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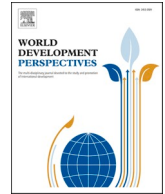
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Research paper

# Protection or pressure? reciprocity in informal social protection in southern Madagascar

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## ABSTRACT

The development of formal social protection in African countries is critical. The Covid-19 crisis has largely increased this need. Informal social protection mechanisms remain central to households' management of shocks. This article investigates the relationship between reciprocity norms and dependency in contexts of extreme poverty. Using egocentric networks, the study conducts an original analysis of reciprocity norms based on 2868 social relationships across three regions in southern Madagascar. Four reciprocity categories are identified within support relationships: symmetrical reciprocity, no reciprocity, and two asymmetrical reciprocities. Using a mixed method approach, the findings reveal that reciprocity norms are closely associated with household living conditions, with individuals in poverty more likely to be integrated into relationships characterized by asymmetrical reciprocity. Moreover, the article identifies a strong correlation between food-safety shocks and asymmetrical reciprocity. Lastly, the results highlights the significant role of local organizations in formation of symmetrical support relationships. These findings underline the need to develop analyses and policies that take into account the diversity of social protection mechanisms (formal and informal).

## 1. Introduction

The lack of formal social protection in poverty regions places many households in extremely vulnerable situations (Barrientos & Hulme, 2008; Niño-Zarazúa et al., 2012). The COVID-19 crisis has considerably accentuated these vulnerabilities and pushed social protection mechanisms under pressure (Sachs et al., 2022). Despite the massive deployment of social assistance programs (Gentilini, 2022), many people do not benefit from any formal social protection mechanisms.

Given the low coverage of formal social protection systems, informal mechanisms have a determinant place (Devereux & Getu, 2013a; Wood & Gough, 2006). The literature distinguishes semi-formal and informal mechanisms (Mamo, 2013; Stavropoulou et al., 2017). First, informal social mechanisms are all the interpersonal support relationships (e.g. collective rules and support, reciprocity networks). These mechanisms are principally structured in the context of “generalized reciprocity” (Du Toit & Neves, 2009 cited in Hebo 2013, 14). Informal social protection are the most prevalent forms in contexts of extreme poverty (Delpy, 2022; Devereux & Getu, 2013a; Wood & Gough, 2006). Secondly, semi-formal social protection refers to insurance mechanisms structured in organisations with participation rules (e.g., Rotating Savings and Credit

Association (ROSCA), producers' organisations, and burial societies). These mechanisms are structured in the context of “balanced reciprocity” (Oduro, 2010, cited in Hebo 2013, 14). Both are embedded in social groups, such as the family (Offer, 2012), community (Fafchamps & Gubert, 2007; Platteau, 1997), friendly (Lubbers et al., 2020), or socio-professional groups (Fafchamps, 1999). A growing literature analyses the ambivalence of informal social protection and social solidarity (Baland et al., 2011; Beekman et al., 2015; Boltz et al., 2019; Di Falco et al., 2018, 2019; Di Falco & Bulte, 2011; Hadnes et al., 2011; Olié, 2022). This ambivalence is particularly problematic in extreme rural poverty contexts, where the absence of resources leads to the development of clientelist relationships (Mumtaz, 2023; Stavropoulou et al., 2017; Wood, 2003; Wood & Gough, 2006). In this article, I examine whether reciprocity norms in support relationships can be seen as a mean of responding to shocks. Or, on the contrary, does it constitute a pressure for the individual?

To carry out this study, I mobilize an original database (Gondard-Delcroix, 2019). This survey was specifically designed to analyse social protection mechanisms in the southern Madagascar. To consider the importance of informal social protection and semi-formal social protection, I use egocentric social network analysis. I analyse

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simultaneously interpersonal support relationships and support relationships between individuals and organisations (Crossley et al., 2015). This survey is composed by quantitative data that characterise 1200 individuals and 2868 informal social protection relationships. In this paper, I use a mixed method (Creswell, 2015). First, I use interpersonal resource exchanges in informal social protection relationships to characterise four categories of reciprocity: symmetrical reciprocity, no reciprocity, and two asymmetrical reciprocities. In asymmetrical reciprocity categories, I identify the dependency of one individual on the other. There are two asymmetrical reciprocities because with egocentric data I can identify the direction of dependency between the two relationship actors. I investigate these four reciprocity categories through an econometric approach. Secondly, I propose extracts from personal interviews to analyse the quantitative results in depth.

The results can be summarized as follows. Firstly, this study highlights the close link between individual livelihoods and reciprocity norms. The poorest individuals are more likely to be in asymmetrical reciprocity relationship. In addition, having experienced a food-safety shock during the last 12 months is strongly related to asymmetrical reciprocity relationships. Secondly, I highlight the link between the support network characteristics and reciprocity norms. Having an organization in a personal support network is related to the formation of symmetrical reciprocity relationships. Soliciting people with an important social status is correlated with asymmetrical reciprocity relationships. Finally, the social embeddedness of the relationship influences the reciprocity of the informal social protection mechanisms.

This article is an important contribution to understanding social protection mechanisms in extreme poverty regions. Therefore, it fills the related literature gap in three ways. First, it allows to understand the diversity of social protection mechanisms and their interactions. Devereux et Getu (2013a) underlined the gap of analysis that considers the different social protection mechanisms and their interactions (formal, semi-formal, and informal). Secondly, this article is critical to analyse the ambivalence of informal social protection mechanisms described in the literature (Hadnes et al., 2011; Stavropoulou et al., 2017). Finally, this article shows the richness of mixed methods and social network analysis in the understanding of the diversity of social protection mechanisms and their interactions (Bilecen, 2020; Bilecen, 2013).

The remainder of the article is organized as follows. Section 2 presents the context of this study. Section 3 reviews the literature which studies the ambivalence of social protection in areas of extreme poverty. Section 4 presents the mixed method used. Section 5 presents the results. To conclude, I propose to discuss the policy implications of this work.

## 2. Poverty and vulnerability in southern Madagascar

The southern region of Madagascar is one of the poorest regions in Sub-Saharan Africa (henceforth, SSA). The gravity of the situation can be assessed from one figure: 91 % of the population lives below the extreme poverty line (USD 1.90/day) (Healy, 2017). This compares with an estimated 78.8 % for Madagascar and 40.4 % for SSA (World Bank, 2020). In this context, households must deal with shocks that keep them in survival mode. Among these shocks, the profound regional climatic upheavals have important consequences. The intensification of the *kéré* (literally “famine” in Antandroy), since September 2020, poses major problems with access to vital resources such as water and food. There are also less visible problems. Link with the scarcity of available resources, traditional and community events (weddings, funeral ceremonies, births, etc.) that organise the lives of local populations are under pressure. These events usually involve the sacrifice of livestock or the giving of money. In this urgent context, the region has gradually become a laboratory for international aid (UNICEF, 2011). Many national and international organisations are present in southern Madagascar. The programs developed in the region mirror international aid. The populations of the deep south have seen a succession of food distribution

programs, water and sanitation programs, and more recently, cash transfer programs. The multiplication of emergency programs is largely insufficient to meet the needs of local populations (Gondard-Delcroix et al., 2021; UNICEF, 2011). For example, cash transfer programs cover less than 2.25 %<sup>1</sup> of the population in southern Madagascar. Under these conditions, faced with the regional difficulties described above, local populations are left to fend for themselves. This context is conducive to maintaining and developing informal social protection practices.

## 3. Informal social protection in poverty areas: Protection or dependence?

### 3.1. Informal social protection as protection

A growing literature analyses on informal social protection mechanisms in poor contexts (King, 2017; Mamo, 2013; Mumtaz, 2022; Stavropoulou et al., 2017). Fafchamps and La Ferrara highlight the importance of mutual assistance mechanisms in poor neighbourhoods in Nairobi (Fafchamps & La Ferrara, 2012). De Weerd & Dercon show the importance of village-level self-help networks in food risk protection in Tanzania (De Weerd & Dercon, 2006). Many studies analysed the formation of risk-sharing relationships and the socioeconomic consequences of risk-sharing (Comola & Fafchamps, 2011; Fafchamps & Gubert, 2007; Fafchamps & Lund, 2003). In these studies, an individual invests in support relationships to insure himself against the occurrence of one or more risks. Other authors do not focus exclusively on risk-sharing relationships, they analyse support relationships as part of social groups and social relationships (Devereux & Getu, 2013b; Lubbers et al., 2020; Platteau, 1997; Wood & Gough, 2006). Platteau (1997), considers that interpersonal supports are governed by balanced reciprocity. In this perspective, sharing resources linked to inter-personal support is not necessarily the result of a bilateral exchange between two people. However, it involves different members of the social group in variable temporalities (Platteau, 1997). Mauss (2007) and then Lévi-Strauss (1958) have placed the gift issue at the heart of anthropological thinking. These works emphasise the structural dimension of giving. The gift relationship is not limited to the exchange of resources between two individuals. It also has implications for the functioning of the group or community. Thus, many authors emphasise the role of local organisations in the functioning and formation of informal social protection. By pooling individual actions, local organisations allow individuals to access new resources without necessarily entering into dependent relationships. This is particularly the case for religious associations (Norton et al., 2001), burial funds (Dercon et al., 2006), or rotating credit and savings groups (Anderson & Baland, 2002; Devereux & Getu, 2013a; Stavropoulou et al., 2017).

### 3.2. The dark side of informal social protection

Informal social protection can also be binding on individuals. When individuals do not conform to social norms, notably reciprocity norms, they may be sanctioned or even excluded from the group. According to Wood and Gough (2006), dependent mutual aid relationships are typical in social insecurity regimes. Characterised by the absence of formal social protection mechanisms, households are forced to turn to their personal network, at the risk of entering into clientelist relationships (Fafchamps, 1992). These dependency logics are particularly marked among poor households (Gondard-Delcroix et al., 2021; Marques, 2015; Offer, 2012; Wood, 2003). Individuals who do not have the necessary resources to be part of support relationships have two possibilities. They may not be integrated into the support relationships, and thus not

<sup>1</sup> According to the dedicated pages on the FID (*Fond d'intervention pour le développement*) website <https://www.fid.mg/fiavota/> and <https://www.fid.mg/vatsinankohonana-2/>.

benefit from the resources available in the network, or they may seek out their network and enter into dependent relationships (Lubbers et al., 2020; Offer, 2012). These dependent support mechanisms are reinforced by the weakness of intermediary bodies and the lack of formal social protection mechanisms (Wood & Gough, 2006). Thus, the absence of intermediary bodies places individuals in positions of extreme vulnerability in the event of exclusion or non-participation in support networks. In rural areas, there are many dependent support relationships. Sharecropping relationships are particularly problematic in contexts of extreme poverty (Jarosz, 1991). Faced with a lack of available resources, many households are forced to exchange their workforce. Fauroux (2002) describes these dynamics in the western of Madagascar and underlines the importance of dependence networks. These clientelist networks are strongly embedded in social and traditional structures. Thus, exclusion from these local social protection systems can be a major danger for the individual or the household (Wood, 2003).

#### 4. Data

To study the social protection mechanisms in southern Madagascar, the Mapping social networks in the South of Madagascar (MAPNET) survey was conducted between April and May 2019. Survey was conducted in local languages (Antandroy, Antanosy and Mahafale). To guarantee the quality of the data, the interviewers and supervisors were fluent in the local languages and customs. The MAPNET survey was coordinated by Claire Gondard Delcroix. LD participated in the implementation of the field survey, the construction of questionnaires, data verification, and data analysis. Moreover, to guarantee the trust of local populations, the team<sup>2</sup> stayed 15 days in each selected area. This survey collected information from 1200 individuals in 7 villages known as “*fokontany*” in three regions of southern Madagascar (see Fig. 1). The area selection illustrates the diversity of the three southern Madagascar regions: Atsimo Andrefana, Anosy, Androy. Four criteria were used to make this selection: (1) climatic conditions, (2) the presence of development projects, (3) geographical isolation (distance from a large town), and (4) socio-cultural groups.

The MAPNET survey collected mixed data. First, quantitative data characterise 1200 individuals. Descriptive statistics for the data are shown in Table 1. The selection of individuals interviewed within the household ensures a balance between women and men. In this way, the survey captures a diversity of situations. The quantitative survey was structured into three parts: (i) household characteristics (household composition, household income level, assets possessions, household consumption (food, water)), (ii) individual characteristics (gender, age, occupation, shocks experienced during the year), and (iii) individual social protection mechanisms (formal, semi-formal, informal) with a name generator.<sup>3</sup> These data allow the characterization of 1200 individuals and 3622 support relationships, including 2868 interpersonal (informal social protection) and 754 involving individuals with organizations (formal and semi-formal social protection). Data were collected using tablets with KoboToolbox software, with interviews lasting an average of 55 min. Second, qualitative data was collected through semi-structured interviews focused on households’ experiences of managing shocks over a longer period (10 years). The semi-structured interviews lasted an average of 20 min. The responses that came out of these interviews were anonymized in order to maximising protection of participants’ identities and maintaining the value and integrity of the data. In this way, I changed the names’ respondents by other random names. The interview guide was composed of several questions aimed at specifying: (i) the nature of the shocks (year, intensity of the shock,

socio-economic consequences of the shock), (ii) the responses developed by individuals to overcome the shock (solicitation of a person, an organization, or self-response), and (iii) the dynamics of shocks and responses (evolution of support provided, evolution of socio-economic conditions, etc.).

Beyond the use of mixed data, the originality and richness of this survey lie in the bimodal dimension of the egocentric network data (quantitative data). Networks are considered egocentric when the focal point of the analysis is the ego (the individual surveyed) and bimodal when the network’s actors can be of two types. In our case, they encompass both individuals and organizations (Crossley et al., 2015). Drawing from the literature on social protection in vulnerable areas (Devereux & Getu, 2013a; Mumtaz, 2023; Stavropoulou et al., 2017), the collection of quantitative data aimed primarily to capture the diversity of social protection mechanisms accessible to individuals (formal, semi-formal, and informal). In this perspective, the name generator method has been employed to gather mutual aid relationships with both individuals and organizations. Collecting data on interpersonal mutual aid relationships allows for capturing informal social protection mechanisms, while gathering data on support relationships between individuals and organizations enables capturing both semi-formal mechanisms (relationships with local groups, e.g., ROSCA, producers’ organizations, and burial societies) and formal mechanisms (support from exogenous organizations, e.g., national public organizations, international organizations, NGOs, etc.). Given the multiplicity of social protection mechanisms present in southern Madagascar (formal, semi-formal, and informal), this approach is perfectly suited. The utilized name generator is thus bimodal (Crossley et al., 2015). To begin, the respondent lists the actors he or she had called upon to deal with a shock in the last 12 months. The respondents, known as the ego, may enlist two types of alters: individuals and organizations, with a limit of 6 alters (3 individuals and 3 organisations). This cap ensures the capture of primary support relationships. Two reasons explain this limitation. First, during the questionnaire testing stages in southern Madagascar,<sup>4</sup> respondents seldom reported having more than 3 individuals and 3 organisations. Secondly, exceeding this threshold would result in a significantly longer questionnaire duration, potentially compromising data quality due to respondent fatigue. The main limitations of this data collection tool (name generator) are that it is highly sensitive to the respondent’s subjectivity and the respondent memory. During the survey we used a specific solution to support the respondent’s memory: reminding them of the various information’s that said during the first part of the survey (e.g. declaration of shocks, the individual’s participation in an organisation, etc.). Based on this data, three types of variables are constructed to characterize support relationships: (i) individual characteristics of the network actors (ego, alter person, alter organisation), (ii) social relationship and relationship intensity between these actors, (iii) resources exchanged in support relationship (helping hand, lending money, giving money, giving food, etc.).

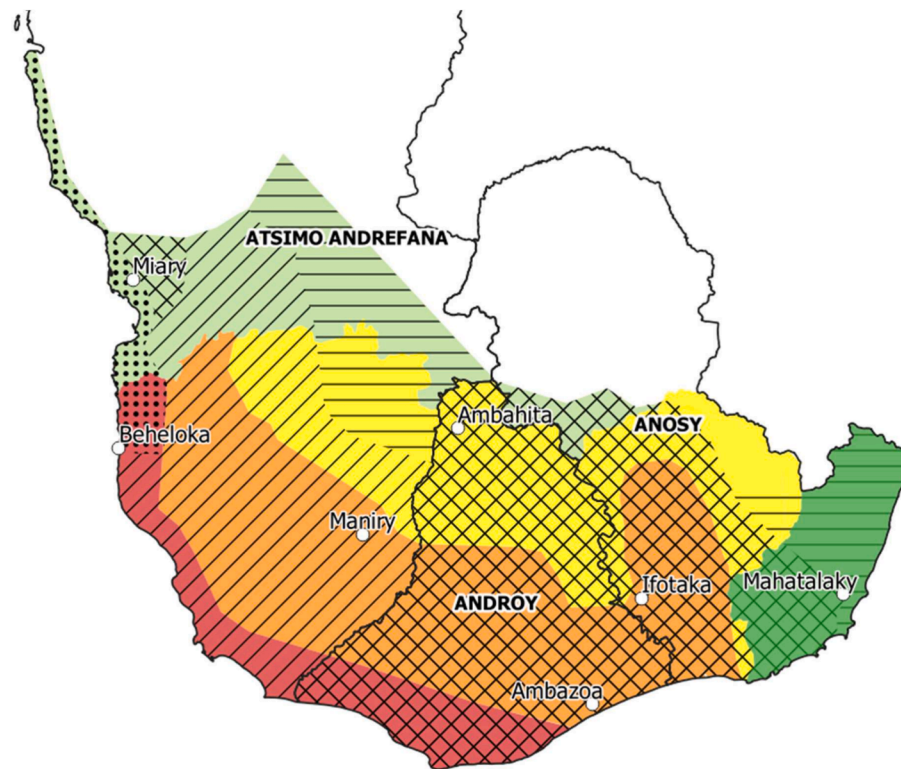
##### 4.1. Reciprocity in informal social protection

The originality of the MAPNET survey is to use social network analysis to collect data on the three types of social protection mechanisms (formal, semi-formal, and informal). I use interpersonal resource exchanges in informal social protection relationships to characterise four categories of reciprocity: symmetrical reciprocity, no reciprocity, and two asymmetrical reciprocity (see Fig. 2). These categories are built based on resource-exchanges between ego and its individuals alter (helping hand, lending money, giving money, giving food, etc.). Symmetrical reciprocity characterizes that ego and alter exchange the same resources in the support relationship. The “no reciprocity” category

<sup>2</sup> The survey team was composed by three supervisor in each region (Atsimo Andrefana, Anosy, Androy) and 8 interviewers in each region.

<sup>3</sup> “During the past year (between 0 and 12 months), have any individuals/organizations helped you to cope with the various difficulties you have faced?”

<sup>4</sup> The qualitative and quantitative questionnaires were tested in the Astimo Andrefana region.



**Fig. 1.** Sampling areas of the MAPNET Note: Colors present the climates in southern Madagascar. Red stands for very arid climate, Orange for arid climate, yellow for sub-arid climate, and finally green for humid climate. The shapes in the map present the ethnicities. Areas with dots present the Vezo, the horizontal straights the Antanosy, the oblique straights the Mahafaly, and the small square the Antandroy. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

characterizes the fact that ego did not return the help to the person who helped him. And finally, asymmetrical reciprocity characterizes that ego and alter exchange not the same resources, one of the two gives his physical strength. To clarify the difference between the two asymmetrical categories, I propose to use “Alter dominated” and “Ego dominated” (see Fig. 2).

These two categories of asymmetrical reciprocity are based on a broad literature that has studied support relationships in rural contexts (Fafchamps & Lund, 2003; Platteau, 1997; Stavropoulou et al., 2017). These asymmetrical support relationships link wealthy individuals in need of labour with poor individuals possessing labour power but limited resources. These patron-client relationships play a crucial role in both protecting and dominating the poor individuals. Following Stavropoulou et al. (2017), sharecropping arrangements are an illustration of these patron-client domination logics, tying the poor to wealthier landlords. The construction of the reciprocity variable largely relies on this literature, which suggests that the exchange of physical resources for the loan or donation of resources underlies domination dynamics.

By applying this approach to the 2868 support relationships, I characterise 2102 of them (see Fig. 2). Table 2 shows the distribution of the different reciprocal relationships. The reciprocity categories are built based on resource-exchanges between ego and its individuals alter. Symmetrical reciprocity characterizes that ego and alter exchange the same resources in the support relationship. No reciprocity characterizes the fact that ego did not return the help to the person who helped him. Asymmetrical reciprocity characterizes that ego and alter exchange not the same resources, one of the two gives his physical strength.

#### 4.2. Living conditions

To test the first hypothesis, I use two types of variables. First, two variables measure individual livelihoods. I include a variable that

captures the individual perception of personal income<sup>5</sup> and other variable that counts the number of assets owned by the individual (see Table 1). MAPNET survey collected information about eight assets: the bicycle, the cart, the motorbike, the phone, the plough, the radio, the solar panel, and the television.

Second, to consider the shocks that influence directly living conditions, I use eight binary variables that provide information on whether the household has suffered a shock during the 12 last months. These binary variables characterize shocks linked with health, agricultural cultivation, crime, food safety, livestock, housing, social obligation,<sup>6</sup> and payment of school fees (see Table 1).

#### 4.3. Social support networks

To take into account the characteristics of social support networks, I integrate two dimensions: the relational and the structural dimension (see Table 1). First, for the relational dimension, I integrate the type of social relationships (nuclear family, extended family, out of family) and the intensity of the relationship (frequency of interactions). Secondly, to integrate the structural dimension, I use the network size (number of organisations, number of people), and the network constraint.<sup>7</sup>

<sup>5</sup> “Is your income sufficient to meet your needs?” (Binary variable).

<sup>6</sup> Social obligation shocks are all difficulties related to social and community events (e.g. expenses for a wedding, baptism or funeral).

<sup>7</sup> The *Burt* constraint measures the level of cohesion between the respondents alters. The higher the indicator, the fewer structural holes. The concept of structural holes developed by Burt (2001) identifies the absence of a relationship within a triad. This lack of relationship gives an advantage to the person who bridges the two individuals who are not directly related.

**Table 1**  
Descriptive statistics of variables.

Individual characteristics (Ego)	Category	Part (%)	N	N
Income	Sufficient	20.85	245	1175
Age	40.56 (Mean)	14	95	1192
		(Min)	(Max)	
Sex	Woman	56.80	677	1192
Religion	No	10,4	124	1192
Marital status	Single	230	19,3	1192
Education	No education	51.85	618	1192
	Primary	30.62	365	1192
	Secondary	17.53	209	1192
Income-generating activity	Agricultural employee	15.32	185	1192
	Non-agricultural activity	16.86	201	1192
	Agricultural employee	67.62	806	1192
Location of activity	In the fokotany	83.56	996	1192
	Out of fokotany	16.44	196	1192
Structural dimension (Network)	Mean	Min	Max	Number
Burt' Constraint	0.644	0	1	1179
Number of personal link	2.406	0	3	1179
Number of organizational link	0.632	0	3	1179
Relational dimension (Network)	Category	Part (%)	N	N
Type of relationship	Nuclear family	43.91	923	2102
	Extended family	39.20	824	2102
	Out of family	16.89	355	2102
Individual characteristics (Alter)	Category	Part (%)	N	N
Social function alter	Specific social function	6.90	145	2102
Type of organisation	No organisation	51.34	612	1192
	Production organization	10.04	215	1192
	Exogenous organization	11.33	135	1192
	Community organization	19.30	230	1192
Age	40.80 (Mean)	7 (Min)	99	2102
			(Max)	
Sex	Woman	45.44	955	2102

Note: The table allows for the characterization of several dimensions: (i) the characteristics of the respondents (ego), (ii) the characteristics of support network characteristics (structural and relational dimensions) and finally, (iii) the characteristics of the individuals or organizations present in the support network.

**5. Mixed method**

The complex nature of reciprocity norms in contexts of extreme poverty necessitated the utilization of a study design that integrates both quantitative and qualitative methodologies. I employed an explanatory sequential mixed methods approach in two distinct phases (QUAN → QUAL) (Creswell, 2015; Kuper et al., 2016). Initially, I conducted an econometric model (Phase 1) to examine two hypotheses, followed by qualitative interviews (Phase 2) to explore these two hypotheses. Both phase of this approach were given equal importance.

**5.1. Phase 1**

For the Phase 1, I use a multinomial logistic regression model. The dependent variable of the model characterizes four categories of reciprocity for 2102 support relationships (see Table 2). For the independent variables, I use variables related to social support network and living conditions variables (see Table 1). This multinomial logistic regression

was conducted to test two hypotheses. First hypothesis, there is a link between living conditions and the different reciprocity categories. It suggests that poor individuals tend to engage in asymmetrical support relationships (Mumtaz, 2023; Wood, 2003; Wood & Gough, 2006). In rural contexts, these types of relationships are perfectly illustrated by sharecropping arrangements, which demonstrate patron-client domination logics (Fafchamps, 1992; Stavropoulou et al., 2017). From this perspective, this article will empirically test this hypothesis, by crossing the variable characterizing the reciprocity categories and the variables characterizing living conditions.

The second hypothesis suggests a relationship between support networks characteristics and reciprocity norms. Following the literature, I propose to test several relationships to investigate this second hypothesis: (i) the presence of semi-formal mechanism in support networks is correlated with the development of symmetrical reciprocity (Devereux & Getu, 2013a; Stavropoulou et al., 2017; Wood & Gough, 2006); (ii) the social embeddedness of support relationships is related with reciprocity norms in support relationships. Conversely, support relationships outside close social circles are more likely to be correlated with a lack of reciprocity (Devereux & Getu, 2013a); (iii) the social status of alters is correlated with the formation of asymmetric support relationships (Fafchamps, 1999; Mumtaz, 2023).

**5.2. Phase 2**

For the Phase 2, a deductive thematic analysis was conducted on the semi-structured interviews to further explore the quantitative findings. This analysis focused specifically on the two hypotheses of our study: (i) the relationships between living conditions and reciprocity norms, and (ii) the relationships between support networks characteristics and reciprocity norms. Therefore, considerable attention was devoted to identifying instances that illustrate these two hypotheses within the transcripts of the semi-structured interviews. LD conducted these thematic analyses using Word software. This qualitative approach offers insights into the complexity and dynamics of social protection mechanisms (Bilecen, 2020; Bilecen, 2013; Dankyi et al., 2017). Consequently, this method complements the quantitative approach effectively.

**6. Results**

**6.1. Better living conditions are associated with durable support relationships**

**6.1.1. Available resources and dependency in support relationships**

The results presented in Table 3 identify a link between living conditions and reciprocity categories. The significance of the variables income perception and number of assets underlines a correlation between living conditions and reciprocity with dependency. How to explain the link between living conditions and inter-relational dependence? The analysis of the marginal effects of the multinomial logistic regression, presented in Table 3, gives us an idea of the importance of the phenomenon. The marginal effects, unlike the multinomial logistic model coefficients, can be interpreted directly. Marginal effects measure the probability's sensitivity of being in a reciprocity category to changes in the explanatory variables.

A sufficient income to meet one's needs is associated with a probability decrease of 5.9 percentage points of being in a support relationship in which ego is under domination, all other things being equal. The link between living conditions and reciprocity types is also visible by observing the significance of the asset score variable for the four dependent variable modalities (see Table 3). From this perspective, the more assets individuals have, the more likely they are to develop support relationships in their favour (symmetrical or ego-dominated). The maintenance and development of social support networks presuppose that its members have the necessary resources to respect mutual support. Poorest individuals, lacking the resources to exchange, are

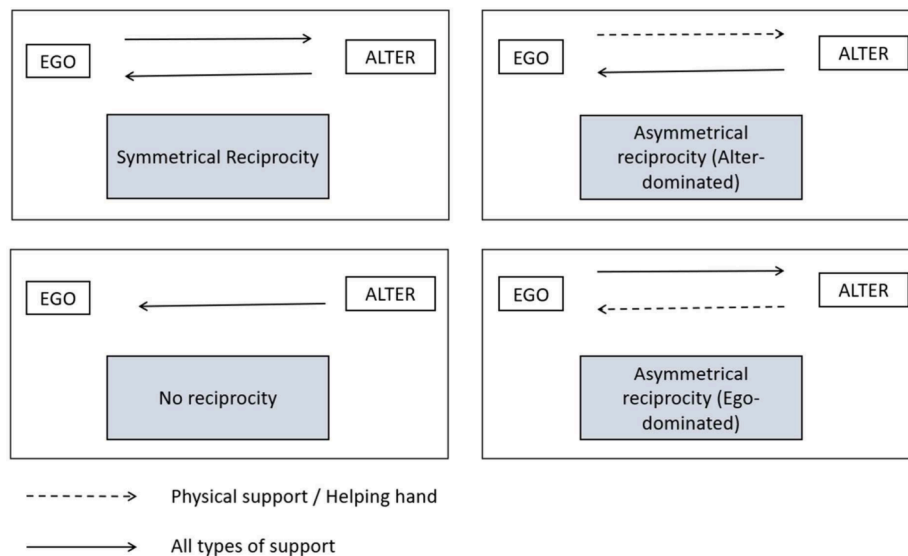


Fig. 2. The categories of reciprocity in informal social protection.

Table 2  
Distribution of the four categories of reciprocity in the database.

Different categories of reciprocity	Number of links	(%)
No reciprocity	402	14.02
Symmetrical reciprocity	776	27.06
Reciprocity dominated by alter	681	23.74
Reciprocity dominated by ego	243	8.47
Relationship cannot be qualified*	766	26.71
Total	2868	100

Note: \*Apart from the exchange of physical force, I cannot qualify the dependence between two individuals who exchange different resources. Indeed, I haven't data on the value of the resource-exchanges between ego and its individuals alter.

excluded from social support networks or integrated into dependent support relationships. There is a vicious circle between dependency and individual's capacities to cope with a shock. The more individuals need protection, the weaker the protection.

In the absence of available resources, individuals have two options. Firstly, the individual engages in a dominant support relationship. Poorest individuals will be more inclined to accept exchanges that are not necessarily beneficial to them but allow, at least in the short term, to overcome the consequences of the shocks. Such situations lead to the establishment of dependent relationships. In southern Madagascar, support mechanisms that involve a dependency logic are recurrent. A relatively large proportion of the individuals interviewed only have their physical strength at their disposal to respect the reciprocity conditions. Many semi-structured interviews can report such trajectories of dependence in support relationships. Maurice's interview reflects this process:

"There was my nephew's decease. For the ceremony, I had to find goats and rice. Mrs. Bénédicte gave me what I needed. In return, I worked at her house to pay her back. For example, I can work at her house during the bean season. When I have a problem, I take something from her and then she decides what work I have to do. I usually work in the field or water her crops when her engine is running." (Divorced man, Agricultural Worker, 49 years old, Iotaka).

As the second option, the individual may also self-exclude or be marginalised from social support networks. Some people experiencing poverty do not use socialised support mechanisms. Individuals who do not fulfil the requirements for the networks' functioning, particularly

Table 3  
Marginal effects of multinomial logistic regression.

	No reciprocity	Symmetrical reciprocity	Alter-dominated reciprocity	Ego-dominated reciprocity
Income perception	0.011	0.046*	-0.059**	0.003
Number of assets	-0.019***	0.022***	-0.016**	0.013***
Food shock	-0.023	-0.055	0.159***	-0.082***
Disease shock	-0.044**	-0.009	0.058**	-0.005
Social obligations shock	-0.023	-0.009	0.059**	-0.028*
Burt Constraint	-0.249***	-0.124	0.116	0.008
Number of organisational links	-0.079***	0.076***	0.003	0.001
Number of individual links	-0.018	0.036	-0.002	-0.015
Extended family <sup>(a)</sup>	0.095***	-0.072***	0.047**	-0.071***
Non-family <sup>(a)</sup>	0.272***	-0.115***	-0.058**	-0.099***
Social function of alter	0.012	-0.037	0.096**	-0.072***

Significance level of model variables \*\*\* p < 0.01, \*\* p < 0.05, \* p < 0.1. \*. Note: (a) The two modalities concerning the type of relationship variable are identified according to a reference category: close family.

The Table represents the marginal effects of multinomial logistic regression. The dependent variable is a categorical variable with 4 reciprocity modalities. Following Freese and Long (2000) several tests were carried out to ensure the robustness of the model. I performed the Wald test which confirms the independence of the variables used in the model. I also applied the Independence of Irrelevant Alternatives test, which allows me to confirm the independence of the dependent variable categories. Pseudo R2 = 0.2399.

Source: Author.

the reciprocity norms, may be excluded from risk-sharing mechanisms. This is not only an economic problem, this marginalisation from support groups often goes hand in hand with exclusion from social groups. The embedding of networks in social groups such as family, clan, or community affects the individual's reputation. Mrs. Claire's story provides an insight into the consequences of marginalisation from social support networks:

"I have no one to borrow from except my best friend and my boss. I take rice to feed the children and 100,000 Ariary per month. The others don't trust me, and even my brother won't help me. He is well aware that I am also in trouble and he is looking for someone he can trust (to pay back)." (Married woman, non-agricultural activity, 41 years old, Ifotaka).

To avoid exclusion, some individuals prefer to exclude themselves from support networks. In addition, out of fear of shame, exclusion from the group, or becoming dependent, some individuals do not seek social support. Therefore, these individuals are particularly vulnerable.

## 6.2. Shocks keep individuals in relational dependency.

I Also identify a link between the dependent variable and the occurrence of food safety shocks and social obligation shocks. According to Table 3, the variable that captures whether the individual has experienced a food safety shock in the past 12 months is significantly and strongly correlated with both types of dependent reciprocity. Specifically, having experienced a food safety shock is associated with a probability rise of 15.9 percentage points of being in a support relationship where ego is dominated. Marie's account helps to illustrate the link between food safety shocks and dependency in support relationships

"There are times when we have no harvest when there is no rain. Our children go to school, two study in Bekily and one here. Those who are in Bekily have difficulties with their studies because we don't have enough harvest to pay the school fees. And they went to school only in April because we had the groundnut harvest to pay their fees. Normally we raise chickens and sheep. We have nothing left at the moment because of the famine. The famine was heavy, and we had no agricultural products left because we were selling them and consuming them with our children. We asked Mrs. Chrystelle and Mrs. Helene for help with food. We also asked Mr. Antoine for help. We borrowed money from him to buy food for the children during the famine. We were also affected by an illness. So, we borrowed money from Mr. Antoine to buy medicine. This happened about two years ago (in 2017)." (Married woman, Farmer, 38 years old, Ambahita).

This finding appears central to understanding support mechanisms in southern Madagascar. The region is regularly faced with *kéré*. This problem is generally caused by climatic conditions that impact the main activity: agriculture. When this covariant shock occurs, it is generally the whole community that is impacted. All network members experience a relative scarcity of available resources. Ultimately, this scarcity facilitates the establishment of dependence on support relationships.

Shocks related to social obligations are also related to reciprocity norms. In Table 3, social obligation shock's variable is significant for two reciprocity categories: Alter-dominated reciprocity and Ego-dominated reciprocity. These results are in a similar direction to the ones identified for food safety shocks: experiencing a shock favours the development of dependent support relationships. In the interviews, many individuals insisted that social events, such as weddings, baptisms, funerals, or circumcisions, can constitute shocks. The costs of staging such events are relatively high for individuals. The link between social obligation and dependent relationships can be explained by the proximity of social support networks and social groups (family, community, clan...). The individual prefers to engage in a dependent relationship rather than not respect the collective expectations. Excluding oneself from support networks also means excluding oneself from the family, community, or even professional networks. Mr. Mathieu's testimony illustrates the link between social obligations and vulnerability issues:

"Four years ago, because of my wife's grandfather's dead, we were given the obligation to provide a zebu. A year ago, her grandmother died, so they asked us for a sheep. We had to borrow money for it.

Then, not long ago, I got sick. I had to borrow money with interest: in total, we paid back 260,000 Ar. We sold our groundnut crops to pay off this debt and now we have nothing." (Married man, farmer, 36 years old, Ambahita).

The presentation of the quantitative and qualitative results confirms the truth of the first hypothesis. The individuals' living conditions are closely linked to the different reciprocity categories. More precisely, individuals who do not have the necessary resources to satisfy their needs and overcome shocks are more inclined to develop dependent support relationships. This result attests the presence of a vicious circle between individual means of protection and socialised support mechanisms. Support relationships are only really beneficial for those individuals who have the necessary resources.

## 6.3. Support networks and reciprocity types

I Structure the presentation of this subsection in three points to have an overall view of the link between support networks and reciprocity norms. These three points take up the three dimensions of support networks: structural, relational, and individual

### 6.3.1. Organisation and reciprocity norms

The number of support relationships with organisations is related to the no reciprocity category and symmetric reciprocity category. These results highlight the importance of local organisations in developing non-dependent support relationships. They allow the formation of symmetrical support relationships. The examples of ROSCA or producers' organisations demonstrate the importance of organisations in developing and maintaining balanced support relationships. Many accounts report the importance of local organisations in managing individual shocks. To illustrate this result, the testimony of Mrs. Aina:

"We are members of the Voamamy association (ROSCA). We pay money into the association's fund. We save 500 Ar per week. When I fall ill, I can borrow from the association and pay it back later. This association is our life insurance." (Divorced woman, Agricultural worker, 35 years old, Beheloka).

I Also expected to identify a link between the number of interpersonal support relationships and the dependent variable. However, the results in Table 3 are not significant enough. This can be explained by the importance of the social status's alter in the dynamics of dependence. Beyond the number of people solicited, it seems that social status is a critical element in the formation of support relationships under dependence. In addition to the number of support relationships, another structural dimension appears to be important in Table 3: The network constraint. As a reminder, this variable measures the level of inter-relationship between alters in the egocentric network. As the network constraints decrease, the probability of being in a non-reciprocal support relationship increases. Thus, structural holes in the egocentric network (as measured by network constraint) tend to increase the probability of being in a non-reciprocal support relationship. Therefore, when the relationships between the alters in the network are weak, the individual is more likely to engage in non-reciprocal support relationships

### 6.3.2. Reticular embedding of support relationships and reciprocity norms

The embedding of support relationships in the non-family group is significantly related to the four categories of reciprocity. In Table 3, seeking support outside the family circle is associated with a non-reciprocal support relationship. I find roughly equivalent results for ties developed in the extended family, except for the alter-dominated category. From this perspective, the closer support ties are in social spheres, the more the norms of reciprocity are binding. In Table 3, for the relationships developed in non-family groups, I can identify an opposite relationship between the no reciprocity category and the other

three reciprocity categories. The consequences of not respecting reciprocity norms are less important in relationships outside family groups. Reciprocity norms within the family circle allow for practices that involve collective reciprocity. For certain shocks, the household members develop common strategies. Thus, the close family allows the development of support mechanisms. Stephanie's account illustrates the importance of the close family circle in managing individual shocks:

"In everyday life, it is my parents, my older brothers, and my sisters who help us solve our problems. And vice versa, since we also help them when they have problems. Only the people closest to us can help us when we have problems because they understand our problems, unlike people who are not related to us." (Married woman, Farmer, 25 years old, Mahatalaky).

Thus, the embedding of support relationships in diverse social groups plays an important role. It also reflects the social complexity of support relationships. As suggested in the introduction, the analysis of support relationships must take into account this complexity.

### 6.3.3. Dependency in support relationships and alters' social status

Table 3 identifies a link between dependent support relationships and the alter's social status. Soliciting the support of a person with administrative, religious, or even symbolic responsibilities can be the source of a dependent relationship. Anna's account illustrates the problem of dependency in support relationships between poor individuals and the notables:

"With our problems, there is only one person we can ask for help, and that is Mrs. Karen. She helps us financially or with food. This support is not enough in the long run, but it is for day-to-day survival. We can't take a lot of money like 100,000 Ar because we can't pay it back. So, we can borrow just what we eat in the evening or at lunchtime. She gives us whatever we want (food or money) but we think about how to pay her back. If we don't pay it back, we have problems. So, we refrain when we go to her house to get something." (Second wife, non-agricultural activity, 41 years old, Ifotaka).

The differences in social status between the ego and its alters, imply inequalities in accessing economic, social, and symbolic resources. These inequalities can lead to support relationships under domination. We argue that beyond the social status of the alters solicited, it is the socio-economic differences that are linked to dependency in support relationships.

## 7. Conclusion and discussion

This article examined the relationship between dependency and reciprocity norms, employing a mixed method and egocentric bimodal support network to investigate the determinants of reciprocity norms within support relationships. It underscores the importance of a comprehensive understanding of social protection mechanisms (Bilecen, 2020; Bilecen, 2013; Devereux & Getu, 2013a), considering the diversity of formal, semi-formal, and informal mechanisms, as well as their interdependencies.

Through analysis of living conditions and support network characteristics across four reciprocity categories, several significant findings emerge. First, the study indicates that the poorest individuals are less inclined to integrate profitable informal social protection mechanism (e.g. symmetrical informal social protection, semi-formal social protection). Additionally, food safety shocks disproportionately subject a significant portion of the population to dependent social relationships. This result underlines the difficulty of informal social protection mechanism to manage covariant shock (Stavropoulou et al., 2017). This result also underscores the existence of a vicious cycle wherein an individual's protective means and socialized support mechanisms are intertwined. Informal social protection tends to benefit only those with adequate resources (Wood, 2003). This result confirm the Mumtaz findings in

Pakistan, patron-client relationships negatively impact the poor through asymmetrical and exploitative informal relations (Mumtaz, 2023). In addition, the results highlight that food safety shocks place a large part of the population under dependent social relationships. This finding is similar to the result of Günther & Harttgen (2009), where covariate shocks have a relatively higher impact on rural households.

Second, the article underline several results that confirm the second hypothesis. First, the presence of informal social protection mechanisms in the support network is correlated with symmetrical reciprocity. According to Small and Gose (2020), participating in an organisation facilitates forming support relationships. Belonging to the same collective allows the development of support relationships without domination. According to these authors, organisations play a brokerage role in the formation of support relationships. Moreover, the interaction of organisations' mechanisms of community life allows a mutualisation of risk. It is common to observe support funds within the community and religious organisations. Described as semi-formal social protection by Stavropoulou et al, (2017), these collectives are effective means of protection for individuals without necessarily leading to the formation of dependency. Second, social embedding of support relationships is related to reciprocity norms. The further the relationship is located in distant networks, the more absence of reciprocity there is.

Finally, the high social status of alters is correlated with asymmetric reciprocity norms. This confirms the importance of patron-client relationships in poor rural areas (Fafchamps, 1992; Mumtaz, 2023; Stavropoulou et al., 2017).

### 7.1. Limitations

This article faces several limitations. Firstly, while the MAPNET database identified support relationships, it couldn't characterize the quantity and quality of social support exchanges. In regions like southern Madagascar, quantifying the value of resources exchanges between two individuals is exceedingly complex. A solution could be to qualitatively analyse the perception of the value of elements exchanged between individuals. Secondly, using cross-sectional study for the quantitative data alone doesn't provide us with a dynamic understanding of support relationships and reciprocity issues. Reciprocity issues are inherently evolving and fluid. While integrating mixed approaches partially addresses this problem, implementing a panel survey would enable us to understand the evolution of reciprocity norms over time, particularly in response to a shock. Thirdly, survey conditions may have influenced data collection, particularly due to security problems. These issues could have impacted site selection. Indeed, accessing certain areas is complicated due to security conditions and the inability to ensure safe working conditions for survey teams. Consequently, it would be interesting but challenging to implement similar analyses in areas significantly affected by security concerns. This raises the question: Do these conditions of insecurity lead to changes in reciprocity norms and broader aid structures?

### 7.2. Rethinking formal social protection mechanisms in extreme poverty contexts

The methodological approach developed in this article provides an opportunity to rethink the development of formal social protection mechanisms. Despite the significant expansion of social assistance programs in vulnerable regions (Gentilini et al., 2020), their implementation faces several challenges, including targeting beneficiaries, sustainability of funding, and adaptation to local contexts (Olivier de Sardan & Piccoli, 2018). The failure to consider semi-formal and informal social protection mechanisms represents a major limitation in the development of public policies in this field. The interaction between formal, semi-formal and informal mechanisms is increasingly studied in the literature (Du Toit & Neves, 2009; Mumtaz, 2023; Visser et al., 2018), but such analysis is still insufficiently integrated into the design

of social protection programs in extreme poverty areas. In this perspective, this article offers a methodological possibility to take into account the diversity and interaction of formal, semi-formal, and informal mechanisms in the implementation of social protection programs. This approach, for example, highlights (in a specific context) the importance of semi-formal social protection mechanisms and their interaction with dependency relationships within support networks. The simultaneous analysis of this plurality of social protection mechanisms offers new perspectives in the establishment of formal social protection mechanisms.

### 7.3. The challenges of climate change and pandemics?

The necessity to enhance the complexity of social protection mechanisms arises from the intensification and complexity of social risks. Climate change and pandemics underscore the importance of rethinking current formal social protection in areas of extreme poverty. These risks intersect with environmental, ecological, economical, nutritional, health, social, and agricultural issues. Therefore, it is crucial to reconsider formal social protection mechanisms. The increasing frequency of climate-related risks, particularly in areas of extreme poverty such as southern Madagascar (Rigden et al., 2024; Weiskopf et al., 2021), alerts us to the necessity of devising new social protection models that adopt a comprehensive approach to risks encompassing environmental, social, economic, and health aspects (Bowen et al., 2020; Sahel, 2016; Tenzing, 2020). Programs of this nature, often termed adaptive social protection (see for example World Bank, 2017), only partially address these challenges. This program has several limitations: (i) coverage rates are inadequate compared to the protection needs of populations, (ii) the funding model is not sustainable, and (iii) programs often overlook semi-formal and informal mechanisms, as well as local contexts. This article underscores the necessity of a more complex approach to social protection mechanisms, which would integrate (i) the social embedding of social protection issues in relation to the diversity of social protection mechanisms (formal, semi-formal, informal), and (ii) the complexity of social risks (climate-related, one health issues, etc.). This systemic approach is critical in the development of public social protection programs. Unfortunately, the implementation of public social protection policies in poor regions is far from meeting this objective (Olivier de Sardan, 2021). As I pointed out in the introduction, the Covid-19 crisis provided a window of opportunity to implement cash transfers in developing countries. Almost all of them have settled up cash transfer systems (Gentilini, 2022). Isn't time to take advantage of this impetus to rethink these systems as an integral part of social mechanisms? In other words, to encourage local adaptation of these systems.

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### CRedit authorship contribution statement

**Léo Delpy:** Conceptualization, Formal analysis, Investigation, Methodology, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

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The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Data availability

Data will be made available on request.

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