than migrants from ex-haciends if they are very dependent on their family and community networks. Furthermore, we observe a positive significant correlation between remittances and independence but only for ayllu communities.

5 Conclusion

The central question of our study is the effect of migrant networks on remittances sent to the parents. Based on a unique dataset collected at both sides of the migration link in Bolivia we construct original measures of dependence from family and community networks and misperceptions of the migrants' employment situation. We show that contrary to what is generally believed in the literature, the migrants who are the most dependent on family and community networks in the city are also those who remit the least. Family based networks appear to be especially detrimental. Furthermore, we find not only that parents underestimate the employment situation of their migrant children more frequently when their family network in the city is large but also that those parents receive larger remittances. This is again in complete contradiction with the widely held believe that migrant children understate their income to eschew remittance obligations towards their parents. These, at first, paradoxical findings become however coherent once we take into account sharing pressure from the wider network, beyond the household sphere.

Migrant children may not only face pressure for transfers from their parents but also from their wider network. Membership of family or community based networks inside the city might be conditional on transfers not only to the parents but also to the wider kinship network, including the one in the city. We observe indeed that the smaller transfers to the immediate family are associated with higher financial participation in community projects. Furthermore, we find that the negative relation between remittances and dependence from family and community networks is particularly pronounced for migrants with large family and community networks within the city and for migrants stemming from ayllu communities. In these latter communities traditional redistributive institutions have remained particularly powerful.

These findings have important policy implications since they show that urban migrants send less remittances than they would choose altruistically to their poor households of origin because of sharing pressures associated to network membership in the city. Unstable work conditions in the informal market make migrants indeed highly dependent on these types of networks and thus vulnerable to predatory demands.

Appendix : Alternative Specifications

Table 8: Transfers: Differential Impact of Community and Family Networks

	C. & K. (i)	C. & K. (ii)	C. & K. (iii)	C. & K. (iv)
UN/Total NW	0.030***		0.007	0.010
	(0.008)		(0.010)	(0.010)
Total NW	0.025***	0.021***		
	(0.009)	(0.007)		
FN/Total NW		-0.022***		
		(0.004)		
(UN/Total NW)*CN			0.006***	
			(0.002)	
CN			0.051	0.125***
			(0.032)	(0.015)
(UN/Total NW)*FN				0.002**
				(0.001)
FN			-0.001	-0.007
			(0.005)	(0.005)
Arabel Land	-1.168***	-0.998***	-0.748***	-0.900***
	(0.310)	(0.269)	(0.281)	(0.261)
Nr of Sheep	-0.011***	-0.011**	-0.0119**	-0.012***
	(0.005)	(0.004)	(0.004)	(0.005)
Refusal	0.313*	0.529**	0.456*	0.472*
	(0.282)	(0.267)	(0.233)	(0.253)
Joint Migr. Dec.	1.327*	1.081**	1.197**	1.025*
	(0.528)	(0.549)	(0.526)	(0.525)
Against Migr. Dec.	1.553*	1.444***	1.345***	1.160**
	(0.533)	(0.541)	(0.519)	(0.519)
Last Wage	0.0003***	0.0003***	0.0002***	0.0002***
	(0.00008)	(0.0001)	(0.0001)	(0.0001)
Job Duration	-0.030*	-0.029***	-0.021*	-0.022*
	(0.012)	(0.011)	(0.011)	(0.012)
N	254	254	254	254
Wald	684.70	684.70	1,326.20	1,180.60

** significant at 10% level, ** significant at 5% level, *** significant at 1% level. Robust Standard Errors clustered at family level between brackets. Family and Individual Controls included.*

The central result from regression (ii) Table 8 is that dependence on urban family network decreases remittances sent to the parents. However the coefficient associated to our dependence measure is smaller in absolute value than the coefficient associated to independence from both community and family networks (regression (i) Table 8) - which is a first indication that community networks have also a detrimental effect on remitttances towards the parents. This is confirmed by regression (iii) and (iv) Table 8 where we observe that the benefits of independence from kinship networks increase with the size of both community and family networks.

Chapter 3

Unequal Bequests in Egalitarian Communities with Migration: Solving a Paradox of the Bolivian Altiplano

Anne Michels and Jean-Philippe Platteau

Abstract

This paper has been triggered by the observation, made in the Bolivian altiplano, that poor or unsuccessful migrant children may be more vulnerable to the risk of losing their right of inheritance to a share of the family land, and thereby an important source of insurance against bad luck on labour markets at the migration destination. In a setup where children can influence the parental decision to maintain or withdraw such a right, we would expect poor migrants to be especially eager to maintain their access to family land, thereby keeping the return option open. We write a model based on the assumption, verified in the Andean communities in particular, that the level of obligations to be met by migrant children to maintain their access to the family land is set at a uniform level. We then show that the exclusive strategy whereby parents fix these obligations at such a high level that unsuccessful migrants are unable to pay is a possible outcome. Moreover, it is all the more likely to be preferred if: (i) the weight that parents attach to the public good produced with the help of the migrants' contributory payments is lower, (ii) the size of the community of origin is smaller, (iii) the amount of output produced in the family farm is smaller; and (iii) the wage received by migrants in the event of a good draw on the urban labour market is higher. The relationship between the wage obtained in the event of a bad draw and the prevalence of an exclusive equilibrium is more complex and often non-monotonous.

JEL Codes: D02, D86, O12, F35

1 Introduction

Population pressure on land resources has been a major preoccupation in the development economics literature since the period immediately succeeding the second world war. The solution to this problem was found in rural-urban migration and the accompanying intersectoral redistribution of labour. One of the most debated questions was the effect of these migration flows on rural output and the supply price of labour in the cities or the non-agricultural sector (Nurkse, 1953; Lewis, 1954; Leibenstein, 1957, 1958; Sen, 1960; Fei and Ranis, 1964; Jorgenson, 1967; Berry and Soligo, 1968; Basu, 1992; Ray, 1998). The proposition that ended the controversy was that, except when income-leisure utility functions exhibit special features hardly found in reality, the higher marginal productivity of labour caused by migration leads to an increase in per capita agricultural output and income but to a decrease in total output. Moreover, the labour supply function is increasing. There is nevertheless a critical assumption on which the theory hinges: migrants do not keep rights over the family land, so that the land freed by their migration is fully available to the remaining workers in the native community.

This assumption has been called into question several decades later when the issue of inheritance rights in the context of migration started to draw attention of a number of development economists (Hoddinott, 1992, 1994; de la Brière et al., 2002; La Ferrara, 2007; Goetghebuer and Platteau, 2010; Chort et al., 2012). Parents may not easily disinherit their children (their sons in patriarchal societies) especially when the former decided that the latter should migrate (Michels 2019a). A major source of inspiration here is the strategic bequest theory that is based on the idea that parents use inheritance strategically: by making access to parental wealth conditional on the children's display of attention toward them, the parents can induce them to behave according to their own interests (Bernheim et al., 1985). Migrant children might indeed be interested in maintaining their ownership rights over their share of the family land, even assuming that family land may not be sold. On the one hand, they may want to return to their native place upon retirement. In this case, land pressure is eased since they will need land at a time when their parents will have become unable to cultivate it. On the other hand, they may be eager to insure against income shortfalls in the destination place, in which case their earlier return may possibly renew land pressure.

In the setup of the strategic bequest theory, inheritance decisions are taken at the level of the household under conditions of complete private property rights in land. But these conditions may not always apply as attested by the existence of corporate ownership rights vested in rural communities in clan-based regions of Latin America, Asia and SubSaharan Africa, and in communist China. More precisely, the land is allocated to families which hold individualized use rights but the local community has the right to re-apportion land when the demographic balance is modified, generally when certain families grow smaller in size as a result of the (permanent) migration of members. When land becomes scarce, however, re-allocation of plots stops and families acquire permanent rights over their landholdings. An essential feature of the corporate ownership system nevertheless subsists: land access rights are conditional on community membership status, and membership is lost if specified obligations vis-à-vis the entire community are not fulfilled (Platteau, 2004, 2006). This is verified not only in Africa but also in Latin American countries such as Peru and Bolivia (Albo, 1988; Rasnake, 1988; de Vries, 2015; Godfrey-Wood and Mamani-Vargas, 2016). Obligations toward the community typically consist of contributions to local public goods such as the building and maintenance of irrigation infrastructure or the organization of collective events and feasts. These duties, which all members of the community are expected to perform whether residents or migrants, are known as "cargo" in Bolivia, Peru, and Mexico, for example.

Honoring these obligations is especially difficult to satisfy when residents decide to migrate and seize upon urban economic opportunities. For migrants the community tax involves transportation costs to and from the destination place as well as the opportunity cost of labour caused by their temporary physical absence from their place of work. In Bolivia, for example, migrants often have to suspend their urban income-earning activities for one year or more to be able to comply with their duties in the community of origin (Lazar, 2008; Godfrey-Wood and Mamani-Vargas, 2016). If these expenses are to be avoided, they must pay a monetary compensation so that the community can hire local residents to perform the tasks required of them. In Peru, an in-depth case study has revealed that because migrants have to meet financial obligations lest they should lose their land access rights, migration has significantly increased the cash resources available to the community. Moreover, unlike individualized remittances these contributions have had the effect of strengthening community ties and preserving intra-community economic equality through the enhanced production of local public goods (de Vries, 2015). The critical point is that, when corporate ownership prevails, the prerogative of making inheritance conditional on the performance of some obligations belongs not only to the member families but also to the community.

In this context of communities possessing corporate land rights an interesting two-pronged dilemma arises. The first part of the dilemma involves a choice problem that is well-known in public finance theory. On the one hand, by extracting a higher tax from the migrants, a community is able to finance a larger amount of activities from which every member benefits. On the other hand, the imposition of a heavier burden on the migrants may dissuade some of them from maintaining their ties to the native location, as attested by the studies of de Vries (2015) for Peru and Lazar (2008) for Bolivia. From this standpoint alone, the problem of the community is simple: it should aim at maximizing the total revenue obtainable from the migrant population. But the problem is complicated by the fact that the decision has implications for land availability: the more migrants choose to maintain their inheritance rights, the smaller the amount of land per capita in the native location. When the land availability dimension is taken into account, we expect the optimal tax to be higher than the revenue-maximizing level. Precisely because the tax serves the double purpose of extracting money for the benefit of the rural community and preventing excessive land pressure, it is liable to produce equity effects. The tax may be so high that unsuccessful (poor) migrants are unable to afford the insurance that continuous ties with the native community offers them. In other words, those who are most in need of land insurance will be deprived of it. This would constitute a nasty paradox since the corporate form of ownership is precisely intended to equalize land access between families unequally endowed in per capita terms.

The problem is actually even more intricate because, unlike what has been implicitly assumed so far, the migrant's decision to maintain or to forsake land inheritance rights cannot be realistically separated from the migration decision itself. In other words, the cost of maintaining ties with the native community is internalized as soon as the decision to migrate or to stay in that community is made. There is indeed solid evidence suggesting that community members take into account the possibility of losing their land inheritance rights when contemplating migration (de la Rupelle et al., 2009, and Mullan et al., 2011 for China; Valsecchi, 2014 for Mexico). As for the non-migrants, they choose the taxation level with the knowledge that it will influence both the decision whether to migrate and the decision whether to pay the tax and thereby preserve membership status and land inheritance rights. More precisely, while setting the level of the community tax, rural residents are aware that higher taxes have contrary effects on land availability. On the one hand, a higher tax discourages migrants from keeping their land access rights and this has the effect of freeing land for those who have remained behind. On the other hand, a higher tax discourages community members from migrating because they anticipate that safeguarding their membership status will be more difficult, and this has the opposite effect of maintaining population pressure on locally available land. When this double effect is allowed for, the possibility of the unequalizing paradox becomes less evident.

Clearly, we need a theoretical model to elucidate such a tricky problem and determine whether the paradox may be observed. This central task is pursued in Section 3 where we write a principal-agent model in which the decision to migrate is endogenized and therefore made interdependent with the decision to pay the community tax. We show that in this complex setup the unequalizing paradox may indeed occur[19].

Before embarking upon our theoretical endeavour, we want to document the unequalizing paradox in order to show that it is not a purely intellectual puzzle (Section 2). This is done with the help of first-hand evidence collected in the Bolivian Altiplano: we compare two types of communities, one in which corpo-

[19]Note that the unequalizing potential of corporate land ownership, which arises from the double purpose of community taxation in a context of migration, contrasts with the equalizing effect of common property stressed in the works of economists (Weitzman, 1974; Jodha, 1986; Baland and Platteau, 1996; Baland and François, 2005). In their setup, a portion of the available land, typically of below-average quality, is earmarked as common property resource accessible by every member of the community. Assuming that member households are unequal in wealth, say because they possess larger or smaller privately apportioned landholdings or because they have different outside opportunities, it is argued that the poorer members use the common property resource as insurance while the richer ones do not need it.

rate ownership exists and migrants' inheritance rights are conditional upon the payment of taxes, or the discharging of duties, and the other type in which more complete private property rights in land prevail and migrants' obligations are significantly lower. As the data show, rural-urban migrants from the Altiplano have a tendency to refuse their share of inheritance. As one would expect from economic theory, this tendency is more marked among richer migrants, yet only in communities with private property rights. The opposite is observed in communities with corporate land ownership: poor migrants with the least stable incomes have a higher probability to voluntarily forego their land inheritance. Section 4 concludes the paper.

2 Documenting the unequalizing paradox: Case study of the Bolivian Altiplano

2.1 Communal taxation

In the Bolivian Altiplano, structural elements of traditional Andean organizations are still prevalent today, and the pre-conquest legacy of communal decision making in land matters remains largely intact (Albó X., 1988, Barragn R. and al, 2007). Neither the Spanish invaders nor the ruling hispanicized national elite of the post-revolutionary period were able to destroy the strong communal structures of the Andean peasant communities of Bolivia. Andean peasants accepted, without really challenging their legitimacy, the heavy tax and labour burdens imposed by the ruling classes but, on the other hand, they never accepted to abandon their cultural heritage and their ethnic identities (Albó X., 1988, Rasnake R., 1988, Klein H., 1992).

Inside the communities of the Bolivian Altiplano, the local assembly and a communal taxation system known as the cargo are perceived as central institutions. They constitute the main vectors of social cohesion and are considered as being the real pillars of the community. The assembly, which is composed of the heads of the landholding families, is the highest level of authority, and it takes the most important decisions concerning work organization, administrative questions and relations with the outside world. As a matter of principle, decisions are reached by consensus so that all community members regard them as binding. Participation in the assembly is very important and even mandatory in some places.

Cargo duties include the compulsory fulfillment of authority positions inside the community as well as mandatory labour and monetary contributions to community projects. They must be honored by the heads of landholding families in return for land access. Authority positions are attributed following a rotation principle, and every head of a landholding household must assume different offices during his lifetime, ideally ascending the entire hierarchical ladder[20]. Important financial, labour and time costs are involved since authorities

[20]The rotation principle for high positions within the *ayllu*, was established by the Spanish

have to organize, and bear the expenses of, different festivities and rituals. Although the highest authority positions require almost continuous presence in the community, they are essentially seen as a service that should not bring genuine awards or advantages. In particular, the prestige gains associated with cargo positions are comparatively small, and it is therefore not surprising that community members may be tempted to eschew them. However, most positions include important religious and ritual functions and the community therefore holds the right to take away land from any member who does not fulfill his communal obligations (Albó X., 1988, Rasnake R., 1988, Godfrey-Wood and Mamani-Vargas, 2016).

2.2 Corporate land ownership

In the Bolivian Altiplano, the average area of a family estate is high: 19 hectares in our sample. Land productivity is nonetheless very low at high altitudes (4,000 m above sea level). This is because only a very limited number of vegetables can be cultivated under the harsh local weather conditions. Consequently, almost all households are confronted with problems of land scarcity. On the other hand, there is a great measure of inequality in land distribution: while the biggest landowners in our sample, those belonging to the highest decile, hold more than 40 hectares, the households belonging to the lowest decile own less than 130 square meters.

Land is held under corporate ownership. This means that households have private usefruct rights over the parcels allotted to them, and also the right to rent or bequeath them. Land access rights, however, ultimately depend on community membership, an attribute that may be denied by the communal authority in some circumstances. In particular, removal of membership rights happens when a member ceases to participate in the most important activities of the community, and the crucial test of participation is provided by the willingness to pay the communal tax.

2.3 Ayllu communities and ex-haciendas

Communities differ significantly in the extent to which they follow the above two rules of corporate land ownership and collective taxation. Traditional communities known as "ayllus", which exist since pre-colonial times, must be distinguished from "ex-haciendas", which emerged from the dissolution of the highland haciendas during the 1953 agrarian revolution. While land titles are communal and not individual in the ayllus, members of the ex-haciendas did receive individual land titles during the agrarian revolution. Differences in land tenure rules have also given rise to important variations in the stringency and enforceability of the rules governing the collective taxation system. More particularly, the threat

authorities after the rebellion of the 1780's led by authorities from different parts of the Andeans. Before this era, high authority positions were attributed following the rule of hereditary succession, while lower authority positions, the ones concerning the organization of smaller *ayllu* units, were probably already attributed following a rotation rule (Rasnake R. (1988)).

of land confiscation is much less credible in ex-haciendas than in ayllu communities, even though only a very limited number of present community members is still in possession of a valid land title. As a consequence, ayllus have largely maintained their ancient organizational pattern unlike ex-hacienda communities which have evolved toward individualized forms of land tenure and community organization.

These inter-community differences will allow us to assess the influence of corporate land ownership on the taxation level and the persistence of community membership, using the ex-hacienda communities as a kind of control group. Since maintaining access to land in the native community may serve as a fallback option for poor migrants, we are also able to assess the effect of corporate ownership, via the taxation level, on the availability of insurance and the type of migrants who remain community members.

2.4 The dataset

Data was collected at both sides of the migration link, at the level of the migrants and at the level of their communities of origin. Community surveys have first taken place in eight Aymara communities in the Bolivian Altiplano from October 2008 to February 2009, followed a year later by a migrant survey in La Paz and El Alto during the same months.

The eight communities of our sample were selected based on their distance from La Paz, so as to try to maximize the variation in the incidence of migration between villages. During the rural survey, data was collected at both community and household levels. Three communal figureheads, the head and two members of the local assembly, were queried about local norms regarding customary land rights, inheritance rules, migration, and governance structures in particular. Furthermore, 454 households were drawn at random, and the household head or his spouse were interviewed to elucidate inheritance practices, intra-household organization of land property and usufruct rights, children's migration experience, and their role in the inheritance decision process.

In a second step, the migrant children themselves were surveyed in La Paz and El Alto, the two main poles of attraction for the emigrants of the Altiplano. The corresponding sample is composed exclusively of individuals belonging to households investigated during the rural household survey. Tracing the migrants has been an extremely difficult task because family members living in the communities of origin almost never know the address of the migrants, whether children or siblings. In fact, we were able to meet only 354 of the 765 migrants declared as living in La Paz or El Alto by the sample rural households. With such an important attrition rate, we may fear the presence of a sample bias. Fortunately, based on information collected among family members in the communities of origin, Michels (2019a) shows that the missing migrants are not statistically different from those who could be interviewed during the second round, at least as far as the key aspects of the study are concerned. Among the interviewed migrants, detailed information was collected on their interest for, and involvement in, the family farm, their migration experience, and their working conditions in La Paz and El Alto.

2.5 Descriptive statistics

Because of the difficult living conditions inside the communities, many young adults choose, or were forced, to leave their native community. At the time of the survey, 84 percent of the families interviewed in the first round counted at least one migrant, and 57 percent of the children belonging to the sample households had migrated. In the Altiplano, migration is with very few exceptions permanent: only 4 percent of the migrant children remained in the city for less than 12 months. However, almost 40 percent of the migrants interviewed in La Paz or El Alto plan to move back to their community in some distant future. Migration starts at a rather young age (18 years on average) and responsibility for the migration decision lies mainly with the migrant children themselves: 77 percent of them took the decision to migrate.

Urban centers in Bolivia are the main destination for migrants: La Paz and El Alto alone attract 72 percent of the migrants of our sample[21]. Upon arrival almost all migrants started to work immediately and, at the time of the survey, 54 percent were self-employed (out of whom 37 percent owned their business). The three main occupations for men are driver, builder and tailor while women work mainly as shopkeepers, stallholders or domestic servants. Average monthly earnings amount to 1,350 bolivianos per month[22], yet this average conceals important inequalities: the richest 10 percent earn more than 2,560 bolivianos while the poorest 10 percent earn less than 400 bolivianos. Job security is relatively low: on the one hand, the huge majority of the migrants work in the informal sector and, on the other hand, even among those working for an employer only 12 percent possess a written job contract. Job turnover is also relatively high: the average migrant has held three long-term jobs and a multitude of short-term employments. Moreover, 21 percent suffered from rather long spells of unemployment.

In this context of high uncertainty, guaranteed access to land in the native community provides a valuable fall back option. Yet, a lack of interest in the family land on the part of migrant children was often deplored by family members during the rural interviews. This lack of interest was later confirmed during the interviews with the migrant children themselves: 13 percent of them declared to have told their parents that they were not interested in their share of the family land and 12 percent said that they had either refused or given away the land bequeathed to them (see Table 1).

This decision to forsake land inheritance is not influenced by pessimistic expectations regarding the parents' intended bequest decision (Michels 2019a).

[21] Important wage differentials also make neighboring South American countries such as Argentina, Chile and Brazil attractive for migrants from the Bolivian Altiplano and 7 percent of the migrants of our community sample chose to migrate to this second type of destination. Finally, surrounding communities constitute a third important destination for rural Bolivian migrants (14 percent).

[22] At the time of the survey the exchange rate was: 7 bolivianos = 1 US dollar.

Table 1: Indicators of the migrant child's interest in land

1. Migrant told parents s/he was not interested in inheriting land	13.03%
2. Migrant refused her (his) share of inheritance	6.97%
3. Migrant gave away her (his) share of inheritance	5.26%

In other words, expression of disinterest in family land cannot be treated as an ex post justification or as a way to suppress cognitive dissonance. As it became clear during the interviews, the forsaking decision, when it was stated, was generally motivated by the high costs involved in maintaining land rights in the Bolivian Altiplano.

2.6 Econometric evidence

As a rule, we expect more successful or richer migrants to forsake their inheritance rights. Indeed, there are four plausible reasons why migrants may wish to hold on to their share of family land. First, they may plan to return to their native community at old age. As we have noted above, more than one-third of the respondents mentioned this motive, and it was evident during the interviews that they did not feel well integrated in the urban society and continue to hold a glorified image of community life[23]. Second, migrants might wish to keep land in their communities because of the incomes obtained from its cultivation. Yet, when due account is taken of the portion of those incomes that accrues to the caretakers of the land (typically, the siblings), and when it is remembered that soil quality is very low in the Altiplano, this second motive does not appear to be strong. A third possible consideration in the minds of the migrants, which we have pointed out in the previous section, is the insurance benefit resulting from continued participation in the life of the community. Finally, the emergence of the Indianist movements after the election of Evo Morales as the first Indian President in 2005 has entailed important political benefits for active members of indigenous rural communities. As a matter of fact, community membership has become a strategic manner of asserting an Indian cultural identity that pays off in the ongoing political game.

Out of the four above-mentioned benefits, the first three suggest that migrants enjoying high and regular incomes (labeled successful migrants henceforth) are less interested in retaining their bequest rights and their ties with the community. The fourth motive probably drives the opposite relationship, yet there is no evidence in our sample that it plays any significant role.

In line with the above hypothesis, we check whether more successful migrants have a higher probability to give up their share of family land. More precisely, the dependent variable in our regression, labeled Refusal, is a dummy variable equal to 1 when one of the following situations are observed: (i) the migrant

[23] See also Ströbele-Gregor (1994) and Canessa (2000)

child clearly expressed to his/her parents a disinterest in land bequest, (ii) the child refused his/her share of land inheritance at the time of bequest, and (iii) the child donated it. Success is measured along two dimensions: the level and security of incomes at the migrant's destination place. Income is measured continuously on a monthly basis and we proxy job security by the total number of months a migrant has been unemployed.

At first sight, the results displayed in the first column of Table 2 come as a complete surprise: the coefficients associated to the length of unemployment spells and income have both counter-intuitive signs : positive and significant in the first case and negative and non-significant in the second one. So far, however, we have left out the institutional setup of the rural communities. The possible role of communal taxation has thus been ignored. Yet, maintaining rights over family land comes with a significant cost and unsuccessful migrants might not be able to afford the cost of community membership. Consequently, the relationship between the attitude toward land inheritance and migration success must be re-estimated with explicit allowance for this institutional dimension. Toward that purpose, we distinguish between ayllu and ex-hacienda communities since the communal tax system is only effectively enforced in the former. In these traditional communities, higher incomes and more secure employment conditions may be more rather than less conducive to the preservation of land inheritance rights. On the contrary, in communities where the communal tax on migrants is low or weakly enforced, the opposite, intuitive relationships should be observed: only those who most need a fall-back option do keep their access to land open.

In order to test the effect of migration success on land inheritance in a way that allows for the role of institutions, we include thus two interaction terms in the list of independent variables: the first between income and ayllu, and the second between unemployment duration and ayllu where *Ayllu* is a dummy equal to one when the community has not been colonized and equal to zero when it is an ex-hacienda

We must obviously worry about the possibility that the effect of communal taxation is confounded with that of distance: insofar as the ayllus are more remote than the ex-haciendas, the liquidity constraint operating in the former could just arise from the presence of significantly higher transaction costs. Fortunately, we have precise information about the amount of time needed to connect the destination location of each migrant and the family farm. This variable, labeled distance, is more meaningful than measures of physical distance which do not allow for heterogeneity in the transportation means used. The regression equation is then:

$$Refusal_{ij} = \alpha + \beta_1 Ayllu + \beta_2 Income_{ij} + \beta_3 Ayllu.Income_{ij}$$

$$+\beta_4\, Unemp. + \beta_5 Ayllu.Unemp._{ij} + \delta Y_{ij} + \eta Z_j + \varepsilon_{ij}$$

In accordance with the above discussion, we expect a positive coefficient for β_1 and β_5 a negative coefficient for β_3. We are rather agnostic about the signs of

β_2 and β_4 since in ex-hacienda setting unsuccessful migrants faced with liquidity constraints may or may not be prevented from keeping their land rights.

To estimate this relationship we use a probit specification where we control for cluster effects at family level and community effects.

The central result is that we now observe a significant positive correlation between income and the forsaking of land inheritance rights in ex-haciendas while the relationship is inverted for ayllus (Table 2 regression (2)). In the latter, indeed, the sum $(\beta_2 + \beta_3)$ is negative and significantly different from zero (at the 95 percent confidence level). Since we control for the distance between the location of the migrants and their community of origin, we may interpret the above result as follows: a rise in income in the ayllus eases the liquidity constraint that may prevent migrants from bearing the costs associated with landownership. In the ex-haciendas, because these costs are much less significant, the liquidity constraint is not binding. A second crucial result concerns our job security variable (measured as the inverse of the duration of unemployment spells): migrants who experienced longer spells of unemployment have a lower probability to forego land inheritance, yet in ex-haciendas only. In ayllu communities, job security is conducive to the preservation of land inheritance rights: there, fulfilling communal obligations is costly - it may require leaving a job in the city for one year or more, as noted in section 1 - and migrants who have experienced long periods of unemployment may be more reluctant to give up an urban income earning activity for the sake of maintaining community membership. Finally, as is evident from the positive sign of β_1, the probability of forsaking land inheritance is significantly higher in ayllus.

To further check the robustness of our results, we have estimated two separate demand-for-inheritance functions, one for ayllus and the other for ex-haciendas (see Table 2, regressions (3) and (4)). The intuitive relationship is again confirmed in the case of the ex-haciendas: migrants with higher incomes who have not experienced long periods of unemployment are more inclined to forsake their share of inheritance (Table 2 regression (4)). In ayllu communities, on the other hand, cost considerations seem to exert a significant influence on the migrant's decision to safeguard their inheritance rights: low incomes and low employment security in the destination location have the effect of increasing the probability of foregoing inheritance (Table 2 regression (3)).

Because of the rather rough nature of our data, our small sample, and the complexity of the question under investigation, we cannot claim to have established causal relations between our dependent and explanatory variables. This is in spite of the fact that our central result is based on an interaction term which reduces the number of possible biases in our estimation. The main merit of our empirical exercise is to have uncovered thought-provoking and counter-intuitive correlations for which we are able to propose an explanation that can be rigorously articulated (see the next section).

Table 2: Migrant's decision to forsake land bequest

	Probit	Interaction term	*Ayllu*	*Ex-Hacienda*
	(1)	(2)	(3)	(4)
Ayllu		1.050***		
		(0.400)		
Income	-0.088	0.337**	-0.321***	1.016**
	(0.085)	*(0.140)*	*(0.118)*	*(0.413)*
*Ayllu**Income		-0.672***		
		(0.171)		
Unemployment	0.125*	-0.299*	0.230***	-0.667**
	(0.073)	*(0.163)*	*(0.080)*	*(0.325)*
*Ayllu*Unemployment*		0.484***		
		(0.184)		
Distance	-0.311	-0.209	0.498	0.771
	(1.436)	*(0.145)*	*(1.609)*	*(1.061)*
Migration duration	0.023	0.022	0.020	0.086
	(0.016)	*(0.018)*	*(0.019)*	*(0.071)*
Years of education	0.020	0.024	0.034	-0.006
	(0.028)	*(0.028)*	*(0.040)*	*(0.065)*
House ownership	-0.072	-0.035	-0.251	0.708
	(0.213)	*(0.213)*	*(0.261)*	*(0.564)*
Woman	0.077	-0.024	0.408	-0.630
	(0.211)	*(0.214)*	*(0.262)*	*(0.422)*
Nr. children	-0.032	-0.045	0.059	-0.197
	(0.072)	*(0.068)*	*(0.091)*	*(0.155)*
Nr. siblings	0.010	0.010	-0.021	0.037
	(0.049)	*(0.050)*	*(0.062)*	*(0.119)*
Land size	0.001	0.003	0.000	0.131
	(0.003)	*(0.003)*	*(0.003)*	*(0.104)*
Nr. sheep (parents)	-0.001	-0.001	-0.003	-0.017
	(0.004)	*(0.003)*	*(0.004)*	*(0.022)*
Controls[A]				
Community effects[B]	*Yes*	*No*	*Yes*	*Yes*
Nr. Obs.	297	297	190	105
Wald Chi²	53.33	74.33	67.39	1042.91
Pseudo R^2	0.113	0.151	0.192	0.431

** significant at 10% level, ** significant at 5% level, *** significant at 1% level*

Robust standard errors clustered at family level between brackets.

[A] *Controls include age, birth order, marital status, identity of the person responsible for the migration decision, nr. of migration destinations, fathers migration status, durable goods, land tenure of spouse and characteristics of the family land*

[B] *Our results do not change significantly when we add community fixed effects. However, we are unable to interpret the ayllu coefficient in this case.*

3 Maintaining membership status or not: A theory

3.1 The setup and game structure

Our task now is to provide a rationale for the scenario documented in Section 2. In other words, we want to prove that a community where land is under corporate ownership in the sense that the right to hold and use the land is conditional upon membership may impose on its migrants a membership tax so high that the poorer of them will be unable to afford it. Because the problem at hand is complex owing to the interdependence between the migration and the tax payment decisions, we need to make a number of simplifying assumptions. The first assumption concerns the actors and their interactive framework. We adopt a principal-agent setup in which the agents are children facing two decisions -whether to migrate and whether to pay the community tax-, and the principals are family heads who choose the level of that tax. Prior to migration, all the families have identical size and land endowment so that they necessarily agree on the tax which is uniform across the whole community.[24] By considering a representative family unit, we assume away all problems of aggregation of heterogeneous choices regarding the tax. An alternative way of circumventing the aggregation problem is by positing that the family is a clan or kinship network that coincides with the community and has a unique leader at the top. Because the assumption of identical family units is admittedly strong, we will discuss how in communities where an assembly attended by all the family heads makes decisions democratically (one man one vote), family heterogeneity would affect the community tax level. This will be done after having worked out the complex mechanics of the model.

Second, the tax is set by family heads at a uniform level. This is in contrast to the strategic bequest theory of Bernheim et al. (1985) which assumes that parents have perfect information regarding the income level of their children and consequently decide the share of bequest deserved by each child in the light of this information and the attention provided. In the strategic bequest model parents are thus able to "finely tune" the bequest shares accruing to their children. The assumption of perfect information is however unrealistic in migration situations where children are able to manipulate information in order to decrease their obligations vis-à-vis their family or community (McKenzie et al., 2013; Ambler, 2015; Michels, 2019b). Community members could overcome this type of problem by relying on information networks at the destination (Chort et al., 2012), or they could set a uniform attention level, which can be viewed as minimal obligations that migrants must meet in order to maintain their land access rights (Hoddinott, 1994).

We thus study the decision making process within a representative family belonging to a rural community composed of k families. Each family is composed

[24]We can alternatively assume that family units have varying size and land endowment but their land per capita ratio is identical. Under constant returns to scale, their situation would be identical and, therefore, they would choose the same taxation level.

of 1 parental couple (called the head) and a set of children N of size n. We consider 2 periods of time $t \in \{1, 2\}$. At the beginning of the first period, the n children have to decide whether to stay in the village v or to migrate to the city c. The subset of migrant children is of size m and is noted $M \subset N$. When taking the migration decision, children take into account the fact that they might subsequently lose the possibility of returning to the community. Migration can indeed last 1 or 2 periods depending on the migrants earnings in the city. In the latter high or low wage employments are randomly attributed at the beginning of each period. Faced with this uncertainty, some migrants may be willing to have the fallback option of returning to his/her village of origin at the beginning of the second period. However, they are only entitled to return migration if they have maintained their community membership rights, including land access. To this end, they are required to fulfill all of their duties as a community member, even during their migration period. In particular, they need to pay a community tax, X,which is used to finance a local public good, G, in period 1. The subset of agents who payed the community tax, called the contributing migrants, is of size p and is noted $P \subset M$. Among the contributing migrants a subset $R \subset P$, namely those who had a bad draw on the urban labour market, will return to the community at the beginning of the second period. Migrants who were unable or unwilling to pay the community tax in period 1 forego this possibility.

Let us now describe the timing of the model in more details:

Period 1:

1. At the beginning of period 1, the level of the communal tax for period 1, X, is set by the family head.

2. Each of the n children decides whether to migrate or not, anticipating that they will have to pay X if they want to maintain their access to land.

3. Migrants, $M \subset N$, observe their first period urban wage, w_1^i, $i = L, H$, and decide whether to pay X. If they do so, they belong to the set of contributing migrants, $P \subset M$, which makes them eligible to return migration in period 2.

4. The family head and the remaining $(n - m)$ children share equally the income derived from the first period's farm production and consume the public good, G,financed by the tax contributions of the contributing migrants, $P \subset M$.

Period 2:

1. Migrants observe their second period urban wage, w_2, and contributing migrants, $i \in P$, decide whether to reverse their migration decision and return to their native community. This determines the set of returnees, $R \subset P$.

2. The agricultural income of the second period is shared equally among the family head and on-the-farm children, including the returnees.

Notice that while our principal-agent set-up is close to the strategic bequest model of Bernheim et al. (1985) it differs along three crucial dimensions. First, we have endogenized the migration decision, thereby bringing more complexity to Bernheim et al's model. Second, as noted above, contributions are set at a uniform level. Finally, the contributions are used to finance a local public good in our setup which is consumed by all residents unlike in the strategic bequest model where migrants pay individualized remittances to their own parents. Our setup has important within community equity effects since in our case the whole community is able to benefit from the successful migration experience of some of its members.

3.2 The setup and utility functions

We assume that agents' utility is additively separable across periods and they discount the future by a factor $\delta \in [0, 1]$. In each period, agents' utility depends on their location $\{v, c\}$. In the village, in period 1, agents derive utility from land and from the local public good, which is produced by contributing migrants and then consumed by residents. The public good can be seen as a flow of services, potentially attached to land, but not necessarily. We assume that only migrants bear the costs of the public good in order to reflect the fact that the costs associated to fulfilling community duties are much higher for migrants who live far away from the community. Furthermore, we assume that the level of the tax, X, is positive ($X \geq 0$), implying that the parents may not offer monetary incentives to their migrant children in order to induce them to leave the family. Finally, we suppose that the children who have decided to stay within their native community (within their family) automatically accept their due share in the family land. They indeed need this land to make a living. Consequently, they play no active role in the model.

Formally, in period 1, the utility level in the village is given by:

$$u_{v1} = \frac{Q(A, L)}{1 + n - m} + \gamma pmkX$$

where the first and second term correspond to the utilities derived from access to family land and the public good respectively. The numerator of the first term corresponds to the total output of the family farm, $Q(A, L^F)$ where A is the (fixed) amount of land and L is the total labour input applied to it. The denominator is the total number of members entitled to an (equal) share of the output, that is, the family head (or the parents counted as one unit) and the remaining children. Regarding public good benefits, we assume that the public good benefit is linear in the aggregate value of tax contributions, and a weight γ (with $0 < \gamma \leq 1$) measures the extent to which this value is transformed into an individual's utility.

Notice that we adopt the convenient assumption that farm production, $Q(.)$, is constant, which implies that L is also constant (since A is fixed), regardless of the number of returning migrants. This assumption, made for the sake of simplicity, has been extensively discussed in a rather old literature dealing with disguised unemployment (Nurkse, 1953; Lewis, 1954; Sen, 1960; Berry and Soligo, 1968; Bliss and Stern, 1982). A central conclusion of this literature is that output remains invariant after the departure of one or more household members only when there is weak preference for leisure, such as when the income-leisure indifference curves are linear (constant rates of substitution between income and leisure), there is extensive saturation for leisure (the utility of leisure is zero not only at the margin but also infra-marginally), or leisure is an inferior good. Under these conditions and assuming constant returns to scale, household members respond to the departure of one sibling, which causes per capita land availability and marginal labour productivity to increase, by raising their effort levels so as to exactly compensate the loss of the migrant's effort. Total output, which depends on labour only (A is fixed), therefore remains constant, and individual income increases. The same reasoning applies, *mutatis mutandis*, to the situation in which a member returns from migration and per capita land availability declines: individual income then decreases.

This assumption is admittedly strong, yet what matters for our purpose is that it conveys a sensible idea, namely that, in a context of land scarcity, farmers incur a loss of income when a family member returns from migration. It is actually innocuous because assuming that farmers have more conventional income-leisure preferences (leisure is a normal good) would also yield the desired conclusion.[25]

In the city, the utility of a migrant i during period 1 depends on their current wage $w_1^j \in \left\{w_t^L, w_t^H\right\}$ and whether they pay the communal tax :

$$\begin{aligned} u_{c1,i\notin P} &= w_1^j \\ u_{c1,i\in P} &= w_1^j - X \end{aligned}$$

Wages are randomly assigned in the beginning of each period and the expected utilities are given by:

$$\begin{aligned} Eu_{m1,i\notin P} &= (1-\pi)\, w_1^L + \pi.w_1^H \\ Eu_{m1,i\in P} &= (1-\pi)\, w_1^L + \pi.w_1^H - X \end{aligned}$$

where π corresponds to the probability for a migrant to find a high paid job w_t^H in any period. This probability is assumed to be identical in the two

[25] When the land scarcity constraint is tightened as a consequence of return migration, family members respond by decreasing their individual effort level so that their individual income declines. Because the percentage decrease in individual effort is smaller than the increase in labour effort caused by the presence of one additional worker, total labour input L and total output $Q = Q(A, L)$ rise. Under the more extreme leisure-related assumptions that underlies our equation, total labour input and total output are constant. As a consequence, the fall in individual income is even more important. It will be actually easy to infer the direction in which our results should be adapted if Q were to vary according to more conventional assumptions.

periods, which implies that the probability to find a good job in the second period is independent of the realized state in the first period [26]. Notice further that, even though the second period urban wage is random and return migration can be seen as a form of insurance, we assume that agents are risk neutral. This allows us to simplify the analysis while still considering one of the main benefits of having a fallback option in the village. Indeed, the fallback option gives the migrant a lower bound on his/her second period income (utility), which both reduces the variability and increases the mean of second period income (utility). This effect is present in the model and suffices to produce a demand for insurance with desirable properties.[27]

In the second period, migrants who have paid the communal tax have the possibility to return to the community if they have a bad draw on the urban labour market contrary to the migrants who chose not to pay the communal tax. Formally, in period 2, the migrants utility is given by

$$\begin{aligned} Eu_{m2,i\notin P} &= (1-\pi)\, w_2^L + \pi . w_2^H \\ Eu_{m2,i\in P} &= (1-\pi)\, u_{v2} + \pi . w_2^H \end{aligned}$$

with

$$u_{v2} = \left(\frac{Q(A, L^F)}{1 + (n-m) + p.m(1-\pi)} \right)$$

where the denominator of u_{v2} is the total number of residents in the community in the second period, that is, the family head (or the parents counted as one unit), the non migrant children, $n-m$, and the migrant children who paid the tax, $p.m$, with $0 \leq p \leq 1$, and had a bad draw at the start of the second period.

In defining Eu_{m2}, we focus attention on the insurance benefits of maintaining rights over family land, so that X can be viewed as a risk premium. There are other potential benefits, but we have chosen to ignore them in order to keep the problem as simple as possible. No additional insights would be gained by allowing for these additional utility components.

Furthermore, we assume that all the benefits of the public good are consumed during the first period, so that the only benefit obtained by tax-paying children is to keep open the option of returning to their community and make a living there during the second period. If this were not the case and future public good consumption would be an additional expected benefit for migrants, it could easily be the case that all contributing migrants choose to return to the family farm in the second period. Such a prediction would not match the observed

[26] The frequency with which the migrant children are paid their wage income and make their tax payment is left outside the model. Employers could for example "advance" the wage of the worker at the beginning of each sub-period either in cash or in kind (lodging, food,...) and work out the net income owed to the worker at the end of each of those subperiods.

[27] The term insurance will be used in the paper for legibility, but we acknowledge that this use is slightly abusive under risk neutrality. Insurance has to be understood as benefiting from a fallback option, which is the main purpose of return migration when migration fails.

reality. Note that assuming away future public good benefits is not empirically groundless since the public good largely consists of collective events that are more or less instantaneously consumed. Finally, we assume that a migrant who receives a high wage in the second period never decides to return to the family farm. If it were not true, a child would never opt for migration. This assumption actually comes down to limiting our attention to situations where A is small enough, that is, where land is sufficiently scarce to make migration potentially attractive.

We can now turn to the principal's problem. The family head, denoted f, is selfish and risk-neutral in our setup. If he were altruist, indeed, he would never tolerate a situation in which the least successful (migrant) children would be deprived of their inheritance. The assumption of risk neutrality will considerably simplify the analysis and, as will be explained later, the direction in which this assumption influences the results can be predicted.

Like for the children, the family heads' utility is additively separable across periods and he discounts the future by a factor $\delta \in [0, 1]$. Similar to non migrant children he derives utility from land and from the local public good. We assume however that the family head has retired from work in period 2. Consequently, he (and his wife) are fully dependent on their children for their livelihood in the second period. We naturally assume that they obtain an income only if at least one child works on the family farm in the second period.

Formally:

$$\begin{aligned} Eu_{f,m<n} &= u_{v1} + \delta u_{v2} \\ Eu_{f,m=n} &= u_{v1} + \delta \left[1 - (\mu)^n\right] u_{v2} \end{aligned}$$

where μ is the probability that one particular child does not return to the community and thus $[1 - (\mu)^n]$ is the probability that at least one migrant child has been willing and able to return.

To make the problem interesting, we assume hereafter that there are at least two children in the family ($n \geq 2$).

3.3 The children's problem: to accept land bequest or not?

We solve the model backwards and start with the migrants' decision to accept or refuse to pay the community tax in the first period. Upon observing their first period wage, migrants decide whether to pay the tax. At this stage of the game, the set of migrants, M, and the level of the communal tax, X, are considered as given. Migrants pay the tax if the expected benefit, the option value of land rights, exceeds the certain cost represented by the associated burden, that is,

$$-X + \delta \left\{(1-\pi)\, u_{v2} + \pi . w_2^H\right\} \geq \delta \left((1-\pi)\, w_2^L + \pi . w_2^H\right) \qquad (1)$$

Migrants will thus accept to pay the tax if and only if:

$$X \leq (1-\pi)\,\delta\left(\frac{Q(A, L^F)}{1+(n-m)+p(1-\pi)m} - w_2^L\right) = \bar{X} \qquad (2)$$

where $\bar{X}$ is the threshold value of X above which a migrant will refuse to maintain her/his membership status. Note that the above condition is meaningful only if $\bar{X} > 0$, which implies that $u_{v2} > w_2^L$, where u_{v2} is endogenous as it depends on the number of residents in the community in period 2, which is itself determined by the number of returnees $p(1-\pi)m$.

It is evident that $d\bar{X}/dA > 0$; $d\bar{X}/dm > 0$; $d\bar{X}/dw_2^L < 0$; $d\bar{X}/dn < 0$; $d\bar{X}/dp < 0$. All these results are according to intuition: the larger the land area and the higher the number of migrants in the family, the higher the maximum acceptable value of the tax; the higher the wage of a badly paid job in urban locations, the higher the total number of children in the family, and the higher the proportion of migrants who have paid the tax, the smaller that critical value. On the other hand, $d\bar{X}/d\pi$ cannot be signed.

In addition to the profitability condition (2), there is a budget constraint since the migrant must have the wherewithal to pay the tax:

$$w_1^i - C \geq X,\ i = L, H \qquad (3)$$

where C stands for the subsistence consumption in the city in any period, assumed to be given.

Migrants pay the tax if and only if both , (2) and (3), are satisfied. In particular, if parents set X so that $X > w_1^L - C$, migrants who had a bad draw in the first period are excluded from land inheritance even though they may perceive it as profitable.

3.4 Migration decision

Every child must decide whether to migrate or stay with their parents on the family farm. We model this decision as though all the children take it simultaneously. This approach allows us to simplify the analysis at a low cost. Our main interest, indeed, lies in the number of children who decide to migrate (m out of n), not in the question as to which child migrates and in which sequential order. The condition describing the migration decision is more complex than conventional expressions because in our setting the children take account of the cost of maintaining land bequest rights.

Two scenarios are especially interesting to discuss (the reader will find in Appendix 1 a summary of the terminology used in the whole paper). The inclusive scenario, on the one hand, occurs when the profitability and budget conditions, (2) and (3), are satisfied for both types of migrants, those with a good and those with a bad draw in the first period. The exclusive scenario, on the other hand, is observed when (2) is satisfied but (3) is violated for the migrants with a bad draw. The scenarios where the profitability condition (2) is not satisfied are less insightful and are discussed in Appendix 2. Let us therefore limit our attention to the first two scenarios in the discussion that follows.

Inclusive scenario

A child decides to migrate when the expected income is higher with migration than by remaining in the family farm. Calling X_I, the equilibrium amount of the tax that achieves the inclusive outcome, Eu^I_{m2}, the expected second period utility of a migrant child under the inclusive scenario and Eu^I_{v2}, the expected second-period utility of a child who works on the family farm under the inclusive scenario, the condition for migration under that scenario can be written:

$$\pi \left\{ w_1^H - X_I + \delta E u_{m2}^I \right\} + (1-\pi) \left\{ w_1^L - X_I + \delta E u_{m2}^I \right\} \geq E u_{v1}^I + \delta E u_{v2}^I \quad (4)$$

$$where\ Eu_{v1}^I = \frac{Q(.)}{1+n-m_I} + \gamma m_I k X_I;\ Eu_{v2}^I = \frac{Q(.)}{1+n-m_I \pi}$$

$$and\ Eu_{m2}^I = (1-\pi)\, Eu_{v2}^I + \pi w_2^H$$

The LHS is the expected income of a migrant while the RHS is the expected income of a non-migrant. Notice that $p = 1$ in the inclusive scenario: since the profitability and budget conditions are satisfied for all migrants, all of them pay the tax and consequently all migrants who have a bad draw in the second period return to the family farm.

exclusive scenario

Under the exclusive scenario, calling X_E, the equilibrium tax level that achieves the exclusive outcome and Eu^E_{v2} the second-period expected utility of a child who lives in the community, the condition for migration is:

$$\pi \left\{ w_1^H - X_E + \delta \left[(1-\pi)\, Eu_{v2}^E + \pi w_2^H \right] \right\} + (1-\pi) \left\{ w_1^L + \delta \left[(1-\pi)\, w_2^L + \pi w_2^H \right] \right\}$$

$$\geq Eu_{v1}^E + \delta Eu_{v2}^E \quad (5)$$

$$where\ Eu_{v1}^E = \frac{Q(.)}{1+n-m_E} + \pi \gamma m_E k X_E$$

$$and\ Eu_{v2}^E = \frac{Q(.)}{1+n-m_E\,(1-(1-\pi)\pi)}$$

Under this scenario, and unlike under the previous one, migrants with a bad draw in both period 1 and period 2 are compelled to remain in their urban location in period 2 since only the migrants with a good draw in period 1 are able to pay the tax. Thus, under the exclusive scenario, $p = \pi$. Compared to the inclusive scenario, the amount of the public good produced is smaller for a given contribution X, but the individual agricultural income is higher in the second period since $Q(.)$ is now shared among fewer people.

Under both scenarios, it is unfortunately impossible to derive an explicit expression for the equilibrium number of migrants. However, using the Implicit Function theorem, we can easily show that $\delta m_i^*/\delta X_i < 0$ for $i = I, E$. Whichever the scenario considered: the optimal number of migrants is decreasing in the level of the tax.

Corner solutions

Our present task is to derive the conditions on X_i that will lead to corner solutions in which either $m_i = 0$ or $m_i = n$ for $i = I, E$. These conditions obviously vary depending on whether we are in the inclusive or the exclusive scenario. For the sake of simplicity, we assume from now on that urban wages are identical across the two periods in the sense that $w_1^j = w_2^j$ for $j = H, L$.

Under the inclusive scenario, the conditions are directly obtained by substituting $m_I = 0$ or $m_I = n$ in (4), and extracting the threshold value of X_I:

$$m_I = 0 \; if \; X_I \geq (1+\delta)\pi w^H + (1-\pi)w^L - (1+\pi\delta)\frac{Q(.)}{1+n} \tag{6}$$

$$m_I = n \; if \; X_I \leq \frac{(1+\delta)\pi w^H + (1-\pi)w^L - [1+(1-\pi)n+\pi\delta]\,\frac{Q(.)}{1+(1-\pi)n}}{1+\gamma nk} \tag{7}$$

Similarly, under the exclusive scenario, after substituting $m_E = 0$ or $m_E = n$ in (5), we find:

$$m_E = 0 \; if \; X_E \geq (1+\delta)w^H + \frac{(1-\pi)}{\pi}\theta w^L - \frac{1+\delta\,(1-\Pi)}{\pi}\frac{Q(.)}{1+n} \tag{8}$$

$$m_E = n \; if \; X_E \leq \frac{(1+\delta)\pi w^H + (1-\pi)\theta w^L - [1+\delta+(n-\delta)\Pi]\,\frac{Q(.)}{1+\Pi n}}{\pi(1+\gamma nk)} \tag{9}$$

$$where \; \theta = 1+\delta(1-\pi); \; \Pi = \pi(1-\pi)$$

It is easily verified that the expression on the RHS of (6) is strictly larger than the expression on the RHS of (7). The same holds true when we compare the RHS expressions of (8) and (9). Therefore, there exists an interval of X_i values such that $0 < m_i < n$ for $i = I, E$.

3.5 The family head's problem: setting the level of the tax

We can now turn to the family head's problem. The family head's utility depends upon the number of children who have decided to migrate. Three situations, that we call regimes, are possible: two regimes, labeled a and c, refer to the above two polar cases ($m_i = n$, and $m_i = 0$, for $i = I, E$) while the third one, labeled b, corresponds to the intermediary situation in which $0 < m^i < n$. Consequently, we write the family head's utility function in three parts, labeled Eu^a_{fi}, Eu^b_{fi}, and Eu^c_{fi} (for $i = I, E$). Each component applies to one of the three regimes :

$$Eu^a_{fi} = [Q(.) + \gamma p_i nkX_i] + \delta [1 - (\mu_i)^n] \frac{Q(.)}{1 + p_i (1 - \pi) n} \; if \; m_i = n; \; i = I, E$$

$$Eu^b_{fi} = \left(\frac{Q(.)}{1 + n - m_i} + \gamma m_i p_i kX_i \right) + \delta \frac{Q(.)}{1 + (n - m_i) + p_i (1 - \pi) m_i}$$

$$if \; 0 < m_i < n; \; i = I, E$$

$$Eu^c_{fi} = (1 + \delta) \frac{Q(.)}{n + 1} \; if \; m_i = 0; \; i = I, E$$

where the probability that one particular child does not return to the community is given by $\mu_I = \pi$ under the inclusive scenario and $\mu_E = 1 - \pi(1 - \pi)$ under the exclusive scenario.

From the above expressions, it is evident that $Eu^b_{fi} > Eu^c_{fi}$, implying that the family head will never determine X_i in such a way that all children are prevented from migrating. This sets an upper bound on the value of X_i. Next, we observe that Eu^a_{fi} is monotonically increasing in X_i, while the opposite is true for Eu^b_{fi} (see Appendix 3). We therefore have a global maximum in $\tilde{X}_i$, $i = I, E$, which coincides with the border between Regimes a and b, as given by (7) and (9), respectively. Together with the regime-defining (liquidity) constraints, the two global maxima are written:

$$\tilde{X_I} = \frac{(1 + \delta)\pi w^H + (1 - \pi) w^L - [1 + (1 - \pi) n + \pi \delta] \frac{Q(.)}{1 + (1 - \pi) n}}{1 + \gamma nk} \tag{10}$$

$$provided \; that \; \tilde{X_I} \leq w^L - C$$

$$\tilde{X_E} = \frac{(1 + \delta)\pi w^H + (1 - \pi)\theta w^L - [1 + \delta + (n - \delta)\Pi] \frac{Q(.)}{1 + \Pi n}}{\pi (1 + \gamma nk)} \tag{11}$$

$$provided \; that \; \tilde{X_E} > w^L - C$$

Lemma 1 summarizes these results.

Lemma 1. *The utility of the family head is monotonically increasing in X until a point is reached beyond which it is monotonically decreasing. The discontinuity level, which coincides with the border between Regime a ($m = n$) and Regime b ($0 < m < n$), is a global maximum. These properties hold whether the head chooses the exclusive or the inclusive scenario.*

The next step consists of comparing the limit values of the parental utility in the neighborhood of $\tilde{X}_i$ for $i = I, E$. We find that $\lim_{X \gtrless \tilde{X}_i} Eu^a_{fi} < \lim_{X \gtrless \tilde{X}_i} Eu^b_{fi}$[28] : the optimal choice of the family head belongs to Regime b, implying that he wants all of his children except one to migrate. We also easily verify that, under both scenarios, the optimal value of X_i increases with w^H and w^L, and decreases with Q and γk. We can therefore write the following lemma:

Lemma 2. *It is always the best choice for the family head to set X in such a way that all children except one are induced to migrate. The equilibrium value of X increases with w^H and w^L while it decreases with Q, γ, and k.*

These findings are according to intuition. A rise in the wages on the urban labour market, w^H and w^L, increases the incentives to migrate and the family head can consequently extract larger tax contributions without increasing the number of children remaining in the community. Second, when conditions inside the community are improved (either because production is larger, the size of the public good has increased or the utility derived from it has risen), the rewards for staying in the community are enhanced for the children and the family head has to reduce the tax to induce some of them to migrate. As for the effects of a variation in π or n, they cannot be signed unambiguously.[29]

From an inspection of equations (10) and (11), it is evident that we cannot say which optimal value of X exceeds the other: $\tilde{X}_I \gtreqless \tilde{X}_E$. However, by writing the explicit condition for $\tilde{X}_I < \tilde{X}_E$, we can gain useful insights about key parameters determining this inequality which are summarized in Lemma 3 (see Appendix 4 for a proof and the discussion).

Lemma 3. *It is not possible to determine a priori if the equilibrium price of exclusion is higher or smaller than the equilibrium price of inclusion. However, the former, more intuitive result is obtained when the urban employment prospects are sufficiently attractive in the sense that w^H and/or w^L are sufficiently large relative to Q while π is not too low.*

Before addressing the central question of this paper, that is, to determine whether the parents have an interest in setting X in such a way that the budget constraint is violated for unsuccessful migrants, a last remark is in order. It is

---

[28] This follows from the fact that $X \to \tilde{X}_i \iff m \to n$ so that the limit value of U_i^b becomes:

$$\lim_{X \gtrless \tilde{X}_i} U_i^b = \left(Q(.) + \gamma npk\tilde{X}_i\right) + \delta \frac{Q(.)}{1 + p(1-\pi)n} \quad i = I, E$$

When the above is compared to $\lim_{X \gtrless \tilde{X}_i} U_i^a$, it is immediately evident that the former value exceeds the latter.

[29] Regarding n, the ambiguity arises from the fact that two forces run into opposite directions: on the one hand, a higher number of children raises the level of the public good (hence the family head must lower X to induce children to migrate) and, on the other hand, it increases the number of claimants on farm output Q (with the opposite implication). The case of a variation in π is even more complex, because (almost) every term in the expressions for $\tilde{X}_I$ and $\tilde{X}_E$ are affected.

easy to show that the amount of the public good is larger under the inclusive scenario at equilibrium. If we multiply the RHS of (10) by nk, and the RHS of (11) by πnk, we are indeed comparing the amounts of the public good at equilibrium under inclusion and exclusion, respectively. Formally:

$$G_I - G_E = \frac{\delta(1-\pi)^2 nk}{1+\gamma nk}\left[\frac{Q(.)(1+n)}{\psi} - w^L\right]$$

$$where\ \psi = [1+(1-\pi)\,n]\,[1+\pi\,(1-\pi)\,n]$$

This expression is positive as long as the profitability condition holds. To understand its meaning, we must first bear in mind that under inclusion, migrants who had a bad draw in two consecutive periods are able to return to the community in the second period while this is not true under exclusion where the migrant has to rely on the low wage. This means that a variation in w^L will affect migration incentives to a greater extent under exclusion than under inclusion. As a result, an increase in w^L will raise the optimal level, X, and hence the amount of public good more under the former than under the latter.

The mechanism underlying the effect of a change in Q works as follows. There are two effects running into opposite directions: one is immediate and the other is indirect. The first effect is that an increase in Q enhances the incentives to stay within the community. To compensate this effect, the family head reduces X - and, therefore, G - so that migration prospects remain as attractive as before. The indirect effect operates trough the fallback option which is now improved: this makes migration more attractive. Because it is weighed down by a probabilistic parameter, the second effect is dominated by the first and we can therefore conclude that both G_I and G_E decrease in response to an increase in Q. But we can go further and argue that G_I will undergo a smaller decrease than G_E so that $G_I - G_E$ will increase. The reason is that an increase in Q has a smaller impact under inclusion than under exclusion since in the former setting all migrant children suffering a bad draw in the second period can use the fallback option and settle back on the family land. On the one hand, this means that a rise in Q will enhance migration incentives more trough the fallback option under inclusion than under exclusion. On the other hand, it implies that the incentives to remain in the community will increase less under the former regime. The second period family output has indeed to be shared among more family members under inclusion, since there are more potential returnees, and the effect of a rise in Q is therefore more diluted under this setting. In other words, since the incentives to remain in the community increase less under inclusion while the incentives to migrate increase more, the family head can be content with a smaller reduction of X and G when the value of Q has risen.

3.5.1 Delimiting the possible cases

Let us first note that there is a single case in which the family head sets the tax at such a high level that the profitability condition (2) is violated: when m_i is close to n $(n - m_i < \delta)$ and γk is very low. In this case, indeed, the head chooses to deprive all the migrant children of their inheritance rights (see the proof in Appendix 2). In all the other instances, he chooses a tax that satisfies the profitability condition. To bring order into the remaining cases when the family head chooses to satisfy the profitability condition, we compare $\tilde{X}_I$ and $\tilde{X}_E$ to $w^L - C$, which is assumed to be positive lest the urban migrants with a bad draw should not be able to survive. We then have six possible cases to consider depending upon whether $\tilde{X}_I$ exceeds $\tilde{X}_E$. However, in the light of Lemma 3, the cases where $\tilde{X}_I > \tilde{X}_E$ do not appear to be relevant to the context of poor and remote outmigration areas in which land is of low quality and subsistence is hard to earn (Q is small relative to w^H). Their treatment is therefore shifted to Appendix 5.

The three following cases can then arise depending upon whether the equilibrium values of the exclusion-triggering and inclusion-triggering tax are higher or smaller than the wage net of subsistence cost:

$$Case\, 1: \; \tilde{X}_E > \tilde{X}_I > w^L - C;$$

$$Case\, 2: \; \tilde{X}_E > w^L - C \geq \tilde{X}_I;$$

$$Case\, 3: \; w^L - C \geq \tilde{X}_E > \tilde{X}_I$$

Case 2 is the canonical case where both the inclusive and exclusive equilibria are internally consistent in the following sense: the equilibrium value of the exclusion (inclusion)-triggering tax is (in)compatible with the budget constraint of the unsuccessful migrants. More precisely, the equilibrium value of the exclusion-triggering tax is such that it exceeds the net income available to the unsuccessful migrant while the equilibrium value of the inclusion-triggering tax is smaller than the amount of this net income and can therefore be paid by the unsuccessful migrant. Cases 1 and 3 are cases of internal inconsistency in the sense that the budget constraint stated in (10) or (11) is violated. In Case 1, the optimal inclusive equilibrium cannot be reached because the unconstrained optimal tax under inclusion exceeds what an unsuccessful migrant can pay (a fortiori, the tax under exclusion is also unaffordable by such a migrant). In Case 3, the unconstrained optimal tax under exclusion is not large enough to deter an unsuccessful migrant from paying it.

Notice that in the following discussion we focus our attention on interior solutions. This implies that $\tilde{X}_I$ and $\tilde{X}_E$ are everywhere positive and the main concern of the parents is therefore to discourage migration with a view to retaining (one of) their children rather than paying them to leave the community. In other words, we are interested in the situations where children are motivated to migrate although the cost of maintaining inheritance rights is positive even when $w^L - C$ is close to zero, that is, the urban wage in the bad draw is close to subsistence level. To have $\tilde{X}_I$ and $\tilde{X}_E$ everywhere positive, which corresponds to what we denote as Sequence 1, is probably the situation closest to reality, hence the central place given to it below. The other, less likely situations are presented in Appendix 7.

Finally, before we embark upon the analysis of Cases 1, 2 and 3 let us note that we will consider the most complete setting which implies that all three cases exist and that Case 1 is succeeded by Case 2, and Case 2 by Case 3. The conditions under which $\tilde{X}_I$ and $\tilde{X}_E$ are everywhere positive and under which Cases 1, 2 and 3 succeed each other are explained in Appendix 6.

3.5.2 The choice of the optimal scenario: an inclusion- or an exclusion-triggering tax?

We start with Case 2, in which both the inclusive and exclusive equilibria are internally consistent.

CASE 2

The relevant comparison is between $Eu_f(\tilde{X}_I)$ and $Eu_f(\tilde{X}_E)$ defined as follows:

$$Eu_f(\tilde{X}_I) = \left(Q(.) + \gamma nk\tilde{X}_I\right) + \delta \frac{Q(.)}{1 + (1-\pi)\, n}$$

$$Eu_f(\tilde{X}_E) = \left(Q(.) + \gamma n\pi k\tilde{X}_E\right) + \delta \frac{Q(.)}{1 + (1-\pi)\, \pi n}$$

These two expressions are directly obtained from Eu^a_{fi}, bearing in mind that $m_i \to n$ when $X_i \to \tilde{X}_i$ for $i = I, E$, while $p_I = 1$ (all migrants pay the tax) and $p_E = \pi$.

The difference between $Eu_f(\tilde{X}_I)$ and $Eu_f(\tilde{X}_E)$ is equal to:

$$\Delta^2 = Eu_f(\tilde{X}_I) - Eu_f(\tilde{X}_E)$$

$$= \gamma nk\left(\tilde{X}_I - \pi\tilde{X}_E\right) + \delta\left[\frac{Q(.)}{1 + (1-\pi)\, n} - \frac{Q(.)}{1 + (1-\pi)\, \pi n}\right] \tag{12}$$

The sign of the second term on the RHS of (12) is obviously negative: during the second period, the family land (output) is shared among fewer children when poor migrants are excluded. This is the output dilution effect. By contrast, the first term, which stands for the public good effect, is always positive: the total amount of the public good is higher under inclusion despite the fact that the individual cargo burden is lower. The sign of Δ^2 will therefore depend on the relative magnitudes of the two effects. This ambiguity reflects the trade-off between the costs and benefits of inclusion compared to exclusion: the cost is reflected in the greater dilution of farm domestic output (in the second period) while the benefit corresponds to the larger public good obtained when every migrant child contributes.

Let us now work out the whole expression (12) after replacing $\tilde{X}_I$ and $\tilde{X}_E$ by their values given in (10) and (11), and see whether it can be signed. After some algebraic manipulations, this expression can be written simply as:

$$\Delta^2 = \frac{n\delta\left(1-\pi\right)^2}{1+\gamma nk}\left[\frac{Q(.)}{\psi}\left(\gamma k - 1\right) - \gamma k w^L\right] \tag{13}$$

$$= \frac{n\delta\left(1-\pi\right)^2}{1+\gamma nk}\left[\gamma k\left(\frac{Q(.)}{\psi} - w^L\right) - \frac{Q(.)}{\psi}\right]$$

$$where\ \psi = \left[1+\left(1-\pi\right)n\right]\left[1+\pi\left(1-\pi\right)n\right]$$

It is immediately apparent from the above two expressions that $\Delta^2 < 0$, and exclusion is therefore preferred, when $\gamma k < 1$ or $w^L > Q/\psi$. When these two conditions are violated, the exclusive equilibrium can still prevail if $(\gamma k - 1)\,Q/\psi < \gamma k w^L$. Consider the first two conditions. The idea behind the first condition ($\gamma k < 1$) is the following: when the value of the public good is low or there are few potential contributors to the public good, the main source of welfare in the community lies in farm income, and this is best shared among fewer members. This situation explains the family head's incentive to set the tax at such a level that some migrants will not be able to afford it and thus lose land access.

To understand the meaning of the second condition ($w^L > Q/\psi$), we must first bear in mind that we compare two equilibrium situations. An immediate implication is that the number of both migrants and returning migrants may not be affected by a parametric change in w^L. The remaining channel to produce the second condition runs through the local public good. Compare migrant children who had two consecutive bad draws under exclusion and inclusion. Under inclusion, these migrants will be able to return to the family farm and benefit from $Q/\left[1+(1-\pi)\,n\right]$ whereas under exclusion they will be forced to rely on the low wage, w^L. Under exclusion, therefore, an increase in w^L represents a higher return on migration not only in the first but also in the second period. As a result, w^L plays a more pivotal role under exclusion than under inclusion. From (10) and (11), bearing in mind that $\theta > 1$, it is thus straightforward to see that $d\tilde{X}_E/dw^L > d\tilde{X}_I/dw^L$. When w^L increases relative to Q/ψ, migration incentives rise more under exclusion than under inclusion. To keep the equilibrium number of migrants constant the family head must consequently increase the contributions to the public good more under exclusion. The surplus of the public good provided under inclusion compared to exclusion will thus decrease with w^L until a point is reached where the negative public good effect associated with exclusion will be outweighed by the positive farming income effect. The exclusive scenario is preferred.

Finally, we need to verify that exclusion is a feasible outcome within the domain of the case considered. More precisely, we need to ascertain whether $w^L > (\gamma k - 1)\,Q/\gamma k\psi$ in some part of the interval of w^L values belonging to Case 2. It is easy to show that the condition for this, $Q(.)$ relatively small compared to w^H, is not unrealistic (see Appendix 8).

The above results are stated in Proposition 4 below:

Proposition 4. *When the inclusive and exclusive equilibria are both internally consistent:*

(i) The family head chooses the exclusive strategy if $\gamma k < 1$, or $w^L > Q/\psi$, where $\psi = [1 + (1-\pi)\, n]\, [1 + \pi\, (1-\pi)\, n]$. If these two sufficient conditions are violated, the relevant condition is $\gamma k w^L > (\gamma k - 1)\, Q/\psi$.

(ii) The family head opts for the inclusive strategy if $\gamma k w^L < (\gamma k - 1)\, Q/\psi$, which implies $\gamma k > 1$ as a necessary condition.

CASE 1

Under Case 1, the inclusive equilibrium is no more internally consistent (the budget constraint for unlucky migrants is violated). The two possible choices available to the family head are (i) to reduce the level of the tax to $X_I^B = w^L - C$ so that the budget constraint binds; or (ii) to raise it so as achieve the optimum value of the exclusion-triggering tax.

Proposition 5 summarizes the results obtained in this case (see Appendix 9 for the proof):

Proposition 5. *When the unconstrained equilibrium value of X violates the budget constraint of migrant children with a bad draw in the first period, the family head may still choose to preserve the inheritance rights of all their children by setting $X_I^B = w^L - C$. However, they will do so only if (i) $w^L - C$ is sufficiently high, (ii) w^H is sufficiently low, and (iii) $\gamma k > 1$.*

The central message to draw is the following: when w^L is very low, the inclusive scenario is very costly for the family head. On the one hand, contributions to the public good, and thus its level, are very low. On the other hand, second period family farm output has to be shared among a maximum number of members. As w^L increases the amount of the public good rises more under inclusion than under exclusion provided that $(1-\pi)\theta < 1 + \gamma n k$. As w^L rises, indeed, the contributions to the public good, and thus its level, increase under both scenarios. Under inclusion, the contributions increase at the same rate as w^L, as is evident from the corner condition $X_I^B = w^L - C$. Under exclusion, the contributions to the public good will also increase so as to maintain the (unconstrained) equilibrium number of migrants (the enhanced incentive to migrate must be matched by an enhanced incentive to remain in the community). If $\gamma n k$ is rather high, that is, if the value of the public good is rather large, children may be content with a moderate increase of the tax to remain induced to stay within their community. The level of the public good will then rise less under exclusion than under inclusion. Consequently, if $\gamma n k$ is rather high and if w^L increases by a sufficiently large margin, a point may be reached where the amount of the public good is so much higher under inclusion than under exclusion that the public good benefit outweighs the negative impact of inclusion on individual farm income.

CASE 3

Under Case 3, it is the exclusive equilibrium that is internally inconsistent (unlucky migrants could pay $\tilde{X}_E$). The parents can then choose between the inclusive equilibrium, $\tilde{X}_I$, and the exclusive strategy in which the budget constraint is just violated. The latter strategy is written: $X_E^B = w^L - C + \varepsilon$, where ε is infinitely small since the utility of the family head is monotonously decreasing to the right of $\tilde{X}_E$ (see Lemma 1). The results obtained in this case can be stated as follows (see Appendix 10 for the proof):

Proposition 6. *When the inclusive equilibrium is internally consistent but the exclusive equilibrium is not, the family head can still opt for the exclusive outcome if one of the following (sufficient) conditions is satisfied: (i) is small enough (close to) yet remains higher than ; (ii) is small enough and ; (iii) is high enough; (iv) or are small enough.*

Consider the case where w^L is large relative to Q/ψ. As we know, this implies that the incentive to migrate is strong under exclusion compared to inclusion because of the comparatively important role played by w^L under the former scenario (w^L is the income earned in the second period). The aggregate public good must therefore be set at a comparatively high level under exclusion so as to cancel this effect. The exclusive scenario thus becomes more attractive to the family head on a double count: more public good and fewer claimants to family land in the second period. However, if w^L becomes very large, exclusion of less successful migrants will require the setting of the tax at a level that exceeds the equilibrium level. The number of migrant children becomes infra-optimal and can reach its degenerate value (zero). Inclusion is then preferred by the parents.

3.6 Looking across regimes: analysis continued

3.6.1 Analytical results

In the following analysis we will focus our attention on the setting where $\gamma k > 1$ since $\gamma k < 1$ simply implies exclusion over the whole domain. Moreover, we will only cover Cases 1 and 2 since we cannot express in simple analytical terms the conditions for an equilibrium reversal within the domain of Case 3. Concerning this latter case we know however that the sequence goes from exclusion to inclusion (see Appendix 10).

EFFECT OF w^L

We start our analysis with the impact of w^L, which is a pivotal variable in our model since it intervenes in the migration decision, the profitability condition and the budget constraint and therefore the boundaries between the cases. From the above analysis, the following six successions of equilibria appear possible for the domain covering Cases 1 and 2:

Sequence 1: exclusion over the whole domain covering Cases 1 and 2;
Sequence 2: exclusion over Case 1 succeeded by inclusion over Case 2;
Sequence 3: exclusion followed by inclusion inside Case 1, succeeded by inclusion over Case 2;

Sequence 4: exclusion followed by inclusion inside Case 1, succeeded by exclusion over Case 2;

Sequence 5: exclusion followed by inclusion inside Case 1, succeeded by inclusion and then exclusion inside Case 2;

Sequence 6: exclusion over Case 1 succeeded by inclusion and then exclusion again inside Case 2.

The relationship between w^L and the type of equilibrium strategy adopted by the family head is obviously complex and a non-monotonous relationship is possible in which the exclusive equilibrium is established for comparatively low and comparatively high values of w^L, and the inclusive equilibrium for intermediate values. The central intuition behind this result can be described as follows. When w^L is very low, the inheritance option value for unsuccessful migrant children could be safeguarded only if the head is willing to set the tax at such a low level that the aggregate amount of the public good would become smaller than under exclusion. Moreover, inclusion would lead to the dilution of the family farm output in the second period. As a result, the exclusion strategy is preferred by the head.

As w^L rises within the domain of Case 1, and provided that the preference for the public good is sufficiently strong, the aggregate amount of the public good may become greater under inclusion than under exclusion. Therefore, the above two effects -the public good effect and the output dilution effect- run into opposite directions and inclusion may well become more attractive than exclusion. This is true only up to a certain level, though. If w^L increases further and Case 2 is now prevailing, the inclusive equilibrium will be disrupted once $w^L > Q/\psi$. While the aggregate amount of the public good is higher under inclusion at equilibrium, a catching up process occurs as w^L rises. Indeed, an increase in w^L rises the migration incentives under both scenarios but the effect is more pronounced under exclusion. This is because w^L only affects the second period income of the migrants under the exclusive scenario. Consequently, in order to keep one child on the family farm, the head needs to increase the aggregate amount of the public good more under exclusion.

When account is taken of Case 3, we find that, for the highest values of w^L, the inclusive equilibrium will always prevail possibly succeeding the exclusive equilibrium inside the domain of Case 3. But Case 3 only exists for values that appear unrealistic in our context.[30] Therefore, we formulate Proposition 7 by focusing on what happens in the domains of Cases 1 and 2:

Proposition 7. *The relationship between w^L and the type of equilibrium strategy adopted by the family head is complex and not necessarily monotonous. When w^L is low, the exclusive strategy is always preferred whereas for high values of w^L the inclusive strategy may or may not be preferred. In many of the possible sequences of equilibria (when $\gamma k > 1$), the relationship between w^L and the type of prevailing equilibrium is non monotonous: the inclusive strategy is preferred for intermediate values of w^L while the exclusive strategy is adopted*

[30]The profitability condition (2) is violated in Case 3 if w^H is high compared to Q(.).

for low or high values. Under no scenario can the inclusive equilibrium prevail over the whole range of w^L values.

EFFECT OF γ

We can show that a decrease in γ increases the domain of inclusion compared to exclusion in Case 2 (see Appendix 11 for the proof). Two opposite effects are at work. First, an increase in γ increases the value of the public good and, since the amount of the public good is higher under inclusion than under exclusion, this effect favours the inclusive outcome. Yet, an increase in γ also enhances the incentives to stay within the community and the family head responds by decreasing the amount of the public good so as to keep a sufficient number of children (one) inside the community. This decrease is more important under inclusion simply because the level of the public good is higher under that scenario. The important point is that the former effect dominates the latter: an increase in γ favours inclusion and, conversely, a decrease in γ promotes exclusion. Turning now to Case 1, while a decrease in γ lowers the threshold value for which we observe inclusion, and therefore increases its probability, it also affects the value of the frontier between Cases 1 and 2 in such a way that the domain of Case 1 is narrowed down and inclusion is more restricted (see Appendix 11). Which effect dominates will depend on the values of our parameters.

Note that in much of the existing economic literature, the safeguarding of inheritance rights is conditioned by the amount of voluntary individualized remittances rather than imposed uniform contributions to a local public good. Interestingly, by just setting $\gamma k = 1$, this possibility can be analyzed as a particular case of our model. Under this assumption, exclusion becomes the only equilibrium. The intuition is straightforward: absent the externalities associated with a public good, the family head attaches more importance to the component of his income that is derived from the family farm production and he therefore opts for an exclusive strategy. Hence the following proposition:

Proposition 8. *If payments conditioning the maintaining of inheritance rights take on the form of uniform remittances rather than uniform contributions to a local public good, the exclusive equilibrium becomes the only possible outcome.*

OTHER EFFECTS

The effect of k is exactly analogous to that of γ: the smaller the size of the community of origin the more likely the family head is to prefer the exclusive strategy.

The effect of the level of the wage obtained by successful migrants is equally non-ambiguous: an increase in w^H causes an enlargement of the area where the exclusive equilibrium prevails (see Appendix 11 for the proof). The intuition, here, is the following: as w^H is higher, the migration prospects for the children improve and, since the family head wants to keep one child within the family farm, he responds by raising the tax so as to mitigate the incentive for migration.

Two effects must be distinguished. First, when w^L is low enough to fall into the domain of Case 1, an increase in w^H will stimulate the provision of the public good only under the exclusion scenario. This is because, being constrained to set the tax at the level just equal to $w^L - C$, the head is unable to use this instrument to influence the migration decision of his children under the inclusion scenario. Second, an increase in the tax causes a shift in the boundaries separating the different cases, and this shift enlarges the domain of exclusion.

The effect of a variation in domestic production, Q, is again unambiguous: an increase in Q narrows down the space of exclusion. A rise in Q reinforces the incentive to stay on the family farm. The head responds by decreasing the amount of the public good (which he achieves by lowering the tax) so as to restore the migration incentive back to the initial level. The decrease will be stronger under exclusion since the family output is shared among fewer people under this scenario. On this count, the inclusive outcome is thus favoured. There is another effect, though: an increase in Q raises the weight of the family farm output in the head's utility and, since second period individual family farm output is lower under inclusion than under exclusion, this new effect works in favour of exclusion. Because the former effect dominates the latter, the probability of inclusion increases with Q. [31]

Finally, it is impossible to derive any clear result about the effects of variations in π and n, which go into several directions and the net outcome of which depends on the values of π or n. Such indeterminacy is easy to understand since π is present at every stage of the model. It enters into the condition for the migration decision, in the condition for the decision to pay the tax (in the first period), and in the decision to return or not to the family farm (in the second period) and the various effects run into opposite directions. To illustrate, for a given level of X, the probability that migrant children will be able to afford the tax during the first period increases with π. Yet, on the other hand, the probability that they may have a bad job draw during the second period is correspondingly reduced, thereby diminishing their need to return to the family land. The probability of return migration is thus both higher and lower than before the change in π. In addition, the decision to migrate is positively influenced by a rise of π. As for the role of n, a higher number of children opens the possibility of more contributory payments from the migration destination. At the same time, it raises the likelihood that there will be more return migrations in the second period, thereby increasing the pressure on the family land. The probability to migrate is also affected since this pressure is taken into account when the profitability of migration is assessed.

Our last proposition summarizes the effects of the model parameters other than w^L:

Proposition 9. *The exclusive equilibrium is more likely to prevail over the inclusive equilibrium if γ, k, or Q is small, or if w^H is high. The effects of π and n are indeterminate.*

[31] Here again, there are other, more complicated effects resulting from the shift of the boundaries separating the different cases.

3.7 Remarks and extensions

The model is based on a number of assumptions. A first assumption is that the tax helps finance a public good. It has been relaxed in the discussion preceding the statement of Proposition 8.

A second assumption is risk-neutrality, especially regarding the family head. If he is risk-averse, our results are affected in a predictable manner. On the one hand, a risk-averse head would be more eager to keep one child on the family farm and, therefore, he would attach a great weight to Regime c (no child migrates) relative to Regime a (in which all children migrate). This effect favours exclusion. On the other hand, a risk-averse head would like to avert the possibility of excessive return migrations, which would again tilt his preference in favour of the exclusive strategy compared to what would happen under risk-neutrality.

A third assumption is the independence of the probabilities of having a good draw in the two periods. Assume, on the contrary, that these probabilities are interdependent in the sense of being positively correlated. Thus, migrants with a good job in the first period have a higher chance of finding (or keeping) a good job in the second period. Knowing that an unsuccessful migrant child in the first period would be more likely to be unsuccessful in the second period and, therefore, more willing to return to the family farm if that possibility exists, the family head would try to limit this possibility by adopting an exclusive rather than an inclusive strategy. The problem is more tricky than it thus appears, however. Indeed, the migration decision itself will be affected by the interdependence of the probabilities and, moreover, the profitability condition (whether it is worth for the migrant to pay X) will now differ between successful and unsuccessful migrants. This condition would then become more difficult to ignore since it would be more likely to be binding for the successful migrants in the new setup.

Finally, we have assumed that member families are identical. In reality, we know that some families are better endowed with land than others. Our comparative statics shows that wealthy families will set a lower tax, and opt with a higher probability for an inclusive inheritance strategy than would poorer families. The two types of families are therefore expected to disagree about the uniform tax to be set in the community assembly. Two points need to be brought here. First, as we have seen in Section 3, we observe actual exclusion of poorer migrants in the traditional communities of the Bolivian altiplano. This suggests that the tax level was set at a rather high level in these communities, thus apparently discarding the view that the choice of the richer families has prevailed. Second, if we had to allow for heterogeneous land endowments in our model, we would also have to permit that other variables than land differ between rich and poor families. In particular, the costs of migration are plausibly smaller for the former (say, because they are facing fewer liquidity constraints), and their children are arguably more educated. The effects of these wealth-dependent characteristics would be to raise the level of the optimal tax for the richer families. In other words, when account is taken of these characteristics, it is not clear any more that rich families would wish to set the tax at a lower level than poor families.

4 Conclusion

This paper has been triggered by the observation, made in the Bolivian altiplano, that poor or unsuccessful migrant children may be more vulnerable to the risk of losing their right of inheritance to a share of the family land, and thereby an important source of social protection against bad luck on labour markets at the migration destination. This happens in the context of a corporate land ownership system in which land access is conditional on membership status and that status is itself conditional on the payment of a community tax set at an uniform level for all migrants. Such a system is observed well beyond Bolivia, not only in other Latin American countries but also in Sub Saharan Africa and China.

To provide a reliable story about why in such a context poor and unsuccessful migrants may be excluded from land inheritance, we have written a model whose main novelty lies in the fact that the migration decision is endogenized. We confirm that acting rationally family heads may indeed set the community tax at such a level that unsuccessful migrants will not be able to pay it. Moreover, the conditions under which the exclusive equilibrium may happen are not restrictive. Because the community tax is allocated to the production of local public goods, the unequalizing effect caused by the discrimination of unsuccessful migrants contrasts with an equalizing effect of the tax inside the community of (remaining) members.

Analytical complexity is high in the sense that, as the urban wage in the event of a bad draw rises from an initially low level, the exclusive and inclusive equilibria may succeed each other in varied ways depending upon the parameter configurations. A non-monotonous relationship may be easily obtained in which the exclusive equilibrium is established for comparatively low and comparatively high values of that wage, and the inclusive equilibrium for intermediate values. What stands out is that in the various possible successions of equilibria the exclusive strategy tends to be more prevailing than the inclusive strategy so that the research question is somewhat overturned: it is inclusion rather than exclusion that needs to be explained.

For other parameters which play a role in the model, less ambiguous results may be obtained. In particular, parents are more likely to prefer the exclusive to the inclusive strategy if: (i) the weight that they attach to the public good produced with the help of the migrants' contributory payments is lower, (ii) the size of the community of origin is smaller, (iii) the amount of output produced in the family farm is smaller; and (iv) the wage received by migrants in the event of a good draw on the urban labour market is higher. Linked to (i) is the result that the exclusive strategy is chosen by the parents if uniform remittances rather than uniform contributions to a local public good is the form taken by payments conditioning inheritance rights for migrants.

Finally, effects (iii) and (iv) point to important welfare and policy implications.First, while increased productivity of agriculture tends to favour inclusion, the opposite is true of economic growth as reflected in the rise of wages received in the urban formal (modern) sector. In other words, urban growth unaccompanied by rural development may entail increasing vulnerability for unsuccessful migrants. Second, greater inequality on the urban labour market, namely low wages in case of a bad draw and high wages in case of a good draw, favours exclusion and increases thus further inequality between migrant community members.

Appendix

Appendix 1: Definitions

A *Scenario* indicates the type of inheritance strategy adopted by the parents (exclusion or inclusion).

A *Regime* denotes the type of migration pattern chosen by the parents (whether all children migrate, no child migrates, or at least one child migrates and at least one stays in the community).

A *Case* indicates whether the optimal cargo (under either exclusion of inclusion) violates the migrant's budget constraint.

A *Sequence* denotes the order in which the Cases succeed to each other, allowing for the possibility of corner solutions.

A *Succession* indicates the way in which inclusive and exclusive equilibria succeed to each other.

Appendix 2: Analysis of the case where the profitability condition is violated

Note that since we cannot a priori rule out the possibilities of $\tilde{X}_I$ and/or $\tilde{X}_E$ being negative, corner solutions may exist. In the following discussion however, attention is confined to interior solutions, which implies that $\tilde{X}_I$ and $\tilde{X}_E$ are everywhere positive.

If parents choose to set the cargo at such a high level that the profitability condition is violated, the migration decision will be independent of the level of the cargo and there remain three possibilities:

$$Case\,7:\ \pi w^H + (1-\pi)w^L \leq \frac{Q(.)}{1+n};$$

$$Case\,8:\ \pi w^H + (1-\pi)w^L > Q(.);$$

$$Case\,9:\ \frac{Q(.)}{1+n} \leq \pi w^H + (1-\pi)w^L < Q(.);$$

CASE 7

This case corresponds to a situation where no child migrates if the profitability condition is violated. It is easy to see that, in this setting, parents will always choose to satisfy the profitability condition. If they choose not to do so their utility would be equal to:

$$Eu_{f7}^{\bar{X}} = \frac{Q(.)}{n+1} + \delta\frac{Q(.)}{n+1} \leq Eu_{f_i}^{k}\ i = I, E;\ k = a, b, c$$

CASE 8

Under this case all the children migrate if the profitability condition is violated. The utility of the parents would then be equal to Q. If, on the other hand, the parents choose to satisfy the profitability condition and set $X = \varepsilon$ with $\varepsilon \to 0$ then at least as many children decide to migrate. The incentives to migrate increase, indeed, if the profitability condition is satisfied since migrant children will get the fall-back option at almost no cost. The incentives to remain in the community, on the other hand, decrease since there is almost no additional public good provided yet they have to divide the family farm output with more family members in the second period. It is again easy to see that parents will chose to satisfy the profitability condition in this context since:

$$Eu_{f8}^{\bar{X}} = Q \leq Eu_{fI}^{a} = [Q(.) + \gamma nk\varepsilon] + \delta\,[1-\pi^n]\,\frac{Q(.)}{1+(1-\pi)\,n}$$

CASE 9

This case corresponds to a situation where at least one child migrates and one child remains in the community when the profitability condition is violated. The utility of the parents would then be equal to:

$$Eu_{f9}(\bar{X}) = \frac{Q(.)}{1+n-m_{\bar{X}}} + \delta\frac{Q(.)}{1+n-m_{\bar{X}}} = \frac{(1+\delta)Q(.)}{1+n-m_{\bar{X}}}$$

9.1.

Let us first consider the situation where $n - m_{\bar{X}} \geq \delta$. To proof the sub-optimality of the violation of the profitability condition we will rely on a comparison between the utilities of the parents when the profitability condition is violated and when they adopt the inclusive strategy. To show that parents prefer to satisfy the profitability condition it is indeed sufficient to proof that either the inclusive or the exclusive strategy is preferred to a violation of this condition.Consequently, we have to consider two sub-cases:

(i) if $\tilde{X}_I > \bar{X}$ or $\tilde{X}_I > w^L - C$

Under this setting, if parents choose to satisfy the profitability condition they would have to lower the level of the cargo beyond the optimum which implies that all the children migrate and we need thus to compare $Eu_{f9}^{\bar{X}}$ and Eu_{fI}^{a}. It is easy to see that:

$$Eu_{f9}(\bar{X}) = \frac{(1+\delta)Q(.)}{1+n-m_{\bar{X}}} < Q \leq Eu_{fI}^{a} = [Q(.)+\gamma nk\varepsilon] + \delta\left[1-\pi^n\right]\frac{Q(.)}{1+(1-\pi)\,n}$$

(ii) if $\tilde{X}_I \leq \bar{X}$ and $\tilde{X}_I \leq w^L - C$

Under inclusion, parents can set the cargo at the optimal level and consequently:

$$Eu_{f9}(\bar{X}) < Eu_f(\tilde{X}_I) \Leftarrow Eu_{f9}(\bar{X}) < Eu_{fI}^{a} \leq Eu_f(\tilde{X}_I)$$

9.2.

Second, let us consider the situation where $n - m_{\bar{X}} < \delta$. We know that $\lim_{n \longrightarrow m_{\bar{X}}} Eu_{f9}(\bar{X}) = (1+\delta)Q(.)$.

We will show that, in this particular setting, there exist some specific values of our parameters for which parents prefer to set X at such a high level that the profitability condition is violated. To show that this possibility exists we will focus our attention on the subcases where $\tilde{X}_i \leq \bar{X}$ for $i = I, E$ and where both the inclusive and exclusive equilibria are internally consistent. The parent's utility reaches indeed a maximum under these subcases and if it is sub-optimal for the parents to respect the profitability condition in this setting it will also necessarily be the case in all the other settings.

It is easy to derive the limit expression of the utility functions of the parents under both scenarios once we bear in mind that $\pi w^H + (1-\pi)w^L \to Q(.)$ when $n \longrightarrow m_{\bar{X}}$.

The limit expression of $Eu_f(\tilde{X}_I)$ is directly obtained from$Eu_{fi}^{3}$and equation (10), bearing in mind that $m_I \to n$ when $X_I \to \tilde{X}_I$ for $i = I, E$,

$$\lim_{n \longrightarrow m_{\bar{X}}} Eu_f(\tilde{X}_I) = Q(.) + \delta Q(.)\left\{\frac{1+\gamma nk + (1-\pi)(1+n)\gamma nk}{(1+\gamma nk)\left[1+(1-\pi)n\right]}\right\} - \frac{\delta\pi(1-\pi)\gamma nk}{1+\gamma nk}w^L$$

while the limit expression of $Eu_f(\tilde{X}_E)$ is directly obtained from$Eu^3_{fi}$and equation (11),

$$\underset{n \longrightarrow m_{\bar{X}}}{Lim} Eu_f(\tilde{X}_E) = Q(.) + \delta Q(.) \left\{ \frac{1 + \gamma nk + (1-\pi)\pi(1+n)\gamma nk}{(1+\gamma nk)\left[1 + \pi(1-\pi)n\right]} \right\} - \frac{\delta\pi(1-\pi)\gamma nk}{1+\gamma nk} w^L$$

The relevant comparisons are consequently :

$$\underset{n \longrightarrow m_{\bar{X}}}{Lim} (Eu_f(\tilde{X}_I) - Eu_{f9}(\bar{X})) = \delta Q(.) \left\{ \frac{(1-\pi)n(\gamma k - 1)}{(1+\gamma nk)\left[1 + (1-\pi)n\right]} \right\} - \frac{\delta\pi(1-\pi)\gamma nk}{1+\gamma nk} w^L$$

or

$$\underset{n \longrightarrow m_{\bar{X}}}{Lim} (Eu_f(\tilde{X}_E) - Eu_{f9}(\bar{X})) = \delta Q(.) \left\{ \frac{(1-\pi)\pi n(\gamma k - 1)}{(1+\gamma nk)\left[1 + \pi(1-\pi)n\right]} \right\} - \frac{\delta\pi(1-\pi)\gamma nk}{1+\gamma nk} w^L$$

It is straightforward that both expressions are negative if $\gamma k \leq 1$. Parents then prefer to set the cargo at such a high level that the profitability condition is violated and all migrant children are deprived of their inheritance rights.

Appendix 3: Global Maximum of X_i

The former relationship is evident from the above expression of Eu_{fi}^a. Because Eu_{fi}^b contains terms in m_i, which itself varies with X_i, the latter relationship needs to be established. First note that, under the inclusive scenario (the budget constraint is satisfied so that $p = 1$), the RHS of (4) is identical to Eu_{fI}^b. Therefore, we can rewrite Eu_{fI}^b as being equal to the LHS of (4) since at the equilibrium that defines the optimal number of migrants the two terms must be equal. After a few algebraic manipulations, the parental utility under Regime b and the inclusive scenario, is written:

$$Eu_{fI}^b = (1+\delta)\,\pi w^H + (1-\pi)\,w^L + \delta\,(1-\pi)\,\frac{Q(.)}{1+n-m_I\pi} - X_I$$

Once we bear in mind that m_I^* is decreasing in X_I, it becomes clear that Eu_{fI}^b is monotonically decreasing in X_I. The above reasoning applies, *mutatis mutandis*, to the exclusive scenario (the budget constraint is violated for poor migrants). Using (5), we get:

$$Eu_{fE}^b = (1+\delta)\,\pi w^H + (1-\pi)\,(1+\delta\,(1-\pi))\,w^L + \delta\pi\,(1-\pi)\,\frac{Q(.)}{1+n-m_E\mu_E} - \pi.X_E$$

The functions Eu_{fI} and Eu_{fE} are discontinuous at the frontier between Regimes a and b: they monotonically increase till their frontier value is reached, respectively $\tilde{X}_I$ and $\tilde{X}_E$, above which they monotonically decrease.

Appendix 4: Conditions for $\tilde{X}_I < \tilde{X}_E$

Whether the optimal value of the cargo under exclusion,$\tilde{X}_E$, will exceed the optimal value under inclusion, $\tilde{X}_I$, depends on the level of the parameters of our model. Indeed, while the denominator is higher in $\tilde{X}_I$ than in $\tilde{X}_E$, we are not able to rank the numerator values. At first sight, this ambiguity appears strange as we expect the price of exclusion to exceed the price of inclusion, that is, the price that would enable all migrants to meet their cargo obligations. The mystery nevertheless vanishes as soon as we bear in mind that, when they set the level of the cargo, parents take the migration incentive of their children into account.

To be more precise, there are four distinct incentive effects when exclusion occurs:

(i) children who remain in the community enjoy a higher share of the family land during the second period since there is less competition from returning migrants, ;

(ii) migrant children who have a bad draw in the first period lose their inheritance rights and, therefore, their fall-back option in the event of a bad draw in the second period;

(iii) migrants who had a good draw and then a bad draw in the two consecutive periods have to share the family land with fewer siblings (in the second period);

(iv) fewer children contribute to the public good.

Clearly, the first two effects reduce the incentive to migrate while the latter two effects enhance it. The only effect that is easily detectable in the above equations is the last one (the public good effect): it is actually reflected in the value of the denominator which is higher under inclusion than under exclusion.

However, by writing the explicit condition for $\tilde{X}_I < \tilde{X}_E$ we can gain useful insights about key parameters determining this inequality;

$$\tilde{X}_I < \tilde{X}_E \Longleftrightarrow$$

$$w^L > Q(.)\frac{1+\delta(1-\pi)+n(1-\pi)(1+\pi+n\pi+\delta)}{(1-\pi)(1+\delta)\left[1+(1-\pi)n\right]\left[1+(1-\pi)\pi n\right]} - \frac{\pi}{1-\pi}w^H \qquad (14)$$

Note that, when π tends towards zero, it is always the case that (14) is violated: $\tilde{X}_I > \tilde{X}_E$. This result follows from the necessity to satisfy the profitability condition (2).[32] This means that the intuitive outcome according to which the equilibrium price of exclusion exceeds the equilibrium price of inclusion never occurs when the employment prospects in urban labour markets are very poor. On the contrary, as π tends towards 1, the intuitive outcome

[32]When π tends towards 0, inequality (14) simply becomes: $w^L > Q(.)$. However, since the profitability condition (2) imposes that $w^L < Q(.)/1+n$ when π tends towards 0, the condition for $\tilde{X}_I < \tilde{X}_E$ is impossible to satisfy, hence $\tilde{X}_I > \tilde{X}_E$.

$\tilde{X}_I < \tilde{X}_E$ is obtained provided that $(1+\delta)\, w^H > Q(.)$.[33] This outcome can also be obtained for values of π smaller than one provided that w^H is sufficiently large relative to $Q(.)$[34]. Finally, it is straightforward to see that the outcome $\tilde{X}_I < \tilde{X}_E$ is more likely to be obtained if w^L is sufficiently large.

In terms of the aforementioned four intervening factors, the intuition behind these results are as follows. When w^H increases, the incentive to migrate is improved whether the prevailing scenario is exclusive or inclusive. Moreover, the measure of improvement is identical between the two scenarios. To keep the same number of migrants as before, parents must compensate the increase in w^H by equally increasing the incentive to stay inside the community. The way to do this consists of raising the level of the public good consumed locally. Since there are fewer contributors under the exclusive scenario (see effect (iv) above), the level of the individual cargo obligation must be raised to a larger extent under this scenario compared to the inclusive scenario. When w^L increases, the situation is more complex because there is an additional effect at work. Indeed, w^L plays a role in the second period but only if the exclusive scenario is chosen. Under exclusion, a migrant child who had a bad draw in the two consecutive periods is unable to return to his community and is thus forced to rely on the low wage (see effect (ii)). Any increase in that wage therefore represents a better return on migration not only in the first but also in the second period. Again, parents want to make up for this improvement through an increase in the cargo. Such a second-period effect is not present under the inclusive scenario since the migrant would be able to use his fall-back option were he to have a bad draw in the second period. The first and second period effects ((iv) and (ii)) of w^L therefore go into the same direction: the increase in the cargo following an increase in w^L is larger under exclusion than under inclusion. From (10) and (11), it is thus immediately evident that $d\tilde{X}_E/dw^L > d\tilde{X}_I/dw^L$. The mechanism underlying the effect of a change in Q is even more complicated because the four above effects come into play[35].

[33]This is easily seen by multiplying both the LHS and the RHS of inequality (14) by $(1-\pi)$ and, then, calculating the limits when π tends towards 1.

[34]It can easily be shown that the first derivative of the RHS of (14) with respect to π is negative if w^H is sufficiently large relative to $Q(.)$

[35]The effect of an increase in Q through channel (i) is that the incentive to stay in the community is bigger under exclusion since the family output is shared among fewer family members. As a result, parents must decrease the cargo more under exclusion than under inclusion to maintain the migration incentives as they were before the change in Q. Regarding channel (iii), the effect runs in the opposite direction: migrants who had a good draw and then a bad draw in the two consecutive periods have to share family land with fewer siblings under exclusion (in the second period), as a result of which their migration incentive is stronger. The cargo will therefore be set at a higher level under that scenario. It is easy to show that the former effect outweighs the latter since effect (iii) is weighed down by a probabilistic parameter. Effect (ii) operates in a manner analogous to what has been described for an increase in w^L. Migrant children who had a bad draw in the first period are (positively) affected by a change in Q under inclusion but not under exclusion. The consequence is that the cargo will be raised only under inclusion when Q has increased. Turning to channel (iv), the lesson is that an increase in Q will cause the individual cargo contribution to be lowered to an even larger extent under the exclusive scenario (where fewer children contribute to the public good).

Appendix 5: Analysis of the cases where $\tilde{X}_I > \tilde{X}_E$

Note again that in the following discussion however, attention is confined to interior solutions, which implies that $\tilde{X}_I$ and $\tilde{X}_E$ are everywhere positive.

CASE 4

Since the only difference between Cases 1 and 4 is that $\tilde{X}_I > \tilde{X}_E$ in the latter, the utility differential remains given by (26) and the discussion is identical to that proposed under Case 1

CASE 5

Under Case 5, both the inclusive and the exclusive equilibria are internally inconsistent, that is $w^L - C$ is comprised between $\tilde{X}_E$ and $\tilde{X}_I$. The choice of the parents is then between the inclusive strategy with a tight budget constraint ($X_I^B = w^L - C$) and the exclusive strategy in which the budget constraint is just violated ($X_E^B = w^L - C + \epsilon$, where ε is infinitely small). In this setting, X_I^B will thus belong to Regime a while X_E^B will belong to either Regime b or c. Bearing in mind condition (8) that defines the threshold value of X_E for Regime c, we can state the condition under which X_E^B belongs to Regime c:

$$[(1+\theta)\pi - \theta]\, w^L \geq (1+\delta)\pi w^H + \pi(C-\varepsilon) - \frac{1+\delta\,(1-\Pi)\,Q(.)}{1+n}$$

Assuming that the above condition is satisfied, we can write Δ^5 as follows:

$$\Delta^5 = Eu_f(X_I^B) - Eu_f(X_E^B) =$$

$$\left\{Q(.) + \gamma nk X_I^B + \delta(1-\pi^n)\frac{Q(.)}{1+(1-\pi)n}\right\} - \frac{(1+\delta)\,Q(.)}{1+n}$$

It is immediately evident that the above expression is always positive, since n $>$ 2, implying that parents always prefer to set an inclusive cargo in this setting.

If condition (8) is violated, X_E^B belongs to Regime b, and Δ^{5bis} is equal to:

$$\Delta^{5bis} = U(X_I^B) - U(X_E^B) = \tag{15}$$

$$\left\{Q(.) + \gamma nk(w^L - C) + \delta(1-\pi^n)\frac{Q(.)}{1+(1-\pi)n}\right\}$$

$$-\left\{\frac{Q(.)}{1+n-m_E} + \gamma m_E \pi k\left(w^L - C + \varepsilon\right) + \frac{\delta Q(.)}{1+n-m_E+(1-\pi)\pi m_E}\right\}$$

After some algebraic work, this expression can be rewritten as:

$$\Delta^{5bis} = \gamma k(w^L - C)(n - m_E\pi) +$$

$$\frac{ZQ(.)}{(1+n-m_E)\left[1+(1-\pi)n\right]\left[1+n-m_E(1-\Pi)\right]} \tag{16}$$

$$where\ Z = (n - m_E - \delta)(1+n-m_E)\left[1+(1-\pi)n\right]$$

$$+(n-m_E)\left[1+(1-\pi)n\right]\Pi m_E + \delta(1-\pi^n)(1+n-m_E)\left[1+n-m_E(1-\Pi)\right]$$

It is impossible to derive an explicit expression for Δ^{5bis} since m_E depends upon X_E and the parameters of the model, and there is no way of specifying an explicit function for m_E. However, the first term is clearly positive and the same holds true of the denominator of the second term. The sign of Δ^{5bis} therefore hinges upon the sign of Z. It is evident that $Z > 0$ if $(n - m_E) > \delta$, leading to $\Delta^5 > 0$. If $(n - m_E) < \delta$, on the other hand, both Z and Δ^{5bis} can become negative. Furthermore, for w^L sufficiently small, $X_E^B \longrightarrow \tilde{X}_E$ and

$$\underset{X_E^B \underset{>}{\longrightarrow} \tilde{X E}_2}{Lim} \Delta^{5bis} = U(X_I^B) - U\left(\tilde{X}_E\right) = \Delta^1$$

If that limit expression is negative, we know that there exists a switching point below which the exclusive equilibrium is preferred (see our analysis of Case 1). Hence the following proposition:

Proposition 10. *When both the inclusive and the exclusive equilibria are internally inconsistent, it is only under highly restrictive conditions that parents will choose the exclusive strategy. We must have that w^L,γnk, π and $Q(.)$ sufficiently low, and w^H and δ sufficiently high.*

Case 6

Under Case 6, unlike the inclusive equilibrium, the exclusive equilibrium is not internally consistent and $\tilde{X}_I > \tilde{X}_E$. The parents can then choose between the inclusive equilibrium, $\tilde{X}_I$, and the exclusive strategy in which the budget constraint is just violated. The latter strategy is written: $X_E^B = w^L - C + \varepsilon$, where ε is infinitely small since parental utility is monotonously decreasing to the right of $\tilde{X}_E$ (see Lemma 1).

It must again be noted that X_E^B can belong to either Regime c (no child migrates) or Regime b (some children migrate and some stay in the family farm). The analysis of the former case, where X_E^B belongs to Regime c is identical to that proposed under Case 3. Yet, this is not true for X_E^B belonging to Regime b. While the utility differential remains given by (29) X_E^B can only tend towards $\tilde{X}_I$, and no more towards $\tilde{X}_E$ when w^L decreases. We are therefore interested in *limit* Δ^3 as $X_E^B \longrightarrow \tilde{X}_I$. We get:

$$\underset{X_E^B \longrightarrow \tilde{X}_I}{Lim} \Delta^3 = \gamma k(n - m_E\pi)\tilde{X}_I + GQ(.) \tag{17}$$

$$where\ G = \frac{(n-m_E)\left[1+(1-\pi)\,n\right]\left[1+n-m_E\left(1-\pi(1-\pi)\right)\right]}{(1+n-m_E)\left[1+(1-\pi)\,n\right]\left[1+n-m_E\left(1-\pi(1-\pi)\right)\right]}$$

$$+\frac{\delta(1+n-m_E)(n\pi+m_E\pi-m_E-m_E\pi^2)}{(1+n-m_E)\left[1+(1-\pi)\,n\right]\left[1+n-m_E\left(1-\pi(1-\pi)\right)\right]}$$

The first term in (17) is positive while the sign of the second term is ambiguous. It is positive when π is relatively large or δ is small. In this case, there exists no switching point and parents always prefer the inclusive equilibrium. On the contrary, there exists a switching point if none of the previous conditions is met and if γk is small while $Q(.)$ is relatively large compared to w^H.

Proposition 11. *When the inclusive equilibrium is internally consistent but the exclusive equilibrium is not, parents can still opt for the exclusive outcome if* w^L,w^H *,* γk *and* π *are small while* δ *and* $Q(.)$ *remain high enough.*

Appendix 6

The definitions of Cases 1, 2 and 3 suggest that, if a ranking of these cases in terms of w^L is possible, Case 1 ought to be succeeded by Case 2, and Case 2 by Case 3 (this describes Sequence 1.1, which is a subset of Sequence 1). The former shift takes place when $w^L - C$ becomes greater than $\tilde{X}_I$ yet remains smaller than $\tilde{X}_E$, and the latter when $w^L - C$ becomes greater than both $\tilde{X}_I$ and $\tilde{X}_E$. Let us first define the threshold value that separates Cases 1 and 2. It is obtained by substituting (10) in the condition $w^L - C = \tilde{X}_I$:

$$w_{1,2}^L = \frac{(1+\delta)\,\pi w^H + (1+\gamma nk)\,C - \frac{[1+(1-\pi)n+\delta\pi]Q(.)}{1+(1-\pi)n}}{\pi + \gamma nk} \tag{18}$$

The second threshold, which defines the border between Cases 2 and 3, is obtained by substituting (11) into the condition $w^L - C = \tilde{X}_E$, which yields:

$$w_{2,3}^L = \frac{(1+\delta)\,\pi w^H + \pi\,(1+\gamma nk)\,C - \frac{[(1+\delta)+(n-\delta)\Pi]Q(.)}{1+\Pi n}}{\pi(1+\gamma nk) - (1-\pi)\,[1+\delta(1-\pi)]} \tag{19}$$

What we have to check now is whether these thresholds exist in the space where $w^L > C$ (see Appendix 3, Sequence 1, for a detailed discussion). To begin with, $w_{1,2}^L$ is certain to be positive in that space, and Case 1 does therefore exist, if $\tilde{X}_I > 0$ when $w^L = 0$, that is, if:

$$\frac{(1+\delta)\,\pi w^H - [1+(1-\pi)n+\pi\delta]\,\frac{Q(.)}{1+(1-\pi)n}}{1+\gamma nk} > 0 \tag{20}$$

On the other hand, $w_{2,3}^L$ will be positive in the same space, and Case 3 does therefore exist, if:

$$\pi\,(1+\gamma nk) > (1-\pi)\,\theta,\ where\,\theta = 1+\delta\,(1-\pi) \tag{21}$$

This is the condition ensuring that the denominator of $w_{2,3}^L$ is positive. We should not be concerned with the numerator since we know that it is positive by virtue of the assumption $\tilde{X}_E > \tilde{X}_I$, which holds for $w^L = 0$ in particular (see Appendix 3).

If (20) and (21) are satisfied, Cases 1, 2 and 3 succeed each other. If the former condition is satisfied yet not the latter, only Cases 1 and 2 exist (Sequence 1.2). If the latter condition is fulfilled yet not the former, the situation is more complex because $\tilde{X}_I$ and $\tilde{X}_E$ can then be negative.

Appendix 7

We have to consider six possible sequences depending upon the level of $\tilde{X_I}$ and $\tilde{X_E}$ when $w^L = 0$. They are as follows:

$$Sequence\,1: \;\tilde{X_I} \geq 0\,if\,w^L = 0;$$

$$Sequence\,2: \;\tilde{X_E} \geq 0\,and\,0 > \tilde{X_I} \geq -C\,if\,w^L = 0;$$

$$Sequence\,3: \;\tilde{X_E} \geq 0\,and\,\tilde{X_I} < -C\,if\,w^L = 0;$$

$$Sequence\,4: \;0 > \tilde{X_E} \geq \tilde{X_I} \geq -C\,if\,w^L = 0;$$

$$Sequence\,5: \;0 > \tilde{X_E} \geq -C\,and\,\tilde{X_I} < -C\,if\,w^L = 0;$$

$$Sequence\,6: \;-C > \tilde{X_E} \geq \tilde{X_I}\,if\,w^L = 0;$$

SEQUENCE 1

In this sequence both $\tilde{X_I}$ and $\tilde{X_E}$ exist in the whole domain where $w^L - C$ is positive. Moreover, Cases 1, 2 and 3 all exist and follow each other in this precise order if $1 + \gamma nk > (1-\pi)\,\theta$. Otherwise, Case 3 will not exist in the domain where $w^L - C$ is positive and Case 1 will only be followed by Case 2.

Indeed, if we substitute (10) in the condition $\tilde{X_I} \geq 0$ when $w^L = 0$ we get:

$$\frac{(1+\delta)\pi w^H - [1+(1-\pi)n+\pi\delta]\,\frac{Q(.)}{1+(1-\pi)n}}{1+\gamma nk} > 0 \tag{22}$$

This implies a fortiori that:

$$w^L_{1,2} = \frac{(1+\delta)\,\pi w^H + (1+\gamma nk)\,C - \frac{[1+(1-\pi)n+\delta\pi]Q(.)}{1+(1-\pi)n}}{\pi+\gamma nk} > 0$$

On the one hand, the numerator of $w^L_{1,2}$ is positive since it is superior to the numerator of equation (22) which is strictly positive as $(1+\gamma nk) > 1$. The denominator, on the other hand is also positive and the whole expression is thus positive in the whole domain.

Furthermore, since $\tilde{X_E} > \tilde{X_I}$, the condition$\tilde{X_I} > 0$ if $w^L = 0$ implies that $\tilde{X_E} > 0$ if $w^L = 0$. Formally, by substituting (11) in $\tilde{X_E} > 0$ we have:

$$\frac{(1+\delta)\pi w^H - [1+\delta+(n-\delta)\Pi]\,\frac{Q(.)}{1+\Pi n}}{\pi(1+\gamma nk)} > 0$$

This implies a fortiori that the numerator of the second threshold, $w^L_{2,3}$, is also positive. The sign of the ratio itself therefore depends on the sign the denominator, that is,

$$w^L_{2,3} = \frac{(1+\delta)\,\pi w^H + \pi\,(1+\gamma nk)\,C - \frac{[(1+\delta)+(n-\delta)\Pi]Q(.)}{1+\Pi n}}{\pi(1+\gamma nk) - (1-\pi)\,[1+\delta(1-\pi)]} > 0$$

$$if\;\pi(1+\gamma nk) > (1-\pi)\,[1+\delta(1-\pi)]$$

This positive threshold value will be superior to $w^L_{1,2}$ since $w^L_{2,3}$ is at the intersection between $\tilde{X}_E$ and $w^L - C$ while $w^L_{1,2}$ is at the intersection between $\tilde{X}_I$ and $w^L - C$ and $\tilde{X}_E > \tilde{X}_I$.

We can thus conclude that all three cases exist in the space where $w^L > C$ and that Case 1 will be succeeded by Case 2, and Case 2 by Case 3, if $\tilde{X}_I$ is positive when w^L is equal to zero and if $\pi(1+\gamma nk) > (1-\pi)\theta$ which represents Sequence 1.1. On the other hand, if the first condition is met but not the second, only Cases 1 and 2 will exist in the domain where $w^L > C$ which defines Sequence 1.2.

Both sequences are analyzed in the core of the paper. Indeed, Sequence 1.2 is equivalent to the Sequence 1.1 with the restriction that Case 3 does not exist in this setting.

SEQUENCE 2

Under this setting only $\tilde{X}_E$ exists with certainty in the whole domain where $w^L - C$ is positive while $\tilde{X}_I$ might not exist for small values of w^L depending on the values of π, w^H and $Q(.)$. In this context we have to consider three sub-sequences:

$$2.1:\; w^L_{1,2} > C \Leftrightarrow \frac{[1+(1-\pi)\,n+\delta\pi]\,Q(.)}{1+(1-\pi)\,n} - (1+\delta)\,\pi w^H < (1-\pi)C;$$

$$2.2:\; w^L_{1,2} = C \Leftrightarrow \frac{[1+(1-\pi)\,n+\delta\pi]\,Q(.)}{1+(1-\pi)\,n} - (1+\delta)\,\pi w^H = (1-\pi)C;$$

$$2.3:\; \frac{[1+(1-\pi)\,n+\delta\pi]\,Q(.)}{1+(1-\pi)\,n} - (1+\delta)\,\pi w^H > (1-\pi)C;$$

The first two sub-sequences are equivalent to Sequence 1 with the restriction that Case 1 does not exist under Sequence 2.2.. Sequence 2.3, on the other hand, is different in so far as $\tilde{X}_I$ will not exist for small values of w^L. Indeed, $\tilde{X}_I$ would be negative for those values and parent's are not allowed to set the *cargo* at a negative level in our setting. Consequently, if parent's decide to choose the inclusive strategy they will choose the lowest possible positive value of X_I

namely $X_I = 0$ since parental utility is monotonously decreasing to the right of $\tilde{X}_I$. This value then needs to be compared to $\tilde{X}_E$ under Case 2 and/or X_E^B under Case 3, if Case 3 exists.

Let us first start with the Sequences where $\pi(1+\gamma nk) > (1-\pi)\left[1+\delta(1-\pi)\right]$ and Case 3 thus exists.

There are three possibilities:

2.3.1.1: $C < w^{L*} = \frac{[1+(1-\pi)n+\pi\delta]\frac{Q(.)}{1+(1-\pi)n} - (1+\delta)\pi w^H}{1-\pi} < w_{2,3}^L$,

where w^{L*} is the intersection between $\tilde{X}_I$ and w^L;

- in the space where $C < w^L < w^{L*}$ we have to compare $\tilde{X}_E$ to $X_I = 0$, where the latter belongs to either regime b or c.

Let us first consider the case where $X_I = 0$ still belongs to regime b. The utility differential, labeled Δ^0 is written:

$$\Delta^0 = Eu_f(X_I = 0) - Eu_f(\tilde{X}_E) \tag{23}$$

$$= \left\{\frac{Q(.)}{1+n-m_I} + \delta\frac{Q(.)}{1+n-\pi m_I}\right\} - \left\{Q(.) + \gamma nk\pi\tilde{X}_E + \delta\frac{Q(.)}{1+\pi(1-\pi)m_E}\right\} < 0$$

Since the utility of $X_I = 0$ will be even smaller under regime c we can conclude that the parents will always prefer the exclusive outcome in this setting.

- in the space where $w^{L*} < w^L < w_{2,3}^L$ we have to compare $\tilde{X}_I$ and $\tilde{X}_E$ which is equivalent to Case 2 in the core of the paper;

- in the space where $w_{2,3}^L < w^L$ we have to compare $\tilde{X}_1$ and X_E^B which is equivalent to Case 3 in the core of the paper;

2.3.1.2: $C < w^{L*} = \frac{[1+(1-\pi)n+\pi\delta]\frac{Q(.)}{1+(1-\pi)n} - (1+\delta)\pi w^H}{1-\pi} = w_{2,3}^L$

- in the space where $C < w^L < w_{2,3}^L$ we have to compare $X_I = 0$ to $\tilde{X}_E$ (for the analysis see Sequence 2.3.1.1).

- in the space where $w_{2,3}^L < w^L$ we have to compare $\tilde{X}_I$ and X_E^B which is equivalent to Case 3 in the core of the paper;

2.3.1.3: $w_{2,3}^L < w^{L*} = \frac{[1+(1-\pi)n+\pi\delta]\frac{Q(.)}{1+(1-\pi)n} - (1+\delta)\pi w^H}{1-\pi}$

- in the space where $C < w^L < w_{2,3}^L$ we have to compare $X_I = 0$ to $\tilde{X}_E$ (for the analysis see Sequence 2.3.1.1).

- in the space where $w_{2,3}^L < w^L < w^{L*}$ we have to compare $X_I = 0$ and X_E^B, which can both belong to either regime b or regime c.

Unfortunately, it is impossible to derive an explicit expression for the utility differential in this setting since both utilities will depend upon $m_i i = I, E$ under regime b and there is no way of specifying an explicit function for m_i. However, if w^L is not too large and close to $w^L_{2,3}$, then $X^B_E \longrightarrow \tilde{X}_E$ so that $m_E \longrightarrow n$ and consequently:

$$\underset{X^B_E \underset{>}{\longrightarrow} \tilde{X}_E}{Lim} \quad Eu_f\left(X_I = 0\right) - Eu_f\left(X^B_E\right) = Eu_f\left(X_1 = 0\right) - Eu_f\left(\tilde{X}_E\right)$$

We have shown in 2.3.1. that this utility differential is negative and exclusion is thus preferred for w^Lsufficiently close to $w^L_{2,3}$.

Moreover, there exists the possibility of a switching point since $U\left(X_I = 0\right)$is increasing in w^L while the opposite is true for $U\left(X^B_E\right)$.This switching point will occur with certainty if X^B_E belongs to regime c in the neighborhood of w^{L*} . Indeed, if

$$X^B_E \geq (1+\delta)w^H + \frac{(1-\pi)}{\pi}\theta w^L - \frac{1+\delta\left(1-\Pi\right)}{\pi}\frac{Q(.)}{1+n}$$

$$\Leftrightarrow \left[2\pi - 1 - \delta(1-\pi)^2\right] w^L \geq \pi\left[(1+\delta)w^H + C - \varepsilon\right] - \frac{1+\delta\left(1-\Pi\right)Q(.)}{1+n}$$

then :

$$Eu_f\left(X_I = 0\right) - Eu_f(X^B_E) =$$

$$\left\{\frac{Q(.)}{1+n-m_I} + \delta\frac{Q(.)}{1+n-m_I\pi}\right\} - \left\{\frac{Q(.)}{1+n} + \delta\frac{Q(.)}{1+n}\right\} \geq 0$$

- in the space where $w^{L*} < w^L$ we have to compare $\tilde{X}_I$ and X^B_E which is equivalent to Case 3 in the core of the paper;

Second, if $\pi(1+\gamma nk) < (1-\pi)\left[1+\delta(1-\pi)\right]$, Case 3 does not exist. Consequently, we have to compare $X_I = 0$ to $\tilde{X}_E$, in the space where $C < w^L < w^{L*}$, and $\tilde{X}_I$ to $\tilde{X}_E$ otherwise, which has already been done above

SEQUENCE 3

Under this setting only $\tilde{X}_E$ exists again with certainty in the whole domain where $w^L - C$ is positive while $\tilde{X}_I$ does not exist for small values of w^L . Furthermore, Case 1 will not exist within this sequence since $w^L_{1,2}$ is negative. Indeed, if we substitute again (10) in the condition $\tilde{X}_I < -C$ when $w^L = 0$ we get:

$$\frac{(1+\delta)\pi w^H + (1+\gamma nk)\,C - [1+(1-\pi)n+\pi\delta]\,\frac{Q(.)}{1+(1-\pi)n}}{1+\gamma nk} < 0 \qquad (24)$$

This implies that:

$$w^L_{1,2} = \frac{(1+\delta)\,\pi w^H + (1+\gamma nk)\,C - \frac{[1+(1-\pi)n+\delta\pi]Q(.)}{1+(1-\pi)n}}{\pi+\gamma nk} < 0$$

since the numerator of $w^L_{1,2}$ is equal to the numerator of equation (24) which is strictly negative as $(1+\gamma nk) > 0$ and the denominator is positive.

The analysis of Sequence 3 is consequently analogous to the analysis of Sequence 2.3.

SEQUENCE 4

In this sequence neither $\tilde{X_I}$ nor $\tilde{X_E}$ exist with certainty. Let us start our analysis by considering that $\pi(1+\gamma nk) > (1-\pi)\,[1+\delta(1-\pi)]$. In this context, we have to consider two possibilities:

$$4.1.1:\ w^L_{2,3} > C \Leftrightarrow \frac{[(1+\delta)+(n-\delta)\Pi]\,Q(.)}{1+\Pi n} - (1+\delta)\,\pi w^H < (1-\pi)\theta C;$$

$$4.1.2:\ w^L_{2,3} \leq C \Leftrightarrow \frac{[(1+\delta)+(n-\delta)\Pi]\,Q(.)}{1+\Pi n} - (1+\delta)\,\pi w^H \leq (1-\pi)\theta C;$$

The first Sequence is equivalent to Sequence 2. Under the second sequence, $\tilde{X_E}$ does not exist since it would be inferior to $w^L - C$ on the whole domain. Cases 1[36] and Case 2 are thus impossible within Sequence 4.1.2. We have thus to compare $X_I = 0$ and X^B_E in the space where $w^L_{2,3} < w^L < w^{L*}$ and $\tilde{X_I}$ and X^B_E otherwise. The first comparison has already been done within Sequence 2 while the second is equivalent to Case 3 in the core of the paper.

Finally, if $\pi(1+\gamma nk) < (1-\pi)\,[1+\delta(1-\pi)]$, Case 3 does not exist. Consequently, we have to compare $X_I = 0$ to $\tilde{X_E}$, in the space where $C < w^L < w^{L*}$, and $\tilde{X_I}$ to $\tilde{X_E}$ otherwise, which has already been done above.

SEQUENCE 5

This Sequence is similar to the previous Sequence with the exception that Case 1 will never exist in this setting.

SEQUENCE 6

In this Sequence $\tilde{X_E}$ will not exist when $\pi(1+\gamma nk) > (1-\pi)\,[1+\delta(1-\pi)]$ while $\tilde{X_I}$ will only exist for relatively high values of w^L. This is equivalent to Sequence 4.1.2.

[36] since $w^L_{I,II} < w^L_{II,III} \leq C$

However, when $\pi(1+\gamma nk) < (1-\pi)\left[1+\delta(1-\pi)\right]$, $\tilde{X_E}$ will exist with certainty for some values of w^L. In this context, we have to consider two cases:

$$6.2.1: \ w^L_{2,3} \leq C \Leftrightarrow \frac{\left[(1+\delta)+(n-\delta)\Pi\right]Q(.)}{1+\Pi n} - (1+\delta)\,\pi w^H \leq (1-\pi)\theta C;$$

$$6.2.2: \ w^L_{2,3} > C \Leftrightarrow \frac{\left[(1+\delta)+(n-\delta)\Pi\right]Q(.)}{1+\Pi n} - (1+\delta)\,\pi w^H < (1-\pi)\theta C;$$

Within the Sequence 6.2.1, $\tilde{X_E}$ will exist in the whole domain. Consequently, we have to compare $X_I = 0$ to $\tilde{X_E}$, in the space where $C < w^L < w^{L*}$; and $\tilde{X_I}$ and $\tilde{X_E}$ otherwise, which has already been done above.

Within Sequence 6.2.2, on the other hand, $\tilde{X_E}$ will only exist for relatively high values of w^L. Consequently,

- in the space where $w^L < w^L_{2,3}$ we have to compare $X_I = 0$ to X^B_E (for the analysis see Sequence 2.3.1.3);
- in the space where $w^L_{2,3} < w^L < w^{L*}$ we have to compare $X_I = 0$ to $\tilde{X_E}$ (for the analysis see Sequence 2.3.1.1);
- in the space where $w^{L*} < w^L$ we have to compare $\tilde{X_I}$ and $\tilde{X_E}$ which is equivalent to Case 2 in the core of the paper;

Appendix 8: Case 2

Under Case 2, the condition to have an exclusive equilibrium is $w^L > (\gamma k - 1)\, Q/\gamma k\psi$ in some part of the interval of w^L values belonging to that case (see Proposition 4). Provided that the denominator and the numerator of $w^L_{2,3}$ are both positive, and bearing the definition of $w^L_{2,3}$ in mind, the combined condition writes:

$$(\gamma k - 1)\, Q/\gamma k\psi < w^L < w^L_{2,3} = \frac{(1+\delta)\, \pi w^H + \pi\, (1+\gamma nk)\, C - \xi Q(.)}{\pi(1+\gamma nk) - (1-\pi)\theta},$$

$$where\ \xi = \frac{(1+\delta) + (n-\delta)\Pi}{1+\Pi n}$$

It is easily verified that the interval exists for certain values of the parameters. Therefore, three possibilities arise under Case 2:

$$If\ \frac{(\gamma k - 1)\, Q}{\gamma k\psi} < w^L_{1,2},\ exclusion\ prevails\ over\ the\ whole\ domain;$$

$$If\ w^L_{1,2} < \frac{(\gamma k - 1)\, Q}{\gamma k\psi} < w^L < w^L_{2,3},\ inclusion\ is\ succeeded\ by\ exclusion;$$

$$If\ \frac{(\gamma k - 1)\, Q}{\gamma k\psi} > w^L_{2,3},\ inclusion\ prevails\ over\ the\ whole\ domain.$$

Appendix 9: Case 1

Under the first case, the price of exclusion is again higher than the price of inclusion, yet now the inclusive equilibrium is no more internally consistent (the budget constraint for unlucky migrants is violated). The two possible choices available to the parents are (i) to reduce the level of the cargo obligation so that the budget constraint binds; and (ii) to raise it so as achieve the optimum exclusion price. In other words, the comparison is between $Eu_f(X_I^B)$ and $Eu_f(\tilde{X_E})$, where $Eu_f(X_I^B) = Eu_f(w^L - C)$ denotes the parental utility obtained when unlucky children are just able to pay the cargo. The utility differential, labeled Δ^1 is written:

$$\Delta^1 = Eu_f(X_I^B) - Eu_f(\tilde{X_E}) \tag{25}$$

$$where\ Eu_f(X_I^B) = \left[Q(.) + \gamma nkX_I^B\right] + \delta(1-\pi^n)\frac{Q(.)}{1+(1-\pi)n}$$

We can then write:

$$\Delta^1 = \gamma nk\left(w^L - C - \pi\tilde{X}_E\right) + \delta\left[(1-\pi^n)\frac{Q(.)}{1+(1-\pi)\,n} - \frac{Q(.)}{1+\Pi n}\right] \tag{26}$$

It is easy to see that the second term of Δ^1 is negative by virtue of the fact that $\pi < 1$ (bear in mind that $\Pi = \pi\,(1-\pi)$). The sign of the first term is ambiguous, however. Let us begin the analysis by looking at the extreme case where $w^L \to C$, so that $X_I^B \to 0$. It then follows that the first term is also negative and $\Delta^1 < 0$. In words, when the income of unsuccessful migrants in the first period is close to the subsistence level, it is never in the interest of the parents to allow these children to maintain their land inheritance rights.

Let us now look at what happens when w^L exceeds C by a sensible margin. A necessary condition for $\Delta^1 > 0$ is that the first term in (26) increases monotonously with w^L ($\tilde{X}_E$ does not rise as fast as w^L) so that it eventually exceeds the second (negative) term. From inspection of (11), this is seen to happen if:

$$(1-\pi)\left[1+\delta\,(1-\pi)\right] = (1-\pi)\,\theta < 1+\gamma nk, \tag{27}$$

which implies, in particular, that the weight attached to the public good is sufficiently high. Note, in particular, that, when $\gamma k > 1$, (27) is automatically satisfied (since $n > 2$ and $1 < \theta < 2$).

Let us now rewrite (26) after substituting $\tilde{X}_E$:

$$\frac{\gamma nk}{1+\gamma nk}\left\{\left[(1+\gamma nk) - (1-\pi)\,\theta\right]w^L - (1+\gamma nk)\,C - (1+\delta)\,\pi w^H + \frac{B}{\gamma nk}\frac{Q(.)}{\psi}\right\} \tag{28}$$

where

$$B = [(\gamma nk - \delta) + \gamma nk\,(n - \delta)\,\Pi]\,[1 + (1 - \pi)\,n] + \delta\,(1 + \gamma nk)\,(1 - \pi^n)\,(1 + \Pi n)$$

Provided that (*27*) is satisfied, the sum of the first two terms in the above equation becomes positive above a certain level of w^L. Moreover, if $\gamma nk > \delta$, it follows that $B > 0$ and, therefore, the last term is also positive.[37] It can therefore be the case that Δ^1 becomes positive if the third term is not too large, that is, if w^H is not too high.

We have thus established that the inclusive outcome is a feasible equilibrium. What remains to be checked is that the condition for an equilibrium reversal can be satisfied within the domain of the case considered.

The only possibility to have an inclusive equilibrium under Case 1 is when $\triangle^1 > 0$, and the associated threshold value of w^L belongs to the domain of Case 1. Bearing the definition of $w^L_{1.2}$ in mind, we write:

$$\frac{(1+\delta)\,\pi w^H + (1+\gamma nk)\,C - \frac{B}{\gamma nk}\frac{Q}{\psi}}{1+\gamma nk - (1-\pi)\,\theta} < w^L < \frac{(1+\delta)\,\pi w^H + (1+\gamma nk)\,C - \tau Q(.)}{\pi + \gamma nk},$$

$$where\ \tau = \frac{1 + (1-\pi)\,n + \delta\pi}{1 + (1-\pi)\,n}$$

The lower bound corresponds to the condition $\Delta^1 > 0$ and has been derived by using (28). The upper bound establishes the condition $w^L < \widetilde{X}_I + C$ by using (10). It can be verified that the above interval exists for some values of our parameters[38]. Under Case 1, the exclusive equilibrium is either succeeded by the inclusive equilibrium as w^L goes above the lower threshold, or it prevails throughout the whole range of w^L values pertaining to that case.

[37] It is easy to show that (27) implies $\gamma nk > \delta$ *if* $\delta > 1/(2+\pi)$, a condition that is automatically satisfied if $\pi > 1/2$.

[38] Bear in mind that the condition for inclusion, $(1-\pi)\,\theta < 1 + \gamma nk$ (see Proposition 5), is automatically satisfied since condition (21) is assumed to hold

Appendix 10: Case 3

Under Case 3, it is the exclusive equilibrium that is internally inconsistent (unlucky migrants could pay $\tilde{X}_E$). The parents can then choose between the inclusive equilibrium, $\tilde{X}_I$, and the exclusive strategy in which the budget constraint is just violated. The latter strategy is written: $X_E^B = w^L - C + \varepsilon$, where ε is infinitely small since parental utility is monotonously decreasing to the right of $\tilde{X}_E$ (see Lemma 1).

It must first be noted that X_E^B can belong to either Regime b (some children migrate and some stay in the family farm) or Regime c (no child migrates). Bearing in mind condition (8) that defines the threshold value of X_E for Regime c, we can state the condition under which X_E^B belongs to Regime c:

$$[(1+\theta)\pi - \theta]\, w^L \geq (1+\delta)\pi w^H + \pi(C-\varepsilon) - \frac{1+\delta\,(1-\Pi)\,Q(.)}{1+n}$$

Assuming that the above condition is satisfied, we can write Δ^3 as follows:

$$\Delta^3 = Eu_f(\tilde{X}_I) - Eu_f(X_E^B) = \left\{ Q(.) + \gamma nk\tilde{X}_I + \frac{\delta Q(.)}{1+(1-\pi)n} \right\} - \frac{Q(.)}{n+1}\,(1+\delta)$$

It is immediately evident that the above expression is always positive (the first term is greater than the fourth term), implying that parents always prefer to set an inclusive cargo.

If condition (8) is violated, X_E^B belongs to Regime b, and Δ^3 is equal to:

$$\Delta^3 = Eu_f(\tilde{X}_I) - Eu_f(X_E^B) = \left\{ Q(.) + \gamma nk\tilde{X}_I + \frac{\delta Q(.)}{1+(1-\pi)n} \right\} \quad (29)$$

$$- \left\{ \frac{Q(.)}{1+n-m_E} + \gamma m_E \pi k \left(w^L - C + \varepsilon\right) + \frac{\delta Q(.)}{1+n-m_E+(1-\pi)\pi m_E} \right\}$$

It is impossible to derive an explicit expression for Δ^3 as defined in (29) since m_E depends upon X and the parameters of the model, and there is no way of specifying an explicit function for m_E. However, we can see that, if w^L is small enough to be close to $w_{2,3}^L$, then $X_E^B \longrightarrow \tilde{X}_E$, and

$$\underset{X_E^B \underset{>}{\longrightarrow} \tilde{X}_E}{Lim} \Delta^3 = Eu_f\left(\tilde{X}_I\right) - Eu_f\left(\tilde{X}_E\right)$$

If that limit expression is negative, we know that there exists a switching point below which the exclusive equilibrium is preferred (see our analysis of Case 2).

Furthermore, using the Implicit Function theorem, we can show below that $\delta\Delta^3/\delta w^H < 0$, $\delta\Delta^3/\delta\gamma k > 0$ and $\delta\Delta^3/\delta Q(.) > 0$. In other words, exclusion under Case 3 becomes more likely as w^H increases and when γk or $Q(.)$ decreases.

To obtain the derivatives of Δ^3 with respect to w^H, $Q(.)$, and γk we need first to compute the derivatives of m_E with respect to these parameters. We know that :

$$(1+\delta)\,\pi w^H + (1-\pi)\,\theta w^L + \frac{\delta\pi\,(1-\pi)\,Q(.)}{1+n-m_E\mu_E} - \pi(w^L - C + \varepsilon)$$

$$= \frac{Q(.)}{1+n-m_E} + \pi\gamma m_E k X_E + \delta\frac{Q(.)}{1+n-m_E\mu_E}$$

Let us call H the following expression:

$$H = (1+\delta)\,\pi w^H + (1-\pi)\,\theta w^L - \frac{\delta(1-\Pi)Q(.)}{1+n-m_E\mu_E}$$

$$-\frac{Q(.)}{1+n-m_E} - \pi(1+\gamma m_E k)(w^L - C + \varepsilon) = 0$$

Consequently:

$$\frac{\delta H}{\delta m_E} = -\frac{\delta(1-\Pi)^2 Q(.)}{(1+n-m_E\mu_E)^2} - \frac{Q(.)}{(1+n-m_E)^2} - \pi\gamma k(w^L - C + \varepsilon) < 0$$

$$\frac{\delta m_E}{\delta w^H} = -\frac{\frac{\delta H}{\delta w^H}}{\frac{\delta H}{\delta m_E}} > 0;\ \frac{\delta m_E}{\delta \gamma k} = -\frac{\frac{\delta H}{\delta \gamma k}}{\frac{\delta H}{\delta m_E}} < 0;\ \frac{\delta m_E}{\delta Q(.)} = -\frac{\frac{\delta H}{\delta Q(.)}}{\frac{\delta H}{\delta m_E}} < 0$$

In a second step we can compute the derivatives of Δ^3 with respect to w^H, $Q(.)$, and γk. We have :

$$\Delta^3 = \left\{Q(.) + \gamma nk\tilde{X}_I + \frac{\delta Q(.)}{1+(1-\pi)n}\right\}$$

$$-\left\{\frac{Q(.)}{1+n-m_E} + \gamma m_E \pi k\left(w^L - C + \varepsilon\right) + \frac{\delta Q(.)}{1+n-m_E(1-\Pi)}\right\}$$

Note that the second term of this equation is identical to the RHS of (**??**). Therefore, if we replace the second term by the RHS of (**??**) and if we substitute $\tilde{X}_I$ by its value given in (10) we can rewrite Δ^3 as:

$$Q(.) + \gamma nk\left\{\frac{(1+\delta)\pi w^H + (1-\pi)w^L - \frac{[1+(1-\pi)n+\pi\delta]Q(.)}{1+(1-\pi)n}}{1+\gamma nk}\right\} + \frac{\delta Q(.)}{1+(1-\pi)n}$$

$$-(1+\delta)\,\pi w^H - (1-\pi)\,\theta w^L - \delta\pi\,(1-\pi)\,\frac{Q(.)}{1+n-m_E\mu_E} - \pi(w^L - C + \varepsilon)$$

Thus[39],

$$\frac{\delta\Delta^3}{\delta w^H} < 0;\ \frac{\delta\Delta^3}{\delta\gamma k} > 0;\ \frac{\delta\Delta^3}{\delta Q(.)} > 0$$

We have thus established that the exclusive outcome will prevail in some part of the domain if $Lim\,\Delta^3 < 0$. It will then be nevertheless succeeded by the inclusive equilibrium. There are other conditions under which the same outcome may arise but we cannot express them in a simple analytical form. What is guaranteed is that the sequence goes from exclusion to inclusion.

[39] since $\Delta^3 = -\frac{(1+\delta)\pi w^H}{1+\gamma nk} + \frac{(1-\pi)\pi[\gamma nk-(1+\gamma nk)\theta]w^L}{1+\gamma nk} - \pi(w^L - C + \varepsilon) + \frac{[1+(1-\pi)n][1+n-m_E(1-\Pi)-\delta\Pi]+\delta[1+n-m_E(1-\Pi)]+\delta\gamma nk(1-\pi)[(1-\pi)+(n-m_E)(1-\Pi)]}{(1+\gamma nk)[1+(1-\pi)n][1+n-m_E(1-\Pi)]}Q(.)$

Appendix 11

Let us first consider the sequence where there is exclusion over the whole domain of cases 1 and 2 and inclusion over the whole domain of case 3. In this setting, the domain under which we observe exclusion will increase with $w^L_{2,3}$. Note that:

$$w^L_{2,3} = \frac{(1+\delta)\,\pi w^H + \pi\,(1+\gamma nk)\,C - \frac{[(1+\delta)+(n-\delta)\Pi]Q(.)}{1+\Pi n}}{\pi(1+\gamma nk) - (1-\pi)\,[1+\delta(1-\pi)]}$$

and consequently[40],

$$\frac{\delta w^L_{2,3,}}{\delta Q(.)} < 0;\ \frac{\delta w^L_{2,3}}{\delta w^H} > 0;\ \frac{\delta w^L_{2,3}}{\delta \gamma k} < 0$$

In this setting exclusion will increase with $w^H$and decrease with $Q(.)$ and γk.

Second, we consider the sequence where exclusion over Cases 1 and 2 is followed by exclusion and then inclusion within Case 3. In this setting exclusion will again increase with $w^H$and decrease with $Q(.)$ and γk as we have seen in the analysis of Case 3.

Third, if exclusion in Case 1 is succeeded by inclusion over Case 2 and 3, then the domain under which we observe exclusion will increase with $w^L_{1,2}$. Indeed:

$$w^L_{1,2} = \frac{(1+\delta)\,\pi w^H + (1+\gamma nk)\,C - \frac{[1+(1-\pi)n+\delta\pi]Q(.)}{1+(1-\pi)n}}{\pi + \gamma nk}$$

and consequently[41],

$$\frac{\delta w^L_{1,2}}{\delta Q(.)} < 0;\ \frac{\delta w^L_{1,2}}{\delta w^H} > 0;\ \frac{\delta w^L_{1,2}}{\delta \gamma k} < 0$$

Exclusion rises thus again with $w^H$and decrease with $Q(.)$ and γk .

The conclusion is exactly the same for the setting where exclusion in Case 1 is succeeded by inclusion over Case 2 and exclusion followed by inclusion over Case 3 since the effects on $w^L_{1,2}$ go in the same direction as those observed for Case 3.

---

[40] Indeed we have $\pi(1+\gamma nk) > (1-\pi)\,[1+\delta(1-\pi)]$ in our setting and the sign of the first two derivatives is thus straightforward

Concerning the third derivative we have:

$\frac{\delta w^L_{2,3}}{\delta \gamma k} = \frac{-n\pi}{[\pi(1+\gamma nk)-(1-\pi)\theta]^2}\left[(1-\pi)\,\theta C + (1+\delta)\,\pi w^H - \frac{[(1+\delta)+(n-\delta)\Pi]Q(.)}{1+\Pi n}\right] < 0$

since $\tilde{X_E}$ positive when $w^L = 0$ implies that$(1+\delta)\pi w^H - [1+\delta+(n-\delta)\Pi]\,\frac{Q(.)}{1+\Pi n} > 0$.

[41] Concerning the third derivative we have:

$\frac{\delta w^L_{1,2}}{\delta \gamma k} = \frac{-n}{(\pi+\gamma nk)^2}\left[(1-\pi)\,C + (1+\delta)\,\pi w^H - \frac{[1+(1-\pi)n+\delta\pi]Q(.)}{1+(1-\pi)n}\right] < 0$

since $\tilde{X_I}$ positive when $w^L = 0$ implies that $\frac{(1+\delta)\pi w^H - [1+(1-\pi)n+\pi\delta]\frac{Q(.)}{1+(1-\pi)n}}{1+\gamma nk} > 0$.

Let us now consider the sequence where exclusion is followed by inclusion inside Case 1, succeeded by inclusion over Cases 2 and 3. In this setting, the domain under which we observe exclusion will increase with

$$R = \frac{(1+\gamma nk)\,C + (1+\delta)\,\pi w^{H} - BQ/\psi\gamma nk}{1+\gamma nk-(1-\pi)\,\theta}$$

and thus[42]:

$$\frac{\delta R}{\delta Q(.)} < 0 \; if \; B > 0; \; \frac{\delta R}{\delta w^{H}} > 0; \; \frac{\delta R}{\delta \gamma k} < 0$$

The conclusion is again exactly the same for the setting where exclusion is followed by inclusion inside Case 1, succeeded by inclusion over Case 2 and exclusion followed by inclusion over Case 3 since the effects on R go in the same direction as those observed for Case 3.

Furthermore, if exclusion is followed by inclusion inside Case 1, succeeded by exclusion over Case 2 then exclusion will increase with w^H and decrease with $Q(.)$ if the space between R and $w^L_{1,2}$ decreases with w^H and increases with $Q(.)$. This holds irrespective of the sequence within Case 3 since the effects on $w^L_{2,3}$ go in the same direction as those observed for Case 3. We observe that :

$$\frac{\delta R}{\delta w^{H}} = \frac{(1+\delta)\pi}{1+\gamma nk-(1-\pi)\,\theta} > \frac{\delta w^{L}_{1,2}}{\delta w^{H}} = \frac{(1+\delta)\pi}{\pi+\gamma nk}$$

since $\pi+\gamma nk > 1+\gamma nk-(1-\pi)\,\theta$. Exclusion increases thus with w^H .

Moreover we find that :

$$\frac{\delta R}{\delta Q(.)} = \frac{-B/\psi\gamma nk}{1+\gamma nk-(1-\pi)\,\theta} < \frac{\delta w^{L}_{1,2}}{\delta Q(.)} = \frac{-\frac{[1+(1-\pi)n+\delta\pi]}{1+(1-\pi)n}}{\pi+\gamma nk}$$

Indeed, we know that in this setting:

$$R = \frac{(1+\gamma nk)\,C + (1+\delta)\,\pi w^{H} - BQ/\psi\gamma nk}{1+\gamma nk-(1-\pi)\,\theta} <$$

$$\frac{(1+\delta)\,\pi w^{H} + (1+\gamma nk)\,C - \frac{[1+(1-\pi)n+\delta\pi]Q(.)}{1+(1-\pi)n}}{\pi+\gamma nk} = w^{L}_{1,2}$$

Consequently, since $\pi+\gamma nk > 1+\gamma nk-(1-\pi)\,\theta$:

$$-BQ/\psi < -\frac{[1+(1-\pi)\,n+\delta\pi]\,Q(.)}{1+(1-\pi)\,n}$$

---

[42]We have: $\frac{\delta G}{\delta \gamma k} = \frac{-n}{(1+\gamma nk-(1-\pi)\theta)^2}\left[(1-\pi)\,\theta C + (1+\delta)\,\pi w^{H} - BQ/\psi\right]$. Moreover, we know that G will be positive even if $C = O$ since Δ^1 will be negative for values of $w^L \leq 0$ irrespective of C. This implies that $(1+\delta)\,\pi w^{H} - BQ/\psi \geq 0$ and consequently that $(1-\pi)\,\theta C + (1+\delta)\,\pi w^{H} - BQ/\psi \geq 0$.

We can thus conclude that exclusion decreases with Q(.) in this setting.

Concerning γk, if we observe inclusion over the whole domain of Case 3, then exclusion will decrease with a rise in γk if the space between $w^L_{1,2}$ and $w^L_{2,3}$ decreases (we have already shown that R decreases with γk. We have:

$$\frac{\delta w^L_{1,2}}{\delta \gamma k} = \frac{-n}{(\pi + \gamma nk)} \left[w^L_{1,2} - C\right];$$

$$\frac{\delta w^L_{2,3}}{\delta \gamma k} = \frac{-n\pi}{\pi(1+\gamma nk) - (1-\pi)\theta} \left[w^L_{2,3} - C\right];$$

Since $w^L_{1,2} < w^L_{2,2}$ and as $\frac{1}{(\pi+\gamma nk)} < \frac{\pi}{\pi(1+\gamma nk)-(1-\pi)\theta}$ we have $\frac{\delta w^L_{1,2}}{\delta \gamma k} > \frac{\delta w^L_{2,3}}{\delta \gamma k}$. Exclusion decreases thus with γk in this setting.

On the other hand, if we observe exclusion followed by inclusion within Case 3, we are not able to show the effect of γk on exclusion since it is impossible to compute an explicit form of the switching point within Case 3.

Let us now turn to the case where exclusion is followed by inclusion inside Case 1, succeeded by inclusion and then exclusion inside Case 2 and Case 3. We observe thus exclusion in the two following domain:

$$w^L < G \, and \, (\gamma k - 1)\, Q/\gamma k\psi < w^L < w^L_{2,3}$$

We have shown above that R and $w^L_{2,3}$ increase with w^H. Since $(\gamma k - 1)\, Q/\gamma k\psi$ is independent of w^H we can conclude that exclusion increases with w^H. We have also shown that R and $w^L_{2,3}$ decrease with γk and $Q(.)$. Since $(\gamma k - 1)\, Q/\gamma k\psi$ increases with γk and $Q(.)$[43] exclusion will decrease with a rise in γk and $Q(.)$.

The conclusion is again exactly the same for the setting where exclusion is followed by inclusion inside Case 1, succeeded by inclusion and then exclusion inside Case 2, followed by inclusion over Case 3 since the effects on $w^L_{2,3}$ go in the same direction as those observed for Case 3.

Finally, if exclusion over Case 1 is succeeded by inclusion and then exclusion inside Case 2, then exclusion will increase with w^H and decrease with $Q(.)$ and γk if the space between $w^L_{1,2}$ and $(\gamma k - 1)\, Q/\gamma k\psi$ decreases with w^H and increases with $Q(.)$ and γk. This holds irrespective of the sequence within Case 3 since the effects on $w^L_{2,3}$ go in the same direction as those observed for Case 3. We have shown above that $w^L_{1,2}$ increases with w^H and as $(\gamma k - 1)\, Q/\gamma k\psi$ is independent of w^H we can conclude that exclusion increases with w^H. We have also shown that $w^L_{1,2}$ decreases with γk and $Q(.)$ while$(\gamma k - 1)\, Q/\gamma k\psi$ increases with γk and $Q(.)$. Consequently, exclusion will decrease with a rise in the two parameters.

[43] since $\gamma k > 1$ is a necessary condition to observe this and the following setting

Appendix 12: Continuous Model

12.1 The setting

As the above evidence suggests, migrants in greatest need of land assets appear more likely to exclude themselves from inheritance if they belong to traditional communities. Such an adverse welfare outcome is not observed in ex-haciendas where unsuccessful migrants may avail themselves of a solid fall-back option in terms of access to family land. The question then arises as to why members of traditional communities accept an unequalising effect that goes against the spirit of customary rules of inheritance that are typically egalitarian. There are two possible answers depending on whether we consider them as rule-bound or rational actors. In the former instance, they do not feel able to call into question the communal taxation institution and the perverse consequences resulting from the persistence of the custom in new circumstances characterized by permanent migration are seen as inescapable. In the latter instance, on the contrary, community members are viewed as rational actors who have the ability to adjust the level of communal taxes. This second approach, which we prefer, is premised on the widespread evidence that traditions are not immutable rules that constrain the people in a rigid manner, but rather arrangements that they can somehow modify or re-interpret (Berry, 1993; Platteau and Peccoud, 2010). We are then confronted with a theoretical challenge since we have to explain why members of traditional communities would choose to push the economically less successful migrants to forego their share of the family land. More precisely, we have to explain why they refuse to adjust the level of taxes downward so as to keep these more unfortunate migrants within the community system.

In the model, we thus study a rural community composed of a continuous set of agents N of size n. Among them, some have left the village v and have migrated to the city c, where they currently live and work. This subset of agents is of size m and is noted $M \subset N$. We consider two periods of time $t \in \{1, 2\}$. Migration is either permanent, lasting two periods or temporary, if the migrant comes back to his/her village of origin at the beginning of the second period. However, migrants are entitled to return migration on condition that they have maintained their community membership rights, which include access to land and to the benefits of a local public good. To this end, they are required to fulfill all of their duties as a community member, even during their migration period. In particular, they need to pay the communal tax. Therefore, among the migrants, a subset of agents, called the contributing migrants $C \subset M$, may decide to contribute in period 1 in order to secure their access to the community assets and services in period 2. As we detail below, the migrant's wage is random in both periods. Faced with this uncertainty, some migrants may thus be willing to have a fallback option in the village in period 2. The set of returnees, who will necessarily belong to the group of contributing migrants, is noted $R \subset C$.

Agents' utility is additively separable across periods and they discount the future by a factor $\delta \in [0, 1]$. In each period, agents' utility depends on their location $\{v, c\}$ in the following way: In the village, agents derive utility from the land and the local public good, which is produced in each period by residents and contributing migrants but consumed by residents only. The public good can be seen as a flow of services, potentially attached to land, but not necessarily.

Formally, in period $t \in \{1, 2\}$, the utility level in the village is given by

$$u_{vt} = w_v - g_t + V(l_t, G_t),$$

where $w_v \in IR_+$ is an exogenous constant, $g_t \in IR_+$ is the individual contribution to the public good at time t, l_t denotes the land endowment per resident, and G_t the local public good, with $V_l > 0; V_G > 0$.[44] This formulation is very general. In particular, it encompasses the following setting. Suppose that village residents supply their workforce inelastically and that they can allocate one unit of time between agriculture and an alternative activity, such as handicraft activities or salaried work, whose marginal productivity is constant and equal to w_v.[45] One can show that in this case, the residents' income is equal to $w_v + V(l_t, G_t)$, where w_v gives the value of the resident's time endowment and $V(l_t, G_t)$ their land rental, given the level of the local public good. Notice that $V(l_t, G_t)$, which is left unspecified, can also capture separate benefits that residents derive from the local public good.

In the city, utility depends on the migrant's current wage $w_t \in IR_+$, on local amenities and the migrant's intrinsic preference for residing in the city, which are captured by the term $v_c \in IR$. Depending on whether the migrant has decided to pay the communal tax or not, the utility is:

$$\begin{aligned} u_{ct,i \notin C} &= w_t + v_c, \\ u_{ct,i \in C} &= w_t - g_t + v_c. \end{aligned}$$

Note also that, even though the second period's urban wage is random and return migration can be seen as a form of insurance, we assume that agents are risk neutral. This allows us to simplify the analysis while still considering one of the main benefits of having a fallback option in the village. Indeed, the fallback option provides the migrant with a lower bound on his/her second period income (utility), which has the effect of reducing the variability, and increasing the mean of second period income (utility). The latter effect is present in the model and suffices to produce a demand for insurance with desirable properties (see below).[46]

Let us now describe the timing of the model in more details.

Period 1:

[44] We do not assume anything on the sign of the second derivatives, including the cross partial derivative V_{lG}, but intuition suggests that land and the local public good are complements, in which case, $V_{lG} > 0$.

[45] In poor regions, the value of w_v can obviously be very low, if not null.

[46] The term insurance will be used in the paper for legibility, but we acknowledge that this use is slightly abusive under risk neutrality. Insurance has to be understood as benefiting from a fallback option, which is the main purpose of return migration when migration fails.

1. At the beginning of period 1, the level of the communal tax for period 1, g_1, is set by migrants and non-migrants alike, by means of majority voting.

2. Migrants observe their first period urban wage, w_1, and decide whether to pay g_1. If they do so, they belong to the set of contributing migrants, $C \subset M$, which makes them eligible to return migration in period 2.

Period 2:

1. At the beginning of period 2, the level of communal taxes for period 2, g_2, is set by contributing migrants, who have maintained their membership rights, and non-migrants, by means of majority voting.

2. Migrants observe their second period urban wage, w_2, and contributing migrants, $i \in C$, decide whether to reverse their migration decision and return to their native community. This determines the set of returnees, $R \subset C$.

Notice that contributing migrants who eventually decide to stay permanently do not contribute in period 2, since this would not yield any benefit for them.

Finally, we assume that w_1 and w_2 are positively correlated. This is to capture the idea that the outcome of the first period of migration gives an indication on the migrant's future opportunities in the city. More precisely, we assume that the shape of the conditional probability distribution of the second period urban wage, $F_2(w_2 \mid w_1)$, is affected by w_1 in the following way: $\partial F_2(w_2 \mid w_1)/\partial w_1 < 0, \forall w_2$. This means that, for any given pair of first period wages $\{w_1^L, w_1^H\}$, $F_2(w_2 \mid w_1^H)$ first order stochastically dominates $F_2(w_2 \mid w_1^L)$ if and only if w_1^H is higher than w_1^L. A last point pertaining to notation needs to be added: since w_1 is observed by migrants before they decide to pay their first period tax g_1, $F_1(w_1)$ denotes the distribution of realized wages among migrants. Migrants are indeed heterogeneous in terms of the first period wage and therefore in terms of their expectations regarding their second period wage. This will generate heterogeneous behaviors regarding their willingness to pay for insurance. Similarly, while studying return migration, $F_2(w_2 \mid w_1)$ denotes the distribution of realized wages in period 2. This is made possible by the continuity of the set of agents.

We solve the model backward and start by describing the return migration equilibrium.

12.2 Return migration

Upon the observation of their second period urban wage, contributing migrants decide whether to return to the village. This decision is based on a comparison between the levels of utility obtained in the city and in the village, respectively. At this stage of the game, the set of contributing migrants, C, who are eligible to return migration, and the level of the communal tax for the second period, g_2, are considered as given. Let Δ stand for the utility gain of return migration:

$$\Delta = u_{v2} - u_{c2},$$

where

$$\begin{aligned} u_{v2}(n_2, g_2) &= w_v - g_2 + V(l_2(n_2), G_2(n_2, g_2)), \\ u_{c2} &= w_2 + v_c. \end{aligned} \tag{30}$$

As expected, contributing migrants migrate back if and only if

$$\Delta \geq 0 \iff w_2 \leq \tilde{w}_2 = u_{v2}(n_2) - v_c.$$

Notice that u_{v2} is endogenous as it depends on the number of residents, noted n_2, itself determined by the number of returnees, $r(\tilde{w}_2)$, in equilibrium:

$$n_2(\tilde{w}_2) = n - m + r(\tilde{w}_2).$$

Indeed, the number of residents in the village affects the availability of land per capita, $l_2 = L/n_2$, with L the land endowment at the village level. It also affects the level of the public good, G_2, which depends on the aggregate tax proceeds $n_2 g_2$.[47] More precisely, the derivative of u_{v2} with respect to n_2 is given by

$$\frac{\partial u_{v2}}{\partial n_2} = V_l \frac{\partial l}{\partial n_2} + V_G g_2. \tag{31}$$

There are two effects of opposite signs. On the one hand, an additional resident (returnee) increases land pressure, which has a negative impact on the utility of all of the residents. On the other hand, for a given level of second period contribution g_2, an additional returnee increases the size of the public good.

Because u_{v2} depends itself on the number of returnees $r(\tilde{w}_2)$, the wage threshold below which contributing migrants decide to migrate back is such that $\Delta(\tilde{w}_2) = 0$, and is implicitly defined by the following equation:

$$\Delta(\tilde{w}_2) = w_v - g_2 + V(r(\tilde{w}_2), g_2) - \tilde{w}_2 - v_c = 0, \tag{32}$$

where the number of returnees is given by

$$r(\tilde{w}_2) = \int_{i \in C} \int_0^{\tilde{w}_2} dF_2(w_2 \mid w_1)\, dF_1(w_1), \tag{33}$$

with

$$\frac{\partial r}{\partial \tilde{w}_2} = \int_{i \in C} f_2(\tilde{w}_2 \mid w_1)\, f_1(w_1)\, dw_1 > 0, \tag{34}$$

by an application of Leibniz's rule. Intuitively, $\tilde{w}_2$ is a measure of the value of the fallback option in the village measured in monetary terms. The number of

[47]The production function $G(ng)$ is left unspecified, but is assumed monotonically increasing in ng, with weakly decreasing marginal returns.

returnees is therefore logically increasing in $\tilde{w}_2$, as more migrants have a wage that falls below the threshold if the latter is higher. Because Δ is itself a function of r, the decision to return depends on the number of returnees. The return migration decisions are therefore interdependent among contributing migrants, which leads to a complex determination of the return migration equilibrium. The following Lemma ensures the existence of at least one stable equilibrium under mild assumptions and specifies its (their) characteristics.

Lemma 4. ***The return migration equilibrium:***

There exists at least one stable return migration equilibrium under the sufficient condition that $u_{v2}(n-m) \geq v_c$.

In any stable equilibrium, $\partial\Delta/\partial\tilde{w}_2 < 0$.

In a stable equilibrium, two situations can arise : either the negative effect of land scarcity dominates and utility in the village is negatively affected by additional returnees, $\partial u_{v2}/\partial n_2 < 0$, or the positive effect of the public good dominates and utility in the village is positively affected by additional returnees, $\partial u_{v2}/\partial n_2 > 0$.

Proof. First, $\Delta(\tilde{w}_2)$ is the net gain of return migration. It is given by equation (32), where $\tilde{w}_2$ is the urban wage in period 2, which also determines the number of returnees according to equation (33). We have that $r(0) = 0$ and $lim_{\tilde{w}_2 \longrightarrow +\infty} r(\tilde{w}_2) = c$. Indeed, when the value of the fallback option is zero, the number or returnees is equal to zero, while when it tends to infinity, all of the contributing migrants return. Hence,

$$\begin{aligned} \Delta(0) &= u_{v2}(n-m) - v_c, \\ lim_{\tilde{w}_2 \longrightarrow +\infty} \Delta(\tilde{w}_2) &= u_{v2}(n-m+c) - \infty = -\infty. \end{aligned}$$

Therefore, $u_{v2}(n-m) - v_c > 0$ ensures that there exists $\tilde{w}_2$ such that $\Delta(\tilde{w}_2) = 0$, since $\Delta(\tilde{w}_2)$ is a continuous function.

Second, when $\tilde{w}_2$ increases, the number of returnees $r(\tilde{w}_2)$ increases as well. If Δ were to increase with $\tilde{w}_2$, the gain from return migration would increase, which would raise the number of returnees, thereby contradicting the notion of equilibrium. On the contrary, if in equilibrium where $\Delta(\tilde{w}_2) = 0$, $\Delta(\tilde{w}_2)$ decreases with $\tilde{w}_2$, one additional returnee would reduce the gain from return migration, thereby preventing this additional returnee from actually returning.The equilibrium is thus stable in this case.

Unfortunately, because u_{v2} is subject to contradictory effects of $\tilde{w}_2$ through n_2 (see (31)), we cannot guarantee that $\Delta(\tilde{w}_2)$ is a monotonic function. It follows that we cannot exclude cases of multiple equilibria. However, by studying how utility in the village u_{v2} depends on the number of residents, we can make a distinction between two types of stable equilibria. Making use of equation (32), we can write the derivative of Δ with respect to $\tilde{w}_2$ is as follows:

$$\frac{\partial\Delta}{\partial\tilde{w}_2} = \frac{\partial u_{v2}}{\partial n_2}\frac{\partial r}{\partial\tilde{w}_2} - 1,$$

where $\partial u_{v2}/\partial n_2$ and $\partial r/\partial\tilde{w}_2$, which is positive, are respectively given by equations (31) and (34). We already know that in a stable equilibrium, $\partial\Delta/\partial\tilde{w}_2 < 0$.

A case where the land pressure effect dominates induces $\partial u_{v2}/\partial n_2 < 0$ and leads clearly to a stable equilibrium. However, we cannot exclude that $\partial u_{v2}/\partial n_2 > 0$, if the effect of the public good dominates, but is weak enough. □

The main message from Lemma 1 is that, in order to ensure the existence of a return migration equilibrium, it is convenient to assume that $u_{v2}(n-m) - v_c > 0$. This condition is natural as it states that, when there are $m-n$ residents, any community member prefers to stay in the village to going to the city and earning a wage equal to zero. Moreover, according to the discussion in the proof, the most likely (and relevant) situation involves a return migration equilibrium where the land pressure effect dominates and where an additional returnee would thus decrease the level of welfare in the village ($\partial u_{v2}/\partial n_2 < 0$).

12.3 Decision on the level of the period 2 communal tax

At the beginning of period 2, g_2, the level of the communal tax for period 2, is cooperatively set by contributing migrants and non-migrants. In order to solve this stage of the game, Proposition 12 therefore analyzes the non-migrants' and the contributing migrants' preferences over the level of contribution to the public good in period 2, g_2(proof shown in Section 12.8).

Proposition 12. The preferred level of contribution to the local public good in period 2 is equal among non-migrants and contributing migrants and is such that the utility level in the village in period 2 is maximized: $\partial u_{v2}(g_2^*)/\partial g_2 = 0$.

Proposition 12 conveys two important messages. First, it states that non-migrants and contributing migrants have identical preferences over g_2. Concerning the latter, it is worth noting that the heterogeneity with respect to the first period urban wage does not affect the contributing migrants' preferences over g_2. The intuition behind the fact that migrants and non-migrants share the same view about the level of communal taxes in period 2 is the following: contributing migrants can either migrate back or not. If they migrate back, they naturally want to maximize the utility level in the village, u_{v2}. But, if they stay in the city permanently, they do not contribute to the public good anymore, nor do they benefit from it in period 2. They are therefore indifferent regarding its level. Since both events occur with a positive probability, they opt for the level that maximizes u_{v2}, similarly to non-migrants. As a result of this unanimity, majority voting will lead to g_2^* such that

$$\frac{\partial u_{v2}}{\partial g_2} = -1 + V_g(l_2, G_2)(n - m + r) = 0.$$

Second, Proposition 12 tells us that the return migration equilibrium is unaffected by the choice of g_2, which greatly simplifies the remainder of the analysis.

Moving backward, we can now turn to the first period of the game.

12.4 The migrant's decision to pay the communal tax

Upon observation of their first period migration wage, migrants make a decision on tax contributions in period 1. During the first period, migrants live in the city and do not benefit from the local public good produced in the village. Still, if they want to maintain their community membership rights in order to have a fallback option in period 2, they need to pay g_1. Migrants decide whether to pay or not by simply comparing the costs and benefits of the fallback option, which we will call insurance, even though migrants are risk neutral, as discussed above. In addition, migrants, who do not have access to capital, must satisfy a liquidity constraint. This constraint states that their current wage must be higher than the tax: $w_1 \geq g_1$. In the following, we describe this decision and how it relates to the migrant's type, given by his/her first period urban wage, w_1(proof given in Section12.8).

Lemma 5. *Migrants pay the communal tax in period 1 if and only if*

$$\delta\pi\left(w_1, \tilde{w}_2\right) - g_1 \geq 0, \tag{35}$$

where

$$\pi\left(w_1, \tilde{w}_2\right) = F_2\left(\tilde{w}_2 \mid w_1\right)\tilde{w}_2 - \int_0^{\tilde{w}_2} w_2 dF_2\left(w_2 \mid w_1\right) \tag{36}$$

is the insurance benefit.

Migrants pay the communal tax if its cost, g_1, is lower than the present value of the benefit they draw from the fallback option $\delta\pi$. Since migrants are risk neutral, the insurance benefit π only captures the effect of the fallback option, which gives a lower bound on the wage, or utility, in terms of expected values. Migrants benefit from insurance in case of return migration, which takes place with probability $F\left(\tilde{w}_2 \mid w_1\right)$. The expected benefit of insurance in case of return migration is equal to the difference between the value of the fallback option, measured in the urban wage equivalent $\tilde{w}_2$, and the expected value of the second period urban wage, conditional on the fact that it is lower than the threshold. Starting from equation (36), one can indeed re-write π as

$$\pi\left(w_1, \tilde{w}_2\right) = F\left(\tilde{w}_2 \mid w_1\right)\left[\tilde{w}_2 - E_{w_2}\left[w_2 \mid w_2 \leq \tilde{w}_2, w_1\right]\right].$$

We then show (see Section 12.8) the result stated in the following proposition:

Proposition 13. *The insurance benefit $\pi\left(w_1, \tilde{w}_2\right)$*
is an increasing function of the return migration threshold $\tilde{w}_2$,
is a decreasing function of the first period urban wage w_1.

The first part of Proposition 13 states that the insurance benefit increases with $\tilde{w}_2$. This is expected as $\tilde{w}_2$ measures the value of the fallback option in the village. As for the second part, it tells us that the insurance benefit is higher for migrants with a low first period wage w_1. The main intuition is that, according to our assumption of first order stochastic dominance, w_1 gives an indication about the probability distribution of the second period wage. More precisely, a high w_1 is seen as a positive signal indicating that the probability to fall below $\tilde{w}_2$ and to be in need of the fallback option is reduced. Therefore, the willingness to pay for the fallback option is higher among low-income migrants, in period 1.

Because π is monotonically decreasing in w_1, we know that there exists $\tilde{w}_1(\tilde{w}_2, g_1)$ such that Condition (35) is satisfied with equality. The willingness to pay of a migrant whose wage is $\tilde{w}_1$ is just equal to g_1, which makes him/her indifferent between paying and not paying the tax. Given the liquidity constraint, the set of tax-paying migrants is therefore composed of migrants whose wage in the first period is between g_1 and $\tilde{w}_1$. Hence, the number of these tax-paying migrants is equal to[48]

$$c = \int_{g_1}^{\tilde{w}_1(\tilde{w}_2, g_1)} dF_1(w_1), \tag{37}$$

which entails that the equilibrium number of returnees can be written as

$$r = \int_{g_1}^{\tilde{w}_1(\tilde{w}_2, g_1)} \int_0^{\tilde{w}_2} dF_2(w_2 \mid w_1)\, dF_1(w_1). \tag{38}$$

The final step of the analysis aims at determining g_1, on which community members agree by means of majority voting. As we will show towards the end of the analysis, non-migrants are affected by g_1 in different ways, including through changes in the behavior of the migrants. The next subsection focuses on how the migrants' willingness to pay the communal tax and their return migration decisions react to changes in g_1.

12.5 The impact of the level of taxes on migrants' decisions

As can be seen from equations (37) and (38), the number of tax payers and the number of returnees are directly affected by g_1, but also by the return migration threshold $\tilde{w}_2$, which corresponds to the value of the fallback option. It turns out that $\tilde{w}_2$ is also impacted by g_1. The reason is precisely that there is a direct effect on the tax-paying and return migration decisions. As a result, the set of returnees changes, which produces the effect on $\tilde{w}_2$, and in turn an indirect effect on the tax-paying and return migration decisions themselves. Therefore, we successively explore the direct partial effects of g_1 on c, r, and $\tilde{w}_2$. We then turn to the analysis of total effects of g_1 on c and r.

Lemma 6. *The direct partial effect of the level of the communal tax in period 1 on the number of tax payers is negative:*

$$\frac{\partial c(\tilde{w}_2, g_1)}{\partial g_1} = -f_1(g_1) + f_1(\tilde{w}_1) \frac{\partial \tilde{w}_1}{\partial g_1} < 0.$$

[48]In what follows, we only consider cases where $g_1 < \tilde{w}_1$, so that demand for insurance is interior.

Proof. This expression is obtained by applying Leibniz's rule to equation (37). We also know that $\partial\tilde{w}_1/\partial g_1 < 0$. Indeed, recall that the function $\tilde{w}_1(\tilde{w}_2, g_1)$ is given by

$$\delta\pi(\tilde{w}_1, \tilde{w}_2) - g_1 = 0.$$

Applying the implicit function theorem, we find

$$\frac{\partial\tilde{w}_1}{\partial g_1} = \left(\delta\frac{\partial\pi}{\partial\tilde{w}_1}\right)^{-1} < 0,$$

by Proposition 36. □

Let us provide intuitions on how an increase in the first period level of the communal tax may affect the migrants' willingness to pay. For a given value of the fallback option (the impact of g_1 on $\tilde{w}_2$ is studied below), there are two effects through which the number of migrant tax payers is impacted by g_1. On the one hand, an increase in g_1 prevents a higher number of migrants from paying the tax, by the effect of the liquidity constraint. On the other hand, for a given willingness to pay for the fallback option π, a higher g_1 means a higher cost of insurance, so that some migrants whose income is close to the indifference threshold may not find it profitable anymore to pay the tax. The direct partial effect of g_1 on c is thus unambiguously negative.

Lemma 7. *The direct partial effect of the level of the communal tax in period 1 on the number of returnees is negative:*

$$\frac{\partial r(\tilde{w}_2, g_1)}{\partial g_1} = -F_2(\tilde{w}_2 \mid g_1) f_1(g_1) + \int_0^{\tilde{w}_2} f_2(w_2 \mid \tilde{w}_1) f_1(\tilde{w}_1)\, dw_2 \frac{\partial\tilde{w}_1}{\partial g_1} < 0.$$

Proof. To obtain the above it is sufficient to apply Leibniz's rule to equation (38). □

This result is a corollary of the preceding Lemma. Indeed, for a given $\tilde{w}_2$, a decrease in the number of returnees can only be due to a decrease in the number of tax payers, who are the only migrants eligible to return migration. Furthermore, because for each income level w_1 only a fraction $F_2(\tilde{w}_2 \mid w_1)$ migrates back, we can easily show that the effect of g_1 on the number of returnees is of a lower magnitude (lower in absolute value) than the effect on the number of tax payers:[49]

$$\frac{\partial c(\tilde{w}_2, g_1)}{\partial g_1} < \frac{\partial r(\tilde{w}_2, g_1)}{\partial g_1} < 0.$$

[49] Indeed, by comparing the expressions in Lemma 6 and Lemma 7, we have

$$\begin{aligned}\int_0^{\tilde{w}_2} f_2(w_2 \mid g_1) f_1(g_1)\, dw_2 &= F_2(\tilde{w}_2 \mid g_1) f_1(g_1) < \int_0^{+\infty} f_2(w_2 \mid g_1) f_1(g_1)\, dw_2 = f_1(g_1), \\ \int_0^{\tilde{w}_2} f_2(w_2 \mid \tilde{w}_1) f_1(\tilde{w}_1)\, dw_2 &= F_2(\tilde{w}_2 \mid \tilde{w}_1) f_1(\tilde{w}_1) < \int_0^{+\infty} f_2(w_2 \mid \tilde{w}_1) f_1(\tilde{w}_1)\, dw_2 = f_1(\tilde{w}_1).\end{aligned}$$

As discussed above, the return migration equilibrium, which is determined by the value of $\tilde{w}_2$, is also affected by g_1. Because $\tilde{w}_2$ gives the value of the fallback option, it is an important determinant of the insurance benefit (see Proposition 13) and hence of the decision to pay the communal tax and to migrate back. The following Lemma states the effect of g_1 on the return migration equilibrium (proof given in Section 12.8).

Lemma 8. *The effect of g_1 on the return migration threshold is positive if and only if the effect of land pressure dominates:*

$$\frac{\partial \tilde{w}_2}{\partial g_1} = \frac{\partial u_{v2}}{\partial r} \frac{\partial r(\tilde{w}_2, g_1)}{\partial g_1} \left(-\frac{\partial \Delta}{\partial \tilde{w}_2} \right)^{-1} > 0 \iff \frac{\partial u_{v2}}{\partial r} < 0. \tag{39}$$

We are now set to calculate the total effect which is given by:

$$\frac{dc(\tilde{w}_2(g_1), g_1)}{dg_1} = \frac{\partial c(\tilde{w}_2, g_1)}{\partial g_1} + \frac{\partial c(\tilde{w}_2, g_1)}{\partial \tilde{w}_2} \frac{\partial \tilde{w}_2}{\partial g_1}.$$

Substituting for $\partial \tilde{w}_2 / \partial g_1$ as given by equation (39) and noting that $\partial \Delta / \partial \tilde{w}_2 < 0$, by Lemma 1, we can show that the total effect of $g_1$on c is negative only if

$$\frac{dc}{dg_1} = \frac{\partial c(\tilde{w}_2, g_1)}{\partial g_1} \chi \left(-\frac{\partial \Delta}{\partial \tilde{w}_2} \right)^{-1} < 0 \tag{40}$$

$$\iff \chi = 1 - \frac{\partial u_{v2}}{\partial r} \frac{\partial r(\tilde{w}_2, g)}{\partial \tilde{w}_2} \left(1 - \frac{\frac{\partial c(\tilde{w}_2, g_1)}{\partial \tilde{w}_2}}{\frac{\partial r(\tilde{w}_2, g)}{\partial \tilde{w}_2}} \frac{\frac{\partial r(\tilde{w}_2, g_1)}{\partial g_1}}{\frac{\partial c(\tilde{w}_2, g_1)}{\partial g_1}} \right) > 0. \tag{41}$$

where

$$\frac{\partial c(\tilde{w}_2, g_1)}{\partial \tilde{w}_2} = f_1(\tilde{w}_1) \frac{\partial \tilde{w}_1}{\partial \tilde{w}_2} > 0,$$

$$\frac{\partial r(\tilde{w}_2, g_1)}{\partial \tilde{w}_2} = F_2(\tilde{w}_2 \mid \tilde{w}_1) f_1(\tilde{w}_1) \frac{\partial \tilde{w}_1}{\partial \tilde{w}_2} + \int_g^{\tilde{w}_1(\tilde{w}_2(g), g)} f_2(\tilde{w}_2 \mid w_1) f_1(w_1) \, dw_1 > 0.$$

Since we have no a priori reason to believe that this condition is satisfied we must conclude that the effect $\partial c / \partial g_1$ is indeterminate:

Proposition 14. *The total effect of the communal tax level in period 1 on the number of taxpayers is indeterminate:*

Unlike the above effect, the total effect of an increase in the level of communal taxes in period 1 on the number of returnees can be signed unambiguously. This result is stated in Proposition 15:

Proposition 15. *The total effect of the level of the communal tax in period 1 on the number of returnees is always negative.*

We indeed have:

$$\frac{dr\left(\tilde{w}_2\left(g_1\right), g_1\right)}{dg_1} = \frac{\partial r\left(\tilde{w}_2, g_1\right)}{\partial g_1} + \frac{\partial r\left(\tilde{w}_2, g_1\right)}{\partial \tilde{w}_2}\frac{\partial \tilde{w}_2}{\partial g_1}.$$

Substituting for $\partial \tilde{w}_2/\partial g_1$ as given by equation (39) and re-arranging, we obtain a new expression which is always negative by Lemma 1 and Lemma 4.

$$\frac{dr\left(\tilde{w}_2\left(g_1\right), g_1\right)}{dg_1} = \frac{\partial r\left(\tilde{w}_2, g_1\right)}{\partial g_1}\left(-\frac{\partial \Delta}{\partial \tilde{w}_2}\right)^{-1} < 0. \qquad (42)$$

12.6 The communal tax level in period 1

Having analyzed the migrants' behavioral response to marginal changes in the level of the communal tax in period 1, g_1, we can now explore the different effects of this tax on the non-migrants' level of utility. Indeed, at the beginning of period 1, non-migrants vote for the level of g_1 that maximizes their utility. Remember that the utility of non-migrants is simply given by

$$U_v = u_{v1}\left(g_1, c\right) + \delta u_{v2}\left(r\right).$$

The first order condition writes

$$\frac{dU_v}{dg_1} = \frac{\partial u_{v1}}{\partial g_1} + \frac{\partial u_{v1}}{\partial c}\frac{dc}{dg_1} + \delta\frac{\partial u_{v2}}{\partial r}\frac{dr}{dg_1} = 0,$$

where

$$\begin{aligned} \frac{\partial u_{v1}}{\partial g_1} &= -1 + V_g\left(l_1, G_1\right)\left(n - m + c\right), \\ \frac{\partial u_{v1}}{\partial c} &= V_g\left(l_1, G_1\right) g_1, \\ \frac{\partial u_{v2}}{\partial r} &= V_l\left(l_2, G_2\right)\frac{\partial l_2}{\partial r} + V_g\left(l_2, G_2\right) g_2. \end{aligned}$$

In the benchmark situation where there are no migrants (and where the number of residents is kept equal to $n-m$),[50] the optimal level of the communal tax for non-migrants is such that

$$\frac{dU_v\left(c=0\right)}{dg_1} = -1 + V_g\left(l_1, G_1\right)\left(n - m\right) = 0.$$

Our results indicate that the presence of migrants increases the level of the tax. This is because, compared to the benchmark case, there are two effects pushing in this direction. This can be shown by re-writing the first-order condition in the general case as follows:

$$\frac{dU_v}{dg_1} = \frac{dU_v\left(c=0\right)}{dg_1} + \Lambda_1 + \Lambda_2 = 0. \qquad (43)$$

[50] In order to make this comparison relevant, we fix the size of the community to $n - m$. Indeed, we need to keep fixed the number of non-migrants. Making m vary alone would affect the number of residents in period 1, which is something we do not want in our comparison.

Equation (43) allows us to identify the impact of migration on the tax level. The first term, $dU_v\left(c=0\right)/dg_1$, is equal to zero in the benchmark situation where migrants are absent. Λ_1 and Λ_2 capture the two effects related to the presence of migrants. If they are positive, the tax level is higher with migration. If they are negative the tax level is lower with migration. A positive effect indeed implies that $dU_v\left(c=0\right)/dg_1<0$, which means that the public good is over-provided in the presence of migration.

Let us now define Λ_1 and Λ_2 more precisely with a view to determining what their signs are, or are more likely to be.

The first effect arises from the fact that taxpaying migrants do not benefit from access to land and from the local public good in the current period. The presence of external taxpayers induces non-migrants to maximize the receipt collected on the migrants. This effect is captured by the following term:

$$\Lambda_1=V_g\left(l_1,G_1\right)\left[c+g_1\frac{dc}{dg_1}\right].$$

Notice that this term would be equal to zero if non-migrants were to maximize the total contributions $c\left(g_1\right)g_1$ extracted from migrants[51]:

$$\frac{\partial c\left(g_1\right)g_1}{\partial g_1}=0\iff c+g_1\frac{dc}{dg_1}=0.$$

Although the equilibrium value of Λ_1 cannot be signed analytically, intuition strongly suggests that it is positive in equilibrium. Suppose that Λ_1 is negative. In this case, non-migrants can increase the rent extracted from migrants by reducing g_1 and hence their own taxes. The impact on total public good provision is indeterminate, but the reduction in non-migrants' taxes is at least partly compensated by migrants' taxes. As a result, the non-migrants would pay strictly less, while total public good provision would be at worse slightly decreased. Following this line of reasoning, we conclude that Λ_1 is likely to be positive (or equal to zero) in equilibrium.

The second effect depends on the extent of land pressure in the community.Given that a higher g_1 decreases the number of returnees ($dr/dg_1<0$, as shown in Proposition 15), non-migrants have an incentive to set a higher tax level in order to release land pressure in period 2:

$$\Lambda_2=\delta\frac{\partial u_{v2}}{\partial r}\frac{dr}{dg_1}>0\iff\frac{\partial u_{v2}}{\partial r}<0,$$

because $dr/dg_1<0$, as shown in Proposition 15.

Therefore, because we expect both Λ_1 and Λ_2 to be positive in equilibrium, $dU_v\left(c=0\right)/dg_1$ need to be negative for condition (43) to be satisfied, which indicates that the local public good is over-provided with migration.

As a final remark, notice that, because migrants pay for a fallback option but do not benefit from the local public good in period 1, their preferred level of

[51] If $dc/dg_1>0$, Λ_1 is always positive.

taxation in period 1 is equal to zero. Therefore, the outcome of majority voting is straightforward. The preferred level of non-migrants is implemented if they represent the majority in the community.

Our analysis of the preferences of non-migrants over the level of taxation reveals two effects, which push this level upwards compared to the benchmark case where migrants are absent. On the one hand, non-migrants want to extract as much as they can from external contributors and on the other hand, they deter return migration by making the payment of the tax difficult.. This analysis provides a rationale for the observation that high communal taxes are imposed on migrants. Due to liquidity constraints, low-income migrants are unable to fulfill their obligations, which forces them to forsake their membership rights and, therefore, their access to family land.

As is apparent from the above discussion, the model we wrote to capture the finding highlighted in Section 2 is quite complex although migration is treated as an exogenous variable. The fact that some results are indeterminate - in particular the effect of the communal tax level on the number of migrants wiling to pay it - attest to that complexity. Deriving static-comparative results proved to be a tricky exercise and we therefore opt for a discussion of some key effects.

12.7 Discussion

In this section, we discuss the impact of two key contextual elements: (1) land scarcity in migrants' sending rural regions and (2) the quality of labor market opportunities in receiving urban areas.

Land scarcity

It is clear from the model that land pressure plays a crucial role in shaping incentives to return migration and in setting the level of the communal tax. On the one hand, a higher land pressure in the village of origin should reduce the attractivity of return migration as an exit option. Because land pressure depends both on the communal land endowment and on demand for communal land, it is partly endogenous. However, despite the complex determination of the return migration equilibrium, one might expect that more migrants should forsake theirs lands rights under higher land pressure. This intuition holds for a given level of communal tax.

On the other hand, the level of communal tax may precisely be impacted in several ways.The tax level indeed results from the combination of three effects, which appear in equation (43):

The first term pertains to the optimal communal tax level in the absence of migration. Although it has not been discussed so far, the complementarity between land and the local public good is a key determinant of the tax level. Indeed, if they are complements, then the marginal utility derived from the public good is positively affected by land availability. A higher land pressure should thus lead to a lower level of communal tax. The opposite should hold if they are substitutes.

The second term captures the incentives that non-migrant community members have to extract contributions from migrants. These incentives are weaker (stronger) if land and the local public good are complements (substitutes). However, this is not only the non-migrants' willingness, but also their ability to extract contributions that is affected by land pressure. As already mentioned, the attractivity of return migration is likely reduced under higher land pressure, which makes it more difficult to collect taxes on migrants. Consequences on the tradeoff between the number of tax payers and the amount contributed are analytically unclear, but it seems that the price of insurance should be reduced, owing to a lower demand.

The third term relates to the deterrent effect of the tax. Land pressure leads non-migrants to set a higher tax, as compared to the autarkic optimum, in order to contain return migration and to relax the land constraint. If land pressure is higher, this effect should be stronger.

As appears from this discussion, characterizing the relationship between land pressure and the communal tax level is not straightforward. It might even be non-monotonic. Still, intuition suggests that if land scarcity is critical, the deterrent effect is likely to dominate the others. Indeed, imagine the extreme case where the local public good and land are complements and where land is so scarce that the local public good has no value. In this case, one the one hand, further decreasing land availability would not affect the first two terms anymore. On the other hand, the willingness to deter return migration would still be present, maybe more.

In conclusion, a lower attractivity of return migration combined with a likely higher level of communal tax should increase the number of migrants who forsake their land rights under high land pressure.

Migration opportunities

In our model, migration opportunities are captured by the migrants' wage distribution. If the wage distribution is more favorable, for instance using the concept of first order stochastic dominance, then the outside option in the village becomes relatively less attractive. It follows that the number of returnees should decrease. For the same reason, demand for insurance should be lower and hence the number of tax payers for a given level of the communal tax. The latter effect could be counteracted by a larger number of migrants, attracted by better employment opportunities. But this is out of the scope of the model. The net effect on demand for insurance remains therefore ambiguous.

If it is negative, it is natural to expect that its price, namely the communal tax, will be decreased as migration opportunities improve. Again, the first order effect, namely the lower relative attractivity of return migration, suggests that more migrants should forsake their land rights as migration opportunities improve.

12.8 Theoretical Proofs

Proof. Proposition 12

We start by analyzing the preferences of non-migrants. The second period tax level is set before return migration decisions are made by contributing migrants. Therefore, non-migrants maximize u_{v2}, while taking account of the potential impact of g_2 on the number of returnees. The first order condition of this maximization problem writes

$$\frac{du_{v2}}{dg_2} = \frac{\partial u_{v2}}{\partial g_2} + \frac{\partial u_{v2}}{\partial r}\frac{\partial r}{\partial g_2} = 0,$$

where

$$\frac{\partial r}{\partial g_2} = \frac{\partial r}{\partial \tilde{w}_2}\frac{\partial \tilde{w}_2}{\partial g_2},$$

where $\partial r/\partial \tilde{w}_2$ is given by equation (34) and is positive. In order to find $\partial \tilde{w}_2/\partial g_2$, we need to apply the implicit function theorem to equation (32). This yields:

$$\frac{\partial \tilde{w}_2}{\partial g_2} = -\frac{\partial \Delta_2}{\partial g_2}\left(\frac{\partial \Delta_2}{\partial \tilde{w}_2}\right)^{-1},$$

with $\partial \Delta_2/\partial \tilde{w}_2 < 0$ in equilibrium, by Lemma 1, and with

$$\frac{\partial \Delta_2}{\partial g_2} = \frac{\partial u_{v2}}{\partial g_2}.$$

As a result,

$$\begin{aligned} \frac{du_{v2}}{dg_2} &= \frac{\partial u_{v2}}{\partial g_2}\left[1 + \frac{\partial u_{v2}}{\partial r}\frac{\partial r}{\partial \tilde{w}_2}\left(-\frac{\partial \Delta_2}{\partial \tilde{w}_2}\right)^{-1}\right] = 0 \\ \Longleftrightarrow &\quad \frac{\partial u_{v2}}{\partial g_2} = -1 + V_g\left(l_2, G_2\right)(n - m + r) = 0, \end{aligned}$$

by (1). This implies that, if g_2 is set at the non-migrant's preferred level, then the marginal effect of g_2 on the return migration equilibrium is equal to zero:

$$\frac{\partial r\left(g_2^*\right)}{\partial g_2} = \frac{\partial \tilde{w}_2\left(g_2^*\right)}{\partial g_2} = 0.$$

Let us now analyze the preferences of the contributing migrants. Because the decision on g_2 is made before w_2 is revealed, contributing migrants express their preferences under uncertainty regarding return migration. Contributing migrants are heterogeneous with respect to their first period urban wage. Hence, they have different expectations regarding return migration. A contributing migrant with a first period urban wage equal to w_1 solves

$$\underset{g_2}{Max} Eu_2 = F_2\left(\tilde{w}_2\left(g_2\right) \mid w_1\right) u_{v2}\left(n_2, g_2\right) + \int_{\tilde{w}_2(g_2)}^{+\infty} \left(w_2 + v_c\right) f_2\left(w_2 \mid w_1\right) dw_2.$$

The first order condition writes:

$$\frac{\partial Eu_2}{\partial g_2} = F_2\left(\tilde{w}_2 \mid w_1\right)\frac{du_{v2}}{dg_2}+f_2\left(\tilde{w}_2 \mid w_1\right)\frac{\partial \tilde{w}_2}{\partial g_2}u_{v2}\left(n_2,g_2\right)-\left(\tilde{w}_2+v_c\right)f_2\left(\tilde{w}_2 \mid w_1\right)\frac{\partial \tilde{w}_2}{\partial g_2}=0.$$

Since $\tilde{w}_2 = u_{v2} - v_c$, this boils down to

$$\frac{\partial Eu_2}{\partial g_2} = F_2\left(\tilde{w}_2 \mid w_1\right)\frac{du_{v2}}{dg_2} = 0 \iff \frac{\partial u_{v2}}{\partial g_2} = 0,$$

as follows from the analysis made for non-migrants. □

Proof. Lemma 5

A migrant who does not does not pay the communal tax in period 1 forsakes his/her community membership rights, upon which access to land in period 2 depends.

He/she will thus stay permanently in the city. In this case, his/her expected utility is given by

$$\begin{aligned} EU_{m,i\notin C} &= u_{c1,i\notin C} + \delta E_{w_2}\left[u_{c2} \mid w_1\right] \\ &= w_1 + \delta \int_0^{+\infty} w_2 dF_2\left(w_2 \mid w_1\right) + \left(1+\delta\right)v_c. \end{aligned}$$

A migrant who pays the communal tax in period 1 maintains his/her access rights. Anticipating that he/she will migrate back if his/her second period urban wage is lower than the return migration threshold $\tilde{w}_2$, we obtain

$$\begin{aligned} EU_{m,i\in C} &= u_{c1,i\in C} + \delta\left[F_2\left(\tilde{w}_2 \mid w_1\right)u_{v2} + \int_{\tilde{w}_2}^{+\infty} u_{c2} dF_2\left(w_2 \mid w_1\right)\right] \\ &= w_1 - g_1 + \delta\left[F_2\left(\tilde{w}_2 \mid w_1\right)\tilde{w}_2 + \int_{\tilde{w}_2}^{+\infty} w_2 dF_2\left(w_2 \mid w_1\right)\right] + \left(1+\delta\right)v_c, \end{aligned}$$

since $\tilde{w}_2 = u_{v2} - v_c$. Therefore a migrant contributes g_1 provided $U_{m,i\in C} \geq U_{m,i\notin C}$, which leads to the condition in the Lemma. □

Proof. Proposition 13

We start by proving the first part of the Proposition. To this end, we take the derivative of π, as given by equation (36), with respect to $\tilde{w}_2$. We get:

$$\frac{\partial \pi\left(w_1,\tilde{w}_2\right)}{\partial \tilde{w}_2} = f\left(\tilde{w}_2 \mid w_1\right)\tilde{w}_2 + F\left(\tilde{w}_2 \mid w_1\right) - f\left(\tilde{w}_2 \mid w_1\right)\tilde{w}_2 = F\left(\tilde{w}_2 \mid w_1\right) > 0,$$

where use has been made of Leibniz's rule.

Turning to the second part pf Proposition 2, the derivative of π with respect to w_1 writes

$$\frac{\partial \pi\left(w_1, \tilde{w}_2\right)}{\partial w_1}=\frac{\partial F\left(\tilde{w}_2 \mid w_1\right)}{\partial w_1} \tilde{w}_2-\int_0^{\tilde{w}_2} w_2 \frac{\partial f\left(w_2 \mid w_1\right)}{\partial w_1} d w_2. \tag{44}$$

The second term can be rewritten as:

$$\int_0^{\tilde{w}_2} w_2 \frac{\partial f\left(w_2 \mid w_1\right)}{\partial w_1} d w_2=\int_0^{\tilde{w}_2} w_2 \frac{\partial^2 F\left(w_2 \mid w_1\right)}{\partial w_1 \partial w_2} d w_2.$$

Integration by parts leads to

$$\int_0^{\tilde{w}_2} w_2 \frac{\partial^2 F\left(w_2 \mid w_1\right)}{\partial w_1 \partial w_2} d w_2=\left[w_2 \frac{\partial F\left(w_2 \mid w_1\right)}{\partial w_1}\right]_0^{\tilde{w}_2}-\int_0^{\tilde{w}_2} \frac{\partial F\left(w_2 \mid w_1\right)}{\partial w_1} d w_2.$$

Substituting into equation (44), we end up with

$$\frac{\partial \pi\left(w_1, \tilde{w}_2\right)}{\partial w_1}=\int_0^{\tilde{w}_2} \frac{\partial F\left(w_2 \mid w_1\right)}{\partial w_1} d w_2<0,$$

by the assumption of first order stochastic dominance, which implies that $\partial F\left(\tilde{w}_2 \mid w_1\right) / \partial w_1 < 0, \forall w_2$. □

Proof. Lemma 6

The proof is rather straight forward . The equilibrium value of $\tilde{w}_2$ is given by equation (32), where $r\left(\tilde{w}_2, g_1\right)$ is given by (38). Making use of the implicit function theorem, we find

$$\frac{\partial \tilde{w}_2}{\partial g_1}=-\frac{\partial \Delta_2}{\partial g_1}\left(\frac{\partial \Delta_2}{\partial \tilde{w}_2}\right)^{-1},$$

where

$$\frac{\partial \Delta_2}{\partial g_1}=\frac{\partial u_{v 2}}{\partial r} \frac{\partial r\left(\tilde{w}_2, g_1\right)}{\partial g_1}>0 \Longleftrightarrow \frac{\partial u_{v 2}}{\partial r}<0,$$

by Lemma 5 and Lemma 8.

$$\frac{\partial \Delta_2}{\partial \tilde{w}_2}=\frac{\partial u_{v 2}}{\partial r} \frac{\partial r\left(\tilde{w}_2, g_1\right)}{\partial \tilde{w}_2}-1<0,$$

by Proposition 12. □

Bibliography

Aguilera, M., 2002. “The impact of social capital on labor force participation: Evidence from the 2000 social capital benchmark survey”. Social Science Quarterly, 83(3), pp. 853-874.

Aguilera, M., 2005. “The impact of social capital on the earnings of Puerto Rican migrants.” *Sociological Quarterly*, 46(4), pp. 569-592.

Albó, X., 1988. Raíces de América: El mundo Aymara, Madrid: Alianza Editorial y Unesco.

Ambler, K., 2015. “Don’t tell on me: Experimental evidence of asymmetric information in transnational households”, *Journal of Development Economics*, 113, pp. 52-69.

Baland, J.M., and P. François, 2005, “Commons as Insurance and the Welfare Impact of Privatization”, *Journal of Public Economics*, 89, pp. 211-231.

Baland, J.-M., C., Guirkinger and C., Mali, 2011. “Pretending to be poor: Borrowing to escape forced solidarity in Cameroon”, *Economic Development and Cultural Change*, 60(1), pp. 1-16.

Baland, J.M., and J.P. Platteau, 1996, Halting Degradation of Natural Resources – Is There a Role for Rural Communities?, Oxford: Clarendon Press.

Barragn, R., G. Colque, and M. Urioste, 2007. Los nietos de la Reforma Agraria : Tierra y communidad en el altiplano de Bolivia, Fundacion Tierra.

Barro, R. J., 1974. “Are Government Bonds Net Wealth?”, *Journal of Political Economy*, 82 (6), pp.1095-1117.

Basu, K., 1992. “The Broth and the Cooks”, *World Development*, 20 (1), pp. 109-117.Becker, Gary S., 1974. “A Theory of Social Interactions”, *Journal of Political Economy*, 82 (6), pp.1063-1093.

Batista, C. and G., Narciso, 2013. “Migrant Remittances and Information Flows: Evidence from a Field Experiment”, *CReAM Discussion Paper*, Series 31/13, Centre for Research and Analysis of Migration, Dept of Economics, University College London.

Becker, Gary S., 1975. “Human Capital and the Personal Distribution of Income: An Analytic Approach”, Woytinsky Lecture 1967, Human Capital, New York, Columbia University Press, pp. 94-144.

Becker, Gary S. and N. Tomes. 1979. “An Equilibrium Theory of the Distribution of Income and Intergenerational Mobility”, *Journal of Political Economy*, 87 (6), pp.1153-1189.

Becker, Gary S. and N. Tomes, 1986. “Human Capital and the Rise and Fall of Families”, *Journal of Labor Economics*, 4(2) , pp.1-39

Beekman, G., M. Gatto, and E. Nillesen, 2015. “Family Networks and Income Hiding: Evidence from Lab-in-the-Field Experiments in Rural Liberia”, *Journal of African Economies*, 24(3), pp. 453–469.

Bernheim, D. B., Shleifer, A., Summers, L. H., 1985. “The Strategic Bequest Motive”, *Journal of Political Economy*, 93 (6), pp. 1045-76.

Berry, R.A., and A. Soligo, 1968. “Rural-Urban Migration, Agricultural Output and the Supply Price of Labour in a Labour-Surplus Economy”, O*xford*

Economic Papers, 20 (2), pp. 230-249.

Bertrand, M., Luttmer, E., and S. Mullainathan, 2000. "network effects and network cultures.", *Quarterly Journal of Economics*, 115, pp. 1019-1055.

Blinder, A. S., 1974. Towards an Economic Theory of Income Distribution, Cambridge, MA, MIT Press.

Blinder, A. S. 1976. "Intergenerational Transfers and Life Cycle Consumption", *American Economic Review*, 66 (2), pp.87-93.

Bliss, C.J., and N.H. Stern, 1982. *Palanpur*, Oxford: Oxford University Press.

Boltz, M., K. Marazyan and P. Villar, 2015. "Income Hiding and Informal Redistribution: a Lab-in-the-field Experiment in Senegal", Working Paper.

Canessa, A., 2000. "Evangelistas and Kataristas in Highland Bolivia", *Journal of Latin American Studies,* 32 (1), pp. 115-144

Chauvet, L., F. Gubert and S. Mesplé-Somps, 2015. "Migrants' Home Town Associations and Local Development in Mali", *Scandinavian Journal of Economics*, 117(2), pp. 686-722.

Chort, I., F. Gubert and J.N. Senne, 2012. "Migrant networks as a basis for social control: Remittance incentives among Senegalese in France and Italy", *Regional Science and Urban Economics*, 42 (5), pp. 858-874.

Comola M. and M. Fafchamps, 2017. "The Missing Transfers: Estimating Misreporting in Dyadic Data", 65 (3), pp. 549-582

Cox, D., 1987. "Motives for Private Income Transfers", *Journal of Political Economy*, 95 (2), pp. 508-546.

Cox, D., Z. Eser and E. Jimenez, 1998. "Motives for private transfers over the life cycle: An analytical framework and evidence for Peru", *Journal of Development Economics*, 55(1), pp. 57-80.

Cox, D. and M., Rank, 1992. "Inter-vivos Transfers and Intergenerational Exchange", *The Review of Economics and Statistics*, MIT Press, 74(2), pp. 305-14.

de la Brière, B., E. Sadoulet, A. de Janvry, and S. Lambert, 2002. "The Role of Destination, Gender, and Household Composition in Explaining Remittances: An Analysis for the Dominican Sierra". *Journal of Development Economics*, 68 (2), pp. 309-28.

de la Rupelle, M., D. Quheng, L. Shi and T. Vendryes, 2009. "Land Rights Insecurity and Temporary Migration in Rural China", Mimeo.

Desai, M. and A. Shah, 1983. "Bequest and Inheritance in Nuclear Families and Joint Families", Economica 50 (198), 193-202.

de Vries P., 2015. "The Real of Community, the Desire for Development and the Performance of Egalitarianism in the Peruvian Andes: A Materialist–Utopian Account", *Journal of Agrarian Change*,15 (1), pp. 65–88.

De Weerdt, J., G. Genicot and A. Mesnard, 2014. "Asymmetry of Information within Family Networks". IZA Working Paper No 8395.

di Falco, S. and E. Bulte, 2011. "A dark Side of Social Capital? Kinship, Consumption and Savings", *Journal of Development Studies*, 47(8), pp. 1128-1151.

Drever, A. and O., Hoffmeister, 2008. “Immigrants and social networks in a job-scarce environment: The case of Germany”. *International Migration Review*, 42(2), pp. 425-448.

Edin, P., P.,Fredriksson and O., Aslund, 2003. “Ethnic enclaves and the economic success of immigrants: Evidence from a natural experiment.” *The Quarterly Journal of Economics*, 118(1), pp. 329-357

Fafchamps, M., 2002. “Returns to social network capital among traders”, *Oxford Economic Papers*, 54(2), pp. 173-206.

Fafchamps, M., D., McKenzie, S., Quinn and C.,Woodruff, 2011. “When is Capital enough to get Microentreprises Growing? Evidence from Randomized Experiment in Ghana”, Oxford: Centre for the Study of African Economies, Dept of Economics, University Oxford.

Fei, J.C.H., and G. Ranis, 1964. Development of the Labor Surplus Economy: Theory and Policy, Homewood, Illinois.

Godfrey-Wood R. and G. Mamani-Vargas, 2016. “The Coercive Side of Collective Capabilities: Evidence from the Bolivian Altiplano”, *Journal of Human Development and Capabilities*

Goetghebuer, T., and J.P. Platteau, 2010, “Inheritance Patterns in Migration-Prone Communities of the Peruvian Highlands”, *Journal of Development Economics*, 93 (1), pp. 71-87.

Grimm M., R., Hartwig and J. Lay, 2013. “Does Forced Solidarity Hamper Investment in Small and Micro Enteprises” IZA Working Paper No. 7229.

Hadnes, M., B.,Vollan, and M. Kosfeld, 2011. “The Dark Side of Solidarity: An Experimental Approach to the Impact of Solidarity on Work Output”, Mimeo, University of Frankfurt.

Hadnes, M., B.,Vollan, and M. Kosfeld, 2013. “The Dark Side of Solidarity”, Working Paper, Becker Friedman Institute for Research in Economics, The University of Chicago.

Harris, J.R., and M.P. Todaro, 1970. “Migration, Unemployment and Development: A two sector analysis”, *American Economic Review*, 60 (1), pp. 126-42

Hoddinott, J., 1992. “Modelling remittance flows in Kenya”, *Journal of African Economies*, 1 (2), pp. 206-232.

Hoddinott, J., 1994. “A model of migration and remittances applied to western Kenya”, *Oxford Economic Papers*, 46, pp. 459-476.

Hoff, K. and A. Sen, 2006. “The Kin System as a Poverty Trap”, S. Bowles, S;N; Durlauf and K; Hoff (Eds), Poverty Traps, New York: Princeton University Press, pp. 95-115.

Ilahi, N. and S. Jafarey, 1999. “Guestworker migration, remittances and the extended family: evidence from Pakistan”, Journal of Development Economics, 58 (2), pp. 485-512.

Jakiela, P. and O. Ozier, 2016. “Does Africa Need a Rotten Kin Theorem? Experimental Evidence from Village Economies,” *Review of Economic Studies*, 83(1), pp. 231-268.

Jodha, N.S., 1986, “Common Property Resources and Rural Poor in Dry Regions of India”, *Economic and Political Weekly*, 21 (27), pp. 1169-1182.

Jorgenson, D., 1967. “Surplus Agricultural Labour and the Development of a Dual Economy”, *Oxford Economic Papers*, 19 (3), pp. 288-312.

Klein, H., 1992. Bolivia: The Evolution of a Multi-Ethnic Society, Oxford University Press.

Kotlikoff, L.J. and A. Spivak, 1981. “The Family as an Incomplete Annuities Market”, *Journal of Political Economy*, 89 (2), pp.372-391.

La Ferrara, E., 2007. “Descent Rules and Strategic Transfers. Evidence from Matrilineal Groups in Ghana”, *Journal of Development Economics*, 83 (2), pp. 280-301.

Lazar S., 2008. El Alto, Rebel City, Duke University Press.

Leibenstein, H., 1957. “The Theory of Underemployment in Backward Economies”, *Journal of Political Economy*, 65 (2), pp. 91-103.

Leibenstein, H., 1958. “Underemployment in Backward Economies : Some Additional Notes”, *Journal of Political Economy*, 66 (3), pp. 256-258.

Lewis, W.A., 1954. “Economic Development with Unlimited Supplies of Labour”, The Manchester School, Vol. 22, N° 2, reprinted in: Agarwal, A.N., and S.P. Singh (Eds.), 1958. The Economics of Undervelopment, Oxford University Press, Oxford.

Lin, N., 1999. “Social networks and status attainment.” Annual Review of Sociology, pp. 467-487.

Lucas, R. and O. Stark O, 1985. “Motivations to remit: evidence from Botswana”, *Journal of Political Economy*, 93 (5), pp. 901-918.

Mazzucato, V., 2009. “Informal insurance arrangements in Ghanaian migrants’ transnational networks: The role of reverse remittances and geographic proximity”. *World Development*, 37(6), pp. 1105-1115.

McKenzie, D. J. Gibson, and S. Stillman, 2013. “A land of milk and honey with streets paved with gold: do emigrants have over-optimistic expectations about incomes abroad?”*Journal of Development Economics*, pp. 116–127.

Menjvar, C., 2002. “The ties that heal: Guatemalan immigrant women’s networks and medical Treatment”, *International Migration Review*, 36(2), pp. 437-466.

Michels A., 2019a, “Interdependence between Migration and Partible Inheritance: Theory and Evidence from Bolivia”, Working Paper

Michels A., 2019b, “Explaining Remittances in the Bolivian Altiplano: Limited Altruism and the Adverse Effects of Kinship Networks”, Working Paper

Modigliani, F. and R. Brumberg. 1954, “Utility Analysis and the Consumption Function: an Interpretation of Cross-Section Data”, in Kurihana, K.K. (ed.), Post-Keynesian Economics, New York, Rutgers University Press, pp. 388-436.

Mouw, T., 2002. “Racial differences in the effects of job contacts: Conflicting evidence from cross-sectional and longitudinal data”. *Social Science Research*, 31(4), pp. 511- 538.

Mullan, K., P. Grosjean and A. Kontoleon, 2011. “Land tenure arrangements and rural–urban migration in China”, *World Development*, 39 (1), pp. 123–133.

Munshi, K., 2003. “Networks in the modern economy: Mexican migrants in the US labor market." *The Quarterly Journal of Economics*, 118(2), pp. 549-599.

Nurkse, R., 1953. *Problems of Capital Formation in Underdeveloped Countries*, Oxford: Blackwell.

Patel, K. and F. Vella, 2007. "Immigrant networks and their implications for occupational choice and wages", IZA Working Paper No. 3217.

Philpott, S.,1968. "Remittance Obligations, Social Networks and Choice among Montserratian Migrants in Britain." *Man*, 3(3), pp. 465-476.

Platteau, J-P, 2000. "Institutions, Social Norms, and Economic Development", Amsterdam: Harwood Academic Publishers.

Platteau, J.P. 2004, "The Gradual Erosion of the Social Security Function of Customary Land Tenure Arrangements: The Case of Tribal Societies in SubSaharan Africa", in S. Dercon (ed.), Insurance Against Poverty, Oxford: Clarendon Press, pp. 247-278.

Platteau, J.P., 2006, "Solidarity Norms and Institutions in Agrarian Societies : Static and Dynamic Considerations", in S. Kolm, J. Mercier-Ythier, and G. Varet (eds.), Handbook on Gift-Giving, Reciprocity and Altruism, Amsterdam: North-Holland and Elsevier, Vol. 1, pp. 819-886.

Platteau, J-P, 2014. "Redistributive Pressures in SubSaharan Africa: Causes, Consequences, and Coping Strategies", in "African Development in Historical Perspective". Bates, R., Robinson, J., Akyeampong, E. & Nunn, N. (eds.). Cambridge: Cambridge University Press, pp. 153-207.

Platteau, J.P., and J.M. Baland, 2001. "Impartible Inheritance Versus Equal Division : A Comparative Perspective Centered on Europe & SubSaharan Africa", in de Janvry A., Gordillo, Platteau, & Sadoulet (eds.), Access to Land, Rural Poverty, & Public Action, Oxford University Press, pp. 27-67.

Poirine, B., 1997. "A Theory of remittances as an implicit family loan arrangement", World Development, 25(5), pp.589-611.

Rasnake, R., 1988. Domination and Cultural Resistance: Authority and Power among an Andean People, Duke University Press.

Ray, D., 1998. Development Economics, Princeton University Press, Princeton, NJ.

Roberts, K. and M., Morris, 2003. "Fortune, Risk, and Remittances: An application of option theory to participation in village-based migration networks". *International Migration Review*, 37(4), pp. 1252-1281.

Rosenzweig, M. R., 1988 (a). "Risk, Implicit Contracts and the Family in Rural Areas of Low-income Countries", *Economic Journal*, 98 (393), pp. 1148-70.

Rosenzweig, M.R., 1988 (b). "Risk, private information, and the family", *American Economic Review*, 78 (2), pp. 245-50.

Sen, A.K., 1960. *Choice of Techniques*, Oxford: Blackwell.

Seshan, G., 2013. "Does Asymmetric Information Within Transnational Households Affect Remittance Flows?", Tech. rep., Georgetown University, -School of Foreign Service in Qatar.

Sjaastad, L.A., 1962. "The Costs and Returns of Human Migration", *Journal of Political Economy*, 70 (4), pp. 80-93.

Stark, O., and D.E. Bloom, 1985. “The New Economics of Labor Migration”, *American Economic Review*, 75 (2), pp. 173-178.

Stark, O. and D. Levhari, 1982. “On migration and risk in LDCs”, *Economic Development and Cultural Change*, 31 (1), pp. 191-196.

Ströbele-Gregor, J., 1994. “From Indio to Mestizo... to Indio: New Indianist Movements in Bolivia”, *Latin American Perspectives,* 21 (2), pp. 106-123

Tomes, N., 1981. “The Family, Inheritance and the Intergenerational Transmission of Inequality”, *Journal of Political Economy*, 89(5), pp. 928-958

Topa, G., 2001. “Social interactions, local spillovers and unemployment”. *The Review of Economic Studies*, 68 (2), pp. 261-295

Valsecchi, M., 2014. “Land property rights and international migration: Evidence from Mexico”, *Journal of Development Economics*, 110, pp. 276-290

Weitzman, M., 1974, “Free Access vs. Private Ownership as Alternative Systems for Managing Common Property”, *Journal of Economic Theory*, 8 (2), pp. 225-234.