

Land markets participation for migrants and natives in western of Madagascar: inclusion or exclusion and reallocation effects

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Abstract

Access to land is key for households who depend on agriculture for their livelihood and their food security. In Madagascar, there is a dearth of studies on how migrants access land through land markets (purchases and tenancy markets). This paper relies on qualitative and quantitative data carried out in 2018 to explore the functioning of land markets in a rural region in Western Madagascar. The focus on domestic in-migrants is a gateway to explore the effects of land markets in terms of inclusion and equity.

Through econometric models, we reject the hypothesis that migrants are facing exclusion for accessing land through land markets, beyond a financial constraint that is also affecting natives, and that is mostly binding for purchases, not for tenancy market. Migrants who manage to overcome the barriers and to purchase land end up practically with the same average amount of land in property that the natives. For the natives, the local land purchase market also contributes to reduce land inequalities that are due to initial inheritance differences.

KEYWORDS: *land markets, access to land, internal migration, inclusion, exclusion, reallocation effects, Probit, Madagascar*

1. Introduction

Because they perform a land reallocation function, land markets raise two major issues in terms of development: efficiency (Does land circulate towards more efficient producers?) and equity (Do the land reconfigurations induced by land markets help to reduce or widen inequalities? Do certain categories of the population systematically lose out, to the benefit of other social groups? (Deininger et al., 2017; Holden et al., 2010; Otsuka, 2007).

Efficiency is first and foremost a question of productivity in relation to the resources mobilized. An allocation is said to be efficient if this ratio is high or increasing (Otsuka, 2007). This productivity can be observed through the creation of wealth, income or jobs at different scales (household, local, national). Efficiency can also be considered in terms of the environmental sustainability of resource allocation. With regard to land markets, according to Colin and Bouquet, (2022) efficiency refers to two main questions: "*Do land markets allow land to be transferred to the most efficient producers? Do land market operations enable the formation of efficient farming units?*"

Equity, on the other hand, refers to principles of social or moral justice, to the consideration of social, economic or political inequalities, and to the means of reducing them. Equity also refers to other notions such as inclusion, exclusion, discrimination, vulnerability and emancipation. One way of approaching land markets from an equity perspective is to look at the differences in social, political or economic constraints faced by the supplier and the customer during transactions. For example, a purchase price that is too high excludes buyers who are potentially interested, with technical capacity and available work force (and therefore potentially efficient), but who are poor or have limited cash flow (particularly in situations where financial markets are absent or imperfect). In terms of equity, it is also important to analyze differences in the negotiating capacities of stakeholders according to their socio-economic categories. The equity of land markets can be broken down into two questions: *Do land markets favor inclusion, or on the contrary lead to exclusion, for certain categories of population? Do land markets contribute to a redistribution of land, or, on the contrary, to a concentration of land by a privileged*

category? (Colin and Bouquet, 2022). In this paper, we will focus on the equity of land markets in Madagascar, looking at both natives and migrants.

For the purposes of this paper, we consider land markets in terms of two quite distinct components: purchase-sale (PS), defined as a complete transfer of property rights; and tenancy market (TM), which correspond to a transfer of land use right. These two types of contract involve different logics and processes, for lessees and assignors alike. (Colin, 2017, 1995; Gebregziabher and Holden, 2011; Gebru et al., 2019) and issues of equity, exclusion and land reallocation are expressed in specific ways.

Using a qualitative approach, a previous study carried out by the authors (Rakotomalala *et al.*, 2022) showed that in the study area, informational and social barriers to entry into the land markets hinder migrants more than natives. These barriers are more pronounced for purchases than for TM acquisitions. It is therefore interesting to observe the importance of these barriers through econometric analysis.

In this paper, the focus is on migrants' participation in land markets. For the purchase market, but also for indirect tenant farming, the three questions this paper seeks to answer are as follows: Firstly, considering their economic characteristics and land endowments, do land markets present specific obstacles to migrants' access to land? Secondly, can the economic poverty of natives and migrants, as measured by their non-agricultural assets and cattle herds, be a factor of exclusion for access to land via land markets? Thirdly, can land markets play a role in rebalancing land endowments by favoring poor land-seekers? How do natives and migrants differ in this respect?

Using data collected in a rural commune in western Madagascar between 2018 and 2020, this paper proposes to analyze the determinants of migrant and native participation in demand-side land markets through descriptive statistics and econometric analysis (probit models for estimating the probability of participation). The article is organized as follows: Section 2 provides a synthesis of the literature on the determinants of access to land via land markets, and positions the fact of being a native or a migrant in relation to the set of these determinants. Section 3 presents the methodology, based on first-hand qualitative and quantitative empirical data collected between 2018 and 2020, and the econometric strategies for estimating the determinants of market participation.

Section 4 focuses on the purchase market and section 5 on the tenancy market, as exclusion and reallocation mechanisms differ according to market type. Our analyses show that household poverty level is a factor of exclusion for purchase, but not for tenancy market. The data do not allow us to identify exclusion processes that affect migrants more specifically. In terms of land reallocation, the tenancy market enables migrants who access it to build up land holdings close to those of the native-born average. The same applies to tenancy market.

2. Literature review: equity and land markets

On the demand side, study on the equity of land markets focuses on categories of the population that are a priori less well positioned in relation to the game of markets: the poor, the landless, young people, women, smallholders, migrants, etc. (Baland et al., 2007; Bezu and Holden, 2013; Deininger et al., 2017; Lastarria-Cornhiel et al., 2014).

In terms of equity, the purchase market is generally considered by the literature to be not very inclusive because purchase is conditional on financial capacity (income, savings, sale of other assets), and land purchase can exclude households with few financial resources (Bezu and Holden, 2013; Deininger et al., 2017; Holden and Otsuka, 2014; Wineman and Liverpool-Tasie, 2017).

In the literature, the tenancy market is often considered to be more inclusive than the purchases market by enabling land-poor households to access land. This access to land via tenancy market has been observed in Ethiopia, Niger (Deininger et al., 2017), Uganda (Baland et al., 2007) Rwanda (Ali et al., 2015), Tanzania (Wineman and Liverpool-Tasie, 2017), Zambia and Malawi (Chamberlin and Ricker-Gilbert, 2016). Financial barriers are less restrictive for leasing contracts than for buying a plot, making leasing relatively more accessible than buying for the poor (Deininger *et al.*, 2017). On the other hand, if we consider the rental/sharecropping alternative, the ex-ante payment method that characterizes the vast majority of rental contracts can be a source of exclusion for the poorest (Holden and Otsuka, 2014).

There is also the possibility of self-exclusion by the poor, in a logic of risk minimization, as the rental amount is fixed whereas in the case of sharecropping, the rent is indexed to the level of production, and sometimes also to the level of sale price of agricultural products (Colin, 1995; Otsuka, 2007). That said, the poverty barrier may manifest itself in other ways than in terms of the ability to pay land rent: poor farmers may face competition from better-off farmers who are potentially more efficient because they are better educated and better endowed with technical and economic capital (Colin, 2017).

In terms of the redistributive function of land markets, the purchase market can be used to compensate for the absence of inadequacy of land acquired through inheritance (Baland et al., 2007; Bouquet, 2009; Di Roberto, 2020; Holden et al., 2010; Zombre, 2013). Kevane and Gray, (1999) and Wineman and Liverpool-Tasie, (2017) show that purchase represents an alternative form of access to land for women, who are often excluded from land ownership by customary systems.

Another dimension of equity in buy-sell markets is about the possible exclusion of some social groups from access to land via purchase, whether for social or political reasons. Evers (2006) has shown that certain migrants who have settled in the southern highlands of Madagascar are excluded from purchase because they are categorized as descendants of former slaves. It should be noted, however, that the rules that favor certain actors (family members, network members) effectively exclude others (due to their origin, for example). In Tanzania, Wineman and Liverpool-Tasie (2018) have highlighted the fact that it is impossible for migrants to buy plots of land on "*clan land*", as these plots must remain within the clan, the descendants of the lineage. This situation is certainly not favorable to migrants, but it does mean that lineage members have less competition for acquisitions, especially when faced with migrants who may belong to the elite. In the highlands of Madagascar, Di Roberto and Bouquet (2018) point out that in the event of the sale of a plot obtained by inheritance, priority is given to the immediate family and then to the extended family, precisely for this purpose. Rakotomalala et al, 2022 have shown that opportunities to access land via land markets are transmitted through affinity networks, and access to these opportunities requires integrating these networks. Even if there is no explicit rule, formal or informal, prohibiting sales to a particular category, this pattern of information transmission immediately excludes those who are not well connected, including recently settled migrants. Hence the importance of jointly considering potential exclusion factors, whether social or economic.

Another dimension of equity for the purchase market concerns distress sales, which in many rural economy contexts are often the main source of land circulation via the market. These distress sales can lead to the impoverishment of selling farm households, especially for smallholders for whom land is often an essential factor of production (references in Colin and Bouquet, 2023). These sales are often irreversible, as the sellers subsequently have financial difficulties in buying back land, especially when supply is very limited (Basu 1986; Rakotomalala et al, 2022). They can thus increase inequalities in access to land and encourage land accumulation by the wealthiest¹. In Madagascar, the importance of distress sales is very important, and poses problems (Boué, 2013; Di Roberto, 2020; Omrane, 2008; Rakotomalala et al, 2022). In this paper, however, we focus on the perspective of access to land.

Imperfections in other markets can also be a source of exclusion for land markets. Land markets, especially tenancy market, are effectively linked to other markets such as credit, inputs, labor and hitching (Colin, 1995; Newbery, 1977). Through a strategy of minimizing the risks associated with the unavailability or inaccessibility of the hitch at the right time, some farmers may exclude themselves from tenancy market. In India, in contexts where the hitch rental market is non-existent, Bell, (1976) and Pant, (1983) have shown that the possession of a hitch is a determinant of tenancy market take-up, and conversely, the non-possession of a hitch is a factor of exclusion for access to land via tenancy market. As we shall see in the following sections, the hitch rental market is very active in the study area and does not appear to pose any particular problems.

The literature review and our prior knowledge of the study context led us to formulate the following research hypotheses:

¹ The situation is even more dramatic in the case of forced sales, but this was not observed in our study.

- The level of economic poverty of households in terms of non-agricultural assets and cattle is a factor of exclusion for purchase and not for tenancy market.
- Purchases and/or tenancy market are inclusive of access to land for the landless or land-poor.
- The fourth hypothesis is that there are barriers to purchase that specifically constrain migrants, and particularly recently settled migrants. These barriers are less decisive when it comes to tenancy market.

3. Methodology

3.1. Data collection

The study is based on first-hand empirical data produced directly or under the close supervision of one of the article's authors. The study was carried out in a rural commune in western Madagascar's Menabe region. This commune has a long history of domestic migrant settlement from others region of Madagascar² and is still an attractive locality (Deschamps, 1959; Fauroux, 2001; Guebourg, 1997; Poulain and Razanakoto, 2014).

Following Baland et al. 2007 in Uganda and Wineman and Liverpool-Tasie, 2018 in Tanzania, a household is qualified as migrant in the rest of the study if the head of household was not born in the study locality. As a result, they are unable to inherit land locally and depend on other market or non-market arrangements for access to land. A household is said to be native when the head was born locally, of native parents or former migrants who have long been established in the area and are likely to pass on land assets through inheritance.

The data comes from a quantitative survey carried out in 2018 on a random sample of 358 households residing in the municipality, including 215 migrants according to the chosen definition (60%). The quantitative survey made it possible to build up a body of systematized data on the 358 households, including 68 households having purchased at least one plot between 2013 and 2018³ and 190 households having taken at least one tenancy market plot in 2018; 483 agricultural plots owned; 279 TC (for the year 2018), 275 purchases (spread over a period from 1979 to 2018) including 106 purchases between 2013 and 2018. For inherited plots, the survey only captures transfers made in the past up to the time of the survey and not inheritance/donation anticipations from parents⁴ if they are still alive.

For the descriptive and econometric analyses, the following variables were collected (or constructed) through the questionnaire survey:

- Dependent variables: purchase between 2013 and 2018 ($A_{2013-2018}$) and tenancy market takeover during 2018 (L_{2018}). These are dichotomous variables (0/1) that take the value 1 if the household bought ($A_{2013-2018} = 1$) or if the household took tenancy market in 2018 ($L_{2018} = 1$), the value 0 otherwise.
- Independent variables: defined on the basis of the research hypotheses (see previous section), but also through a list of variables proposed by Holden et al. (Holden et al, 2010, p. 23)⁵ and validated on the basis of qualitative investigations carried out in the field.

Hypothesis no. 1: the level of economic poverty is a factor of exclusion for purchase and not for tenancy market holdings:

² High-land and South-eastern part of Madagascar,

³ It is possible that some households bought a plot during this period but sold it before the 2018 survey. Our survey does not capture this situation, and the households concerned are then considered as not being part of the households that bought between 2013 and 2018. We assume that this situation only affects a limited number of households.

⁴ A question on inheritance prospects was put to the respondents, but the answers were more based on suppositions and wishes than on a clear estimate based on the parents' assets, the distribution between heirs and local inheritance rules.

⁵ This is a list of variables that explains household participation in land markets from both the supply and demand sides, without distinguishing between the buy-sell market and indirect tenancy market.

- A wealth score obtained via a PCA of households' non-farm assets⁶ (Filmer and Pritchett, 2001). Households are then divided into wealth score terciles
- The number of cattle raised extensively. Generally speaking, zebus are symbols of social prestige, a form of income accumulation and provide an insurance function for the household in the event of a shock (Fauroux et al., 1990; Hänke and Barkmann, 2017).
- Possession of two (or more) draught zebus. Despite the importance of hitch hire in the study area, the question is whether the absence of draught zebus on a farm can be a limiting factor in tenancy market take-up.
- The practice of agricultural wage-earning (1 euro/day) in a punctual or structural way, which is considered as a signal of the poverty level of households. Our postulate is that those who practice agricultural wage-earning in a structural way are even poorer than those who practice it punctually.
- Off-farm activities can provide additional income to finance farming activities. They can also be an alternative to insufficient or non-existent farm income due to limited access to land.

Hypothesis n°2: purchase and/or tenancy market are inclusive for landless or land-poor access to land:

- Parcels owned in 2018 (indicator and area concerned),
- Plots owned in 2013, inherited in 2013, bought in 2013, and landless in 2013⁷ (indicator and area concerned).

Hypothesis no. 3: there are barriers to purchasing that specifically constrain migrants, particularly recently settled migrants

- The fact of being a migrant or a native according to the definition used in this study (cf. Supra).
- The year migrants settled in the study locality. We hypothesize that those who arrived before 1998 are better endowed with social capital (relationships, reputation) and can access opportunities more easily. Those who arrived between 1998 and 2007 constitute our reference category. They are assumed to have an intermediate position: relative to older migrants, they can still express a demand for land if they didn't have the opportunity to buy before 2013; relative to more recent migrants, they are less constrained by social barriers (and may have had more opportunities to accumulate financial or sufficiently liquid capital to meet the large cash outflow required by land purchase). Finally, those who arrived later, between 2008 and 2018, have a priori a higher demand for land, but their integration into the community is still in progress, which may penalize them in terms of access to information. The justification for this breakdown is based on the results of the qualitative investigations (see below).

In addition to the variables of interest, which are directly linked to the hypotheses, control variables are also included in our models; these are the characteristics of the head of household (age, gender, level of education).

The quantitative survey was combined with several series of qualitative interviews (132 individual interviews with 99 people, and 8 focus groups), conducted in 2018, 2019 and 2020, in different localities of the study commune with a diversity of stakeholders (migrants or not, farmers or not, resource persons, etc.). The information gathered during this qualitative phase will reinforce the interpretation of the econometric results and the management of the endogeneity of the explanatory variables.

3.2. Econometric models

To test our hypotheses, we adopt the general structure of a dichotomous probit model as proposed by Deininger et al, (2017, p. 88). In their work, Deininger et al. (2017) deal with the purchase and rental markets, and the same applies to our paper, which treats the two markets separately. Estimates of the determinants of participation in land markets are made by the following probit model equation:

$$(1) A_{=2013-2018} = \alpha + \beta M_i + \gamma C_i + \delta R_i + \lambda F_i + \varepsilon_i$$

$$(2) L_{2018} = \alpha + \beta M_i + \gamma C_i + \delta R_i + \lambda F_i + \varepsilon_i$$

⁶ These are the number and type of goods in the household (radio, cell phone, cooking pot, table, bed, chair, mat, bicycle, motorcycle) and the number of rooms in the dwelling.

⁷ The 2013 land allocations have been reconstituted based on the date of acquisition of the plots.

Equation 1 concerns purchase between 2013 and 2018 ($A_{2013-2018}$) and equation 2 concerns the estimate of TC uptake during 2018 (L_{2018}). First, we estimate the determinants of market participation for the entire sample. In a second step, we estimate the models separately for the subsamples of natives (equations 3 and 4) and migrants (equations 5 and 6).

$$\begin{aligned} (3) \quad A_{2013-2018}(\text{native}) &= \alpha + C + R + \gamma_i \delta_i \lambda_i + F + \varepsilon_i \\ (4) \quad L_{2018}(\text{native}) &= \alpha + C + R + \gamma_i \delta_i \lambda_i + F + \varepsilon_i \\ (5) \quad A_{2013-2018}(\text{migrant}) &= \alpha + C + R + \gamma_i \delta_i \lambda_i + F + I + \varphi_i \varepsilon_i \\ (6) \quad L_{2018}(\text{migrant}) &= \alpha + C + R + \gamma_i \delta_i \lambda_i + F + I + \varphi_i \varepsilon_i \end{aligned}$$

In the equations, i is the index for households, C_i is a vector for control variables related to household head profiles (age, gender, level of education), R_i the vector for variables related to economic poverty (wealth score, cattle herd, agricultural wage-earning), F_i corresponds to household land endowments and includes access to inheritance only for natives, M_i represents the household category (native/migrant), I_i is the vector for the year in which migrants settled and $\alpha, \gamma, \delta, \lambda, \varphi$ are the parameter vectors.

Variables specific to natives (inheritance) and migrants (years of settlement) are not included in equations 1 and 2, which cover the whole sample. To avoid collinearities in the equations, the areas owned in 2018 will not be used for the determinants of purchase $A_{2013-2018}$.

Equations on the determinants of purchase are subject to a risk of endogeneity linked in particular to temporality. It is to limit this risk that the period considered concerns only the last five years preceding the survey (purchase between 2013 and 2018). Deininger *et al.*, (2017) also made this choice when estimating the determinants of purchase. The second strategy to limit the risk of endogeneity is to incorporate variables prior to 2013 (plot ownership, inheritance). Despite these precautions, we cannot totally rule out an endogeneity problem, particularly with regard to household wealth. In the case of tenancy market (L_{2018}), endogeneity is less related to temporality than to possible unobserved heterogeneity variables, and therefore not taken into account in the equations.

3.3. Descriptive statistics of key variables

Table 1 shows the statistics (mean and standard deviation) for the dependent and independent variables. Statistics are presented for the native and migrant sub-samples, then for the whole sample. Area information is presented in two ways: firstly, there are the average areas calculated for the whole sample; secondly, there are the areas measured only for the households concerned (e.g. owner or tenant).

For the dependent variables, Table 1 shows that between 2013 and 2018, the difference in purchase participation is insignificant (17% of natives have purchased at least one plot versus 20% of migrants). Table 1 also highlights the importance of the tenancy market for migrants: 38% of natives use it versus 63% of migrants in 2018. The average area taken up under tenancy market is also lower among natives than among migrants (0.28 versus 0.53 ha). These results rule out the hypothesis that migrants are excluded from land markets, especially for tenancy market takings. Conversely, the low participation of natives in tenancy market could be interpreted in terms of exclusion. However, our qualitative data suggest that it is rather a question of a relatively lower demand on the part of natives, who have greater access to land ownership, notably through inheritance.

With regard to household wealth indicators (R_i), Table 1 shows that the distribution of natives and migrants according to wealth terciles is similar. However, significantly more natives than migrants own a pair of draught zebus (58% vs. 23%), and significantly more extensive zebus (5 vs. 1). This difference in the number of cattle could potentially benefit migrants in their access to land via land markets. In fact, zebus constitute savings on the ground, the sale of which could facilitate the purchase of a plot, and the fact of having zebus for harnessing makes it possible to better manage the risks of access to factors of production when taking tenancy market and for the exploitation of purchased plots. Table 1 shows that fewer migrants engage in salaried agricultural work on an ad hoc or structural basis (67%

vs. 76% for natives), but significantly more engage in an activity complementary to farming (46% vs. 26% for natives).

For land endowments (F_i), table 1 shows significant differences between natives and migrants in the frequency of landless households in 2018 (13% vs. 54%), as well as in the average area owned (1.9 vs. 0.8 ha). We note, however, that migrant households with access to land ownership are virtually on a par with native-born households (1.8 ha versus 2.2). Table 1 shows that tenancy market increases the area farmed by migrants in relation to the area owned (1.36 vs. 0.8 ha).

Table 1 Statistics for dependent and independent variables

	Native	Migrant	Total
Dependent variables			
1=Purchase of parcel from 2013 to 2018 (A) ₂₀₁₃₋₂₀₁₈	0,17 (0,38)	0,20 (0,40)	0,19 (0,39)
1= Takes at least one tenancy market plot (L) ₂₀₁₈	0,38 (0,49)	0,63 (0,48) ***	0,53 (0,5)
Profile of the head of household (C)_i			
Age of head	42 (12,64)	45 (14,24)	44 (13,69)
1= Female head	0,11 (0,32)	0,12 (0,33)	0,12 (0,32)
1= High school and above	0,36 (0,48)	0,43 (0,5)	0,4 (0,49)
Household wealth indicators (R)_i			
1= Tercile 1 wealth score	0,34 (0,47)	0,33 (0,47)	0,34 (0,47)
1= Tercile wealth score 2	0,38 (0,49)	0,31 (0,46)	0,33 (0,47)
1= Tercile wealth score 3	0,29 (0,45)	0,36 (0,48)	0,33 (0,47)
1= Owns two (or more) draught zebus	0,58 (0,5)	0,23 (0,42) ***	0,37 (0,48)
Number of extensively raised cattle	4,86 (9,56)	0,84 (2,43) ***	2,45 (6,62)
1=Does not work as a salaried farmer	0,24 (0,43)	0,34 (0,47) *	0,30 (0,46)
1=One-off farm work	0,31 (0,47)	0,27 (0,44)	0,28 (0,45)
1=Structural agricultural wages	0,44 (0,50)	0,40 (0,49)	0,41 (0,49)
1= Salaried off-farm activity	0,26 (0,44)	0,46 (0,5) ***	0,38 (0,49)
Household property allowances (F)_i			
1=Landless household in 2018	0,13 (0,34)	0,54 (0,5) ***	0,38 (0,49)
1=Landless household before 2013	0,2 (0,4)	0,72 (0,45) ***	0,51 (0,5)
1= Owns at least one plot inherited in 2018	0,55 (0,5)		
1=Household inherited before 2013	0,41 (0,49)		
1=Household who bought before 2013	0,32 (0,47)	0,21 (0,41) ***	0,26 (0,44)
Area owned in 2018 (ha) total ^a	1,92 (2,40)	0,84 (1,76) ***	1,27 (2,10)
Area owned in 2018 (ha) owners ^c	2,21 (2,45)	1,84 (2,23)	2,05 (2,36)
Area purchased before 2013 (ha) total ^a	0,51 (1,12)	0,39 (1,03)	0,44 (1,07)
Area owned before 2013 (ha) total ^a	1,52 (2,37)	0,45 (1,05) ***	0,88 (1,78)
Area owned before 2013 (ha) owners ^c	2,27 (2,58)	1,73 (1,42)*	2,07 (2,24)
Inherited area in 2018 (ha) ^b	0,95 (1,86)		
Area inherited before 2013 (ha) ^b	0,82 (1,86)		
Area under tenancy market in 2018(ha) total ^a	0,28 (0,58)	0,53 (0,72) ***	0,43 (0,67)
Area under tenancy market in 2018(ha) tenant ^d	0,74 (0,74)	0,84 (0,75)	0,81 (0,74)
Area farmed in 2018 (ha) total ^a	2,20 (2,43)	1,36 (1,75) ***	1,70 (2,08)
Area farmed in 2018 (ha) tenant ^d	1,88 (1,89)	1,07(1,04) ***	1,30 (1,38)
Migration (M_i) and (I)_i			
1=Migrant household			0,60 (0,50)
1=Migrant arrived before 1998		0,23 (0,42)	
1=Migrants arriving between 1998 and 2007		0,27 (0,44)	
1=Migrant arriving between 2008 and 2018		0,50 (0,50)	
Observation (Household)^a	143	215	358

i) ^a Calculated on the whole sample; ^b Calculated on the whole sub-sample of natives; ^c Calculated only for owners; ^d Calculated only for tenants ii) Significance of mean comparisons between native and migrant: *** at 1%, ** at 5%, * at 10%; iii) standard deviations are shown in brackets. Source: authors based on questionnaire surveys (2018).

In 2013, there were far fewer landless households among natives than among migrants (20% vs. 72%). Across all samples (landowner and landless), the average area owned by natives was significantly higher than that of migrants (1.52ha vs. 0.45ha). If the analysis focuses solely on landowning households in 2013, then the difference between the areas owned is significantly reduced (2.27ha for natives and 1.73ha for migrants).

Concerning inheritance for natives, 55% said they had inherited at least one plot at the time of the survey (2018) with an average area of 0.9ha. This proportion rises to 41% if the period considered is before 2013, with an average inherited area of 0.8ha.

4. Determinants of purchase participation

4.1. Descriptive statistics

Table 2 compares the profiles of households that bought at least one plot between 2013 and 2018 and those that didn't, separately for the native sub-sample, the migrant sub-sample and the whole sample.

Table 2 Buyer profiles between 2013 and 2018

Buyer between 2013 and 2018	Native		Migrant		Total	
	No	Yes	No	Yes	No	Yes
Profile of the head of household (Ci)						
Age of head	42.1	40	44.9	44.7	43.8	43.0
1= Female head	0.14	0*	0.13	0.070	0.13	0.044**
1= High school and above	0.31	0.56**	0.44	0.40	0.39	0.46
Household wealth indicators (Ri)						
1= Tercile 1 wealth score	0.37	0.16**	0.38	0.14***	0.38	0.15***
1= Tercile wealth score 2	0.39	0.32	0.31	0.26	0.34	0.28
1= Tercile wealth score 3	0.24	0.52***	0.30	0.60***	0.28	0.57***
1= Owns two draught zebus (or more)	0.57	0.64	0.19	0.40***	0.34	0.49**
Number of extensively raised cattle	4.75	5.36	0.80	1.02	2.41	2.62
1=Does not work as a salaried farmer	0,22	0,36	0,33	0,40	0,28	0,38
1=One-off farm work	0,32	0,28	0,26	0,28	0,29	0,28
1=Structural agricultural wages	0,46	0,36	0,41	0,33	0,43	0,34
1= Salaried off-farm activity	0.78	0.64	0.67	0.60	0.72	0.62
Land grants (Fi)						
1=Landless household before 2013	0.19	0.20	0.75	0.58**	0.52	0.44
1= Owns at least one plot inherited in 2018	0.59	0.32**				
1=Household inherited before 2013	0.45	0.24*				
1=Household who bought before 2013	0,32	0,32	0,2	0,26	0,25	0,28
Area owned in 2018 (ha) total ^a	1,84	2,25	0,51	2,16***	1,05	2,20***
Area owned in 2018 (ha) owner ^c	2,19	2,24	1,58	2,16*	1,98	2,19
Area purchased before 2013 (ha) total ^a	0,48	0,65	0,34	0,58*	0,4	0,60*
Area owned before 2013 (ha) total ^a	1.66	0.89	0.42	0.56	0.92	0.68
Area owned before 2013 (ha) owner ^c	2,32	1,84	1,73	1,73	2,12	1,78
Inherited area in 2018 (ha) ^b	1.09	0.29**				
Area inherited before 2013 (ha) ^b	0.94	0.23*				
Migration (Mi) and (I):						
1=Migrant household			0.59	0.63		
1=Migrant arrived before 1998			0.25	0.16		
1=Migrants arriving between 1998 and 2007			0.23	0.42**		
1=Migrant arriving between 2008 and 2018			0.52	0.42		
Comments (Household)	118	25	172	43	290	68

^a Calculated on the whole sample; ^b Calculated on the whole sub-sample of natives; ^c Calculated only for homeowners
 ii) Tests for comparison of means (ttest) between non-buyers and buyers are included in the table; iii) Significance Student test: *** at 1%, ** at 5%, * at 10%. Source: authors based on questionnaire surveys (2018).

Table 2 shows first of all that buyers belong mainly to the most affluent category of the population. They are over-represented in the 3rd wealth tercile and under-represented in the 1st. They are also significantly more likely to own draught zebus, especially in the case of migrants. Economic poverty therefore appears, unsurprisingly, to be a factor of exclusion for access to land via purchase.

For natives, the purchase market has enabled those who did not inherit in 2013 to buy and compensate for inheritance inequalities. Indeed, those who bought are significantly less beneficiaries of inherited land (in terms of both indicator and area). The differences are maintained for households that inherited in 2018.

Concerning the participation of landless or land-poor households, Table 2 shows first of all that for the whole sample 44% of buyers between 2013 and 2018 were landless in 2013, a lower percentage than that of non-buyers, but the difference is not significant. Among natives, the proportion of landless (in

2013) is similar among buyers and non-buyers between 2013 and 2018. It is also logically much lower than for the sample as a whole (19-20%).

Among migrants, on the other hand, there is a significant difference in the proportion of landless among buyers, which is significantly lower (58%) than among non-buyers (75%). This result seems to suggest an accelerating effect of past purchases (before 2013 in this case) on the possibility of future purchases.

For natives, table 2 shows that households who bought after 2013 owned smaller areas in 2013 than non-buyers. This is true whether the analysis is made for all natives (0.89ha for buyers and 1.66 for non-buyers) or just for natives who owned land in 2013 (1.84ha for buyers and 2.32ha for non-buyers).

These differences are not statistically significant, but in any case, they rule out the hypothesis of a widening of inequalities via the purchase market. For migrants, Table 2 shows that households who bought after 2013 owned larger areas in 2013 than non-buyers. This insignificant difference suggests a weak tendency towards accumulation for those who have already bought, and therefore points to a tendency towards greater inequality within the migrant category, linked to a cohort effect.

4.2. Econometric model

Table 3 shows the results of the Probit models for the equations concerned with purchase between 2013 and 2018. The dependent variable is the dichotomous variable that takes the value 1 for households having purchased at least one plot between 2013 and 2018. Column 2 concerns the native sub-sample, column 3 concerns the migrant sub-sample and column 4 concerns the whole sample.

Table 3 shows that belonging to the 3rd tercile of wealth (calculated on non-agricultural assets) has a positive and significant effect on purchase for all three equations. Our estimates confirm that economic poverty appears to be a factor of exclusion for access to land via purchase. The coefficients associated with the "landless in 2013" variable are negative, but the only significant coefficient is that of the migrant equation. The purchase market thus seems to contribute to widening inequalities between landless and landowners for this category.

The coefficient associated with the "migrant" variable is non-significant (and positive). This result rules out the hypothesis of the existence of exclusion mechanisms affecting migrants in particular.

For migrants, in comparison with migrants settled between 1998 and 2007, migrants who arrived before and those who arrived after have a lower probability of having bought land after 2013. However, the coefficient is only significant for those who arrived before 1998.

Migrants who arrived before 1998 have a significantly lower probability of buying than the reference category. Our qualitative data allow us to refine our interpretations. We can consider that migrants who settled before 1998 have easier access to purchasing opportunities because of their seniority, but that they do not buy if they have already had the opportunity to build up a land portfolio before 2013. Their lesser participation in purchases would therefore reflect lower demand. This result suggests that, above a certain threshold (surface area), landowning households limit their land acquisitions, which helps to avoid the phenomenon of land concentration. This limitation may be a strategy for the efficient allocation of other production factors (labor, financial resources) available to households.

For migrants arriving after 2008, on the other hand, the situation is very different. Their demand for land is assumed to be high, but our assumption was that they lacked the necessary social capital to access purchasing opportunities. The coefficient is indeed negative, as expected, but it is not significant, and therefore does not allow us to confirm this hypothesis.

Table 3 Probit model of the determinants of land purchases between 2013 and 2018

	Native	Migrant	Total
1= Migrant household			0.320 (0.21)
Profile of the head of household (Ci)			
Age of head	0.090 (0.09)	0.075 (0.06)	0.060 (0.05)
Age squared	-0.001 (0.00)	-0.001 (0.00)	-0.001 (0.00)
1= Female head	0.000 (.)	-0.545 (0.43)	-0.702** (0.35)
1= High school and above	0.595* (0.31)	-0.519* (0.27)	-0.093 (0.19)
Household wealth indicators (Ri)			
1= Tercile 1 wealth score (ref: Tercile 2)	-0.089 (0.40)	-0.392 (0.33)	-0.341 (0.24)
1= Tercile wealth score 3	0.921*** (0.35)	0.920*** (0.30)	0.703*** (0.21)
1= Household owns two draught zebus (or+)	0.260 (0.33)	0.458 (0.30)	0.225 (0.20)
Number of extensively raised cattle	-0.004 (0.01)	0.007 (0.05)	-0.004 (0.01)
1= Occasional agricultural wage-earning (ref: Does not practice wage-earning)	-0.431 (0.40)	(0.28)	0.116 (0.23)
1= Structural agricultural wage employment	-0.353 (0.36)	(0.32)	0.037 (0.21)
1= Salaried off-farm activity	-0.159 (0.36)	(0.29)	-0.162 (0.20)
Land grants (Fi)			
1= Landless household before 2013	-0.244 (0.44)	-0.647* (0.37)	-0.282 (0.24)
1= Household who bought before 2013	-0.353 (0.34)	-0.575 (0.40)	-0.210 (0.23)
1= Household inherited before 2013	-0.818** (0.36)		
Migration (Mi) and (I)i			
1= Migrant household			0.320 (0.21)
1=Migrant arrived before 1998 (ref: arrived between 1998 and 2007)		-0.565* (0.33)	
1=Migrants arriving between 2008 and 2018		-0.159 (0.27)	
Constant	-2.263 (1.86)	-1.695 (1.49)	-2.070** (1.03)
Pseudo r2	0.179	0.185	0.115
Observation (Household)	143	215	358

Significance *** at 1%, ** at 5%, * at 10%. Source: authors based on questionnaire surveys (2018).

5. Determinants of participation in tenancy market

5.1. Descriptive statistics

Table 4 compares the profile of households that did and did not take tenancy market in 2018, for the native sub-sample, the migrant sub-sample and the whole sample.

Table 4 shows that tenancy market tenant households are significantly poorer economically, whatever the indicator considered (wealth score tercile, draught zebu, extensive zebu herd, year-round wage farming). This profile holds overall for the subsample of natives and migrants. Poverty is therefore not an exclusion factor for access to land via tenancy market. Nor does the absence of an animal team on the farm appear to be a source of exclusion from tenancy market.

With regard to landless or land-poor households taking IVF, Table 4 shows that landless households are significantly more represented among tenants, whether among natives or migrants. Tenant households also hold significantly less land than households not involved in tenancy market. These results suggest that not only does the tenancy market not exclude land-poor households, but that it also enables a rebalancing of exploited land endowments (if not heritage land endowments).

Table 4 shows that migrant households are over-represented among tenancy market takers. This contrasts with Table 2, which showed no significant difference between migrants and natives for purchases. Finally, migrants who arrived after 2008 are over-represented among tenancy market lessees (unlike for purchases). This may suggest a stronger demand for this category, but also that exclusion mechanisms are different and/or better overcome. Qualitative investigations have shown, firstly, that social constraints and difficulties in accessing opportunities are less important for IVF (compared with purchasing). Institutional arrangements such as intermediaries and guarantors enable recently settled migrants to be accepted into tenancy market (Rakotomalala et al, 2022). Again, for migrants who arrived before 1998, their low take-up of tenancy market is not to be interpreted as a manifestation of exclusion, but rather to be linked to the fact that they are already landowners and that their demand for land is lower.

Table 4 Profiles of tenants in 2018

Takes into indirect ownership (tenancy market) in 2018	Native		Migrant		Total	
	No	Yes	No	Yes	No	Yes
Profile of the head of household (Ci)						
Age of head	45.3	35.9***	49.2	42.3***	47.2	40.4***
1= Female head	0.12	0.093	0.15	0.10	0.14	0.10
1= High school and above	0.36	0.35	0.41	0.44	0.38	0.41
Household wealth indicators (Ri)						
1= Tercile 1 wealth score	0.28	0.43*	0.23	0.40***	0.25	0.41***
1= Tercile wealth score 2	0.38	0.37	0.31	0.30	0.35	0.32
1= Tercile wealth score 3	0.34	0.20*	0.46	0.30**	0.40	0.28**
1= Owns two draught zebus (or more)	0.62	0.52	0.35	0.16***	0.49	0.26***
Number of extensively raised cattle	6.88	1.54***	1.35	0.54**	4.26	0.83***
Land grants (Fi)						
1= Landless household in 2018	0.045	0.28***	0.29	0.70***	0.16	0.58***
Area owned in 2018 (ha) total ^a	2,39	1,14***	1,87	0,23***	2,14	0,49***
Area owned in 2018 (ha) owner ^c	2,49	1,58**	2,61	0,76***	2,54	1,16***
1=Does not work as a salaried farmer	0.31	0.13**	0.46	0.27***	0.38	0.23***
1=One-off farm work	0.28	0.37	0.23	0.29	0.25	0.31
1=Structural agricultural wages	0.40	0.50	0.31	0.44*	0.36	0.46*
1= Salaried off-farm activity	0.69	0.87**	0.54	0.73***	0.62	0.77***
Migration (Mi) and (I)_i						
1=Migrant household					0.47	0.71***
1=Migrant arrived before 1998			0.31	0.19**		
1=Migrants arriving between 1998 and 2007			0.36	0.21**		
1=Migrant arriving between 2008 and 2018			0.33	0.60***		
Comments (Household)	89	54	80	135	169	189

^a Calculated on the whole sample; ^c Calculated for owners only ii) Tests for comparison of means (ttest) between tenants and non-tenants are included in the table; iii) Significance Student test: *** at 1%, ** at 5%, * at 10%. Source: authors based on questionnaire surveys (2018).

5.2. Econometric model

Table 5 shows the results of the Probit models for the three equations concerning the taking of land under indirect tenure (tenancy market). In all cases, the dependent variable is the dichotomous variable that takes the value 1 for households having taken at least one tenancy market plot in 2018. Column 2 concerns only natives, column 3 only migrants and column 4 deals with the whole sample,

Table 5 shows that household wealth tercile is not a determining factor in tenancy market take-up. On the other hand, other wealth indicators are significant: the number of cattle in extensive farming has a negative effect, and the structural practice of salaried farming significantly increases the probability of taking up tenancy market. Qualitative investigations inform us that, in addition to being an indicator of wealth (live savings), extensive zebu breeding is an activity in its own right in the study area. Those

with large herds are often less involved in farming, which explains the negative effect between the number of cattle and tenancy market take-up, as they have a lower demand for land.

Table 5 Probit model of the determinants of tenancy market take-up for 2018

	Native	Migrant	Total
Profile of the head of household (Ci)			
Age of head	-0.019 (0.07)	-0.090** (0.04)	-0.082*** (0.03)
Age squared	-0.000 (0.00)	0.001* (0.00)	0.001** (0.00)
1= Female head	-0.845* (0.48)	-0.296 (0.30)	-0.341 (0.24)
1= High school and above	-0.026 (0.28)	0.153 (0.24)	0.127 (0.17)
Household wealth indicators (Ri)			
1= Tercile 1 wealth score (ref: Tercile 2)	0.245 (0.32)	0.031 (0.26)	0.114 (0.20)
1= Tercile wealth score 3	0.141 (0.32)	0.125 (0.27)	0.098 (0.20)
1= Household with two (or more) draught zebus	0.261 (0.28)	-0.244 (0.28)	0.024 (0.18)
Number of extensively raised cattle	-0.059** (0.03)	0.007 (0.04)	-0.043** (0.02)
Land grants (Fi)			
1= Landless household in 2018	1.078** (0.42)	0.818*** (0.23)	0.863*** (0.19)
1=Salaried farming (ref, does not practice salaried farming)	0.453 (0.35)	0.660** (0.28)	0.564*** (0.21)
1=Structural agricultural wages	0.678* (0.35)	0.480* (0.26)	0.506** (0.20)
1 = salaried off-farm activity or trade	0.025 (0.31)	0.044 (0.23)	0.028 (0.18)
Migration (Mi) and (I)i			
1= Migrant household			0.335* (0.18)
1=Migrant arrived before 1998 (ref: arrived between 1998 and 2007)		0.160 (0.28)	
1=Migrants arriving between 2008 and 2018		0.279 (0.24)	
Constant	0.179 (1.41)	1.573 (1.05)	1.312* (0.74)
Pseudo r2	0.246	0.186	0.223
Comments (Household)	143	215	358

Significance *** at 1%, ** at 5%, * at 10%. Source: authors based on questionnaire surveys (2018).

Being a landless household is positively and significantly correlated with tenancy market take-up for both natives and migrants. This result confirms the presence of a dynamic of compensation for inequalities in exploited land (beyond owned land). The tenancy market thus offers the possibility of giving access to land to vulnerable categories (landless), and/or those starting out in farming (young people).

The analyses show a positive and significant effect of being a migrant on the probability of taking up tenancy market in 2018. These results indicate that the tenancy market is very inclusive for migrants, to the point where we might wonder whether there is no exclusion against natives. Our qualitative data provide some answers: our results should be interpreted more as the expression of a lower demand among natives. tenancy market is above all an alternative means of accessing land for landless households, and landless households are more numerous among migrants than among natives, just as the areas owned by migrants are smaller than those owned by natives (Table 1).

6. Discussion

6.1. Purchase market and equity

A first dimension of equity concerns the existence of exclusion mechanisms against different categories of actors, and based on different pedestals. By showing that the probability of purchasing a plot is positively associated with household wealth, our study is in line with the literature on the risks of exclusion of the poorest and widening inequalities associated with purchase land markets (Ali et al., 2015; Deininger et al., 2017; Di Roberto, 2020; Mwesigye et al., 2017; Wineman and Liverpool-Tasie, 2017; Zombre, 2013). But our work also offers a richer, more nuanced view of the equity effects of the AV market.

The analyses do not reveal any exclusion processes linked to the migrants' own identity. This result contrasts with observations made by Evers, (2006) for certain migrants in the southern highlands of Madagascar, or by Wineman and Liverpool-Tasie, (2018) in Tanzania. Observations made within the category of migrants in our case study, however, show the difficulties of buying for recently settled migrants. These findings confirm the results obtained by qualitative investigations concerning informational barriers (Rakotomalala et al, 2022). Migrants need to integrate well into their host locality to access purchasing opportunities. This requires respect for local codes of conduct, the support of intermediaries who vouch for migrants in the eyes of others, and the building of a network and reputation, all of which take time.

When migrants manage to overcome the barriers to purchase (which only concerns a minority of them), they build up an average landholding of the same order of magnitude as that of natives. Inequalities do not increase in favor of either category.

Among natives, our results also suggest that purchasing helps to reduce land inequalities resulting from inheritance. Similar results have been observed in the Highlands (Di Roberto, 2020) and in the Alaotra region (Zombre, 2013) in Madagascar and by Baland et al, (2007) in Uganda.

6.2. Tenancy market and equity

Our study confirms other work showing that the TC market is more likely than the purchase market to enable the economically poorest, the landless and the land-poor to access agricultural land (Sadoulet, 2001; Deininger et al., 2017; Ethiopia, Niger: Deininger et al., 2017, in Uganda : Baland et al., 2007Rwanda : Ali et al., 2015Tanzania: Wineman and Liverpool-Tasie, 2017Zambia and Malawi: Chamberlin and Ricker-Gilbert, 2016).

Contrary to the observations made in India by Bell, (1976) and Pant, (1983) in the study area, the absence of an animal team on the farm is not a source of exclusion from tenancy market. This can be explained by the fact that there is a market for the hire of animal teams, which means that when the time is right, it is possible to use the services of draught zebu. This result is all the more important for migrants, who are much less likely than natives to own draught zebu (Table 1).

Unlike purchasing, access to opportunities is easier for tenancy market, even for recently settled migrants. The tenancy market is therefore clearly an alternative to the barriers to entry of the purchase market, notably informational and financial barriers (Rakotomalala et al, 2022).

Conclusion

The aim of this paper is to analyze the properties of the market for purchase and indirect tenure through the prism of equity, based on a mixed qualitative/quantitative study carried out in a rural commune in western Madagascar characterized by active land markets and the significant presence of migrants in search of land. Our research focuses on the role of land markets in the access of natives and migrants to agricultural land.

In a context such as Madagascar, where agriculture provides the main source of income and food security, it is important to take into account equity issues in land access strategies. Over and above comparisons between natives and migrants, this study generates lessons of a more general scope that contribute to the reflections for the continuation of the land reform underway in Madagascar. The latter aims to improve access to land and land tenure security, but to date has paid little operational attention to the functioning of land markets.

The study's main recommendation is to pay particular attention to those categories who are excluded from land markets for financial reasons. These include young people, who have few financial resources but are often in the process of setting up their farms (Burnod et al, 2016). The results of the study clearly highlight the role of the tenancy market as an alternative to purchase. Access to land for vulnerable groups could therefore be favored by the development of the tenancy market. Future research could focus on these tenancy market in order to anticipate possible sources of insecurity of rights for lessees and assignors, or forms of contractualization leading to land tenure insecurity for tenants.

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