

Land Tenure Security and Access to Finance of Agricultural Households in Cameroon

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Abstract

This study investigates the relationship between the land tenure security and the financing of agricultural households. The study uses data from the third Cameroun Household Survey (ECAM3), carried out by the National Institute of Statistics in 2007. The study has two objectives. The first objective investigates the effect of the land tenure security on the access to finance of agricultural households; the second assesses the impact of the land tenure security on the volume of credit extended to agricultural households. The regression switching model is used. The study assumes formal and informal financing sources. The empirical results reveal different impact of land property rights on the access to financing of the agricultural households. Precisely, the legal land title improves by 5.4% the possibility to access to formal financing. On the other hand, the land title, whether legally or customarily defined, increases by 20% the possibility of access to informal financing. Such results imply a double orientation of economic policy. The first should set up a financing scheme adapted to rural environment. The second should aim to reconcile the legal and customary land property rights in order to ensure higher economic efficiency of the land property rights.

1. Introduction

Neo-institutional theory provides a coherent and formalized theoretical framework to investigate the relationship between the property rights and investment. According to North (1990), economic institutions such as the structure of property rights are paramount for economic and social achievements. The institutions help to allocate resources to the most efficient uses. In the neo-institutional theory, property rights reduce market imperfections and improve economic efficiency. This theory triggered a set of works that include the relationship between land law and agricultural finance. This issue is a priority in the development agenda in sub-Saharan African countries.

In Sub-Saharan Africa, agricultural activity is perceived as particularly risky, whether regarding price volatility of agricultural products or considering the uncertainty affecting production. For a financial institution, these factors represent a high repayment default risk that is difficult to assess. Faced with such risk, financial institutions require collateral that all the agricultural producers cannot provide (land title and other goods) and consequently charge generally high interest rates. According to the World Bank (2017), 80% of agricultural households in sub-Saharan Africa are excluded from the financial system. For Stiglitz (1981), this exclusion is due to imperfect competition in the financial and agricultural markets, characterized by a strong information asymmetry and high transaction costs. In the presence of imperfection in the credit market, economic theory proposes confidence instruments based on collateral and land rights (Demsetz, 1967; Armen, 1969). For the economic theory, such instruments help reduce uncertainties linked to imperfect contracts.

In most sub-Saharan African countries, agricultural households generally have land capital whose property rights would need to be clarified so as to reduce uncertainties vis-à-vis the credit market. Besley (1995) indicated that land law ensures a better allocation of resources in the presence of an imperfect credit market. De Soto (2000) considers land capital in its traditional form as a “dead capital”. For De Soto (2000), a system of legal land property laws can transform the dead capital of the poor into “active capital”. In this regard, economic theory establishes a close correlation between land law and access to finance by agricultural households.

This idea triggered many land reforms around the world. Those reforms led to far-reaching land securitization programmes. Many studies examined the effects of such programmes on the access to finance by agricultural households. The empirical results of those studies reveal mixed effects, which may be either positive (Abdoulaye,

2017; Adamon et al., 2017; Buehren et al., 2017) or negative (Barrows and Roth, 1990; Feder and Feeny, 1991; Mushinski, 1999; Dower and Potamites, 2005; Fleisig et al., 2006; Mellor, 1996; Lawry et al., 2016)

Despite the numerous studies, the issue of the relationship between property rights and financing of the rural sector is a priority in the development agenda of sub-Saharan African countries. The empirical results of previous studies are mixed and inconclusive. Furthermore, the previous studies rely on the hypothesis of superiority of legal land property rights. In fact, the institutional framework in many countries in Sub-Saharan Africa is marked by the coexistence of both regimes, legal and customary land tenures. While legal land tenure is inspired by considerations from Western positive law, customary land tenure is created and maintained by the community itself. In its original form customary land tenure is based on social trust, which gives it a strong capacity for resilience and flexibility.

In Cameroon the low level of credit supply to agriculture persists. Empirical results suggest the reduction of risks in the economic environment on which depend the solvency of agricultural households and securitization of the loan repayment. While the issue of financing agricultural households is highly debated in Cameroon, by contrast, the issue of the link between financing and land tenure security has not been investigated enough in scientific works.

The objective of this study was to examine the effects of land tenure security on access to financing of agricultural households in Cameroon. It specifically assessed two issues: first, the influence of land tenure security on access to credit by agricultural households and second, the impact of land tenure security on the volume of credit extended to agricultural households.

This study is particularly relevant at least for two reasons. First, the study is justified in a context marked by the coexistence of two land property regimes, notably the legal and customary land property regimes. In fact, Cameroon recognizes the equality of the two regimes. Previous studies have been more interested in the impact of land securitization programmes on the classical credit. They were carried out under the hypothesis of customary non-market tenure, hence non-transferable. Yet Cameroonian rural communities rely on a socio-cultural trust that underpins the legitimacy of the customary land property regime. This legitimacy can constitute an efficient instrument as a guarantee to financing.

Second, previous work is exclusively interested in the access to credit. Yet, the credit is useful when it not only increases the production capacity of the agricultural households, but also helps households face the uncertainties of agricultural production. The agricultural activities in the rural areas are subject to many risks, notably economic, technological and environmental risks. These risks sustainably implies mobilizing important financial resources. Yet, both land tenure regimes are underpinned by a different legal basis and degree of trust, which if accounted for, can affect the volume of credit extended.

This study contributes to a better understanding of the link between property rights and agriculture sector financing. The remainder of the paper is structured as

follows: the next section clarifies the institutional evolution of the question related to the financing of the agriculture sector in Cameroon. This is followed by the literature review. Section 4 presents the methodology used in the study and Section 5 discusses the empirical results. The final section concludes the paper and outlines the policy implications of the study.

2. Institutional developments of the agricultural sector finance

In Cameroon agriculture sector financing has long been of great concern. It manifests in two economic models: the interventionist model and the neo-liberal model. The first model allowed the government to have a predominant role in the financing the sector. During almost two decades after independence, government financing was implemented through two institutions, namely the National Fund for Rural Development (FONADER) and the Agricultural Bank of Cameroon (BAC). The numerous economic crises experienced in the 1980s, associated with poor strategic management led to the bankruptcy of the two financing structures. The results of the experience did not meet the expectations. In this regard, less than 20% of the mobilized resources were allocated to the agriculture sector during this period (Fouda, 2003). The inconsistency between the financial services delivered by the State and the rural conditions are the main explanation of the failure.

Since the early 1980s the withdrawal of the State from economic activity was advocated. A new model was adopted, one that relied on private financing. The new model was based on neo-liberal economic theory. In this model, the banking market plays a predominant role. However, at the beginning of the 1980s Cameroon's economy was characterized by low development of the banking system development, resulting from the controlled management of the post-colonial financial system. This system was not favourable to efficient financing of the rural sector. The subsequent liberalization of the financial system led to diverse development of the commercial banks. Unfortunately, the capital structure of the banks, which were predominantly located in urban areas, did not improve access of the rural sector to financing. In this regard, according to Central African Banking Commission (CABC, 2018), only 3% of agricultural households obtained credit from the existing commercial banks. It is in this context that the informal financial system took the lead as the main financing instrument of the rural sector. According to CABC (2018), the informal financing system accounts for 93% of total credit obtained by agricultural households.

During the 1990s microfinance institutions experienced strong development that created an additional source of financing to rural households. The underlying idea of the new paradigm is to associate the financial return to social return supported by specific financial services fitting the socio-economic conditions of the rural sector. Since the first year of their operation, the relative weight of credit extended

to the economy by the microfinance institutions stood around 14%. Only 4% of the financing was channelled to the rural agriculture sector (CABC, 2016). The economic environment of the 1990s which was linked to competitiveness requirement reinforced the conditioning package of access to the new financial services. In this context, the extension of credit from microfinance institutions focused more on the urban areas; this further reinforced the exclusion of the rural areas from the access to microfinance credit.

Previous studies carried out on financing the rural sector in Cameroon show that the rural agricultural households are excluded from access to financing due to lack of collateral (Kamajou, 1978; Fouda, 1988; Foko, 1994 ; Fouda, 2003). According to the fourth Cameroon Household Survey (ECAM4, 2014), around 70% of agricultural households are excluded from access to financing. Furthermore, according to the National Institute of Statistics (NIS, 2017), more than 60% of credit extended to agricultural households is collateralized by land titles.

During the two last decades Cameroon has experienced changes in land policies, of which the reform carried out in 2005 puts in place two innovations. The first innovation introduces greater flexibility in the land securitization procedure in Cameroon whose objective is to improve substantially the number of delivered legal land titles. This reform is based on the assumption that the fragility of the property rights does not improve economic efficiency (North, 1990; Tortensson, 1994; Goldsmith, 1995). The second innovation gives full legitimacy to customary land property in contract matters. This second innovation constitutes important progress, as it recognizes primacy and legitimacy to customary land tenure in rural area. The legitimacy granted to customary land tenure aims to reinforce its capacity to act as collateral. From this point of view, the last decade simultaneously registered reinforcement of the private land property in rural areas and an increase of 2% in credit extended to agricultural households (NIS, 2017).

Furthermore, during the last decade, financing of the rural sector and promotion of microfinance institutions (EMF) in rural areas constituted an important component in the documents on Poverty Reduction and Strategy Paper (PRSP) and on Rural Sector Development Strategy (RSDS) in Cameroon. In this context, the country has put in place a supporting programme to promote the development of rural microfinance. This programme was also supported by international organizations such as the Food and Agriculture Organization of the United Nations (FAO) and the International Fund for Agriculture Development (IFAD). This programme allocates in its component an amount of US\$14.1 million (MINAGRI, 2008). This programme aims to increase the financing capacity of smallholders in the rural farming sector. It seeks to set up an appropriate financing system that fits the socio-economic needs of the farmers. One feature of the programme is that it focuses on the customary land tenure as a financing instrument.

3. Literature review

The assumption of market imperfection, justifies the relationship between land tenure security and access to financing in agricultural households. According to Akerlof (1970), the information asymmetry generates a situation where the borrower has more information than the lender on his solvency and the planned use of the credit. Such a situation gives the borrower the ability to benefit from unreleased information and use it at the expense of the lender. To minimize the uncertainties that are inherent to this situation, the economic analysis builds its investigation on the theory of property rights (Demsetz, 1967) and trust (Williamson, 1993; Ferrary, 1999). The point of view adopted by the property rights theory is that of private property, which guarantees the solvency of the borrowers. Regarding the trust theory, the allocation of resources is guaranteed by the reputation of the players. In this perspective, the notion of trust characterizes an institutional or social environment where the players respect their commitment in an honourable way. For Gambetta (1988), trust represents the probability that a person with whom you are dealing achieves a beneficial or at least not harmful action is high enough to engage in any form of cooperation with him. The interpersonal nature of trust may be a condition of cooperation, notably in a context of unequal relationship between the partners. According to Dei Ottati (1994), given the information asymmetry, the trust based on reputation is a personal strategic capital that can be used in transactions which might be difficult to measure.

These theoretical developments led to empirical work, the results of which point to negative and positive effects.

Some studies Petracco and Pender (2009), show that land law, whether legal or customary so far does not have a significant effect on the access to credit (Broegaard et al., 2002; Carter & Olinto, 2003; Denninger and Chamorro, 2004; Galeana, 2004; Angel et al., 2006; Zegarra et al., 2008; Galiani and Schargrotsky, 2010; Lawry et al., 2016). At least two reasons may justify those conclusions. The absence of a formal financial system together with credit rationing to agriculture may undermine the credibility of a land title. Moreover, the land constitutes a safe asset for agricultural households. In this regard, the possibility of losing property rights due to repayment defaults can reduce the level of participation in the credit market. Furthermore, the low value of land can also be an obstacle to access to credit. Likewise, the works carried out by Titus (2009) in Tanzania, show that loans are only extended in high value land areas and to big farms. This evidence contradicts the belief that land title improves access to credit.

Research by Barrow and Roth (1990) and Domeher and Abdulai (2012) shows that in an environment characterized by recurrent land conflicts, having a land title does not guarantee access to credit. This is because land conflicts not only increase the transaction costs for banks but also lower expected financial return. Furthermore, in an environment marked by corruption, the same land title could serve as collateral for two different credit contracts. Such a situation generates legal conflicts which are costly to lenders. Fleisig (2006) indicates that having a land title is not a sufficient condition to get credit. The lenders may also focus on more important factors such as cash flow, internal return and credit history, to ensure that the credit extended will be paid back without the need to realize the collateral. This is because in developing countries there are indeed many legal obstacles to realizing collateral.

With the prospect of checking the relationship between customary land tenure and access to credit research by several authors (Mellor, 1966; Binswanger et al., 1995; Baland and Francois, 2007) reaches the same conclusions. The research shows that customary land tenure is a source of uncertainty and a restraint to credit access.

Despite those negative empirical results, the arguments in favour of positive effect are important. The work by Bouquet et al. (2009) carried out in Mexico and Madagascar, investigates the determinants of access to credit by rural households. According to Bouquet et al. (2009) access to credit is constrained at least by three factors: the poverty of the households, the property rights related to the inadequacy of the land titles and certificates in the case of Madagascar and the restrictions to property seizure conditions in the case of Mexico. The study by Petracco, and Pender (2009) in Uganda, shows that the untransferable land property has a positive impact on access to credit by agricultural households compared to households without land title or with a customary land title. In the same vein, Buehren et al. (2017), assessed the impact of land securitization on the access to credit, investment and production in Ghana. The authors considered the issue from a gender point of view. They concluded that the land securitization policy had a positive impact on the access to credit by the households. However, this impact varies substantially according to the sex of the property owner. When they analysed the issue from the point of view of constrained and unconstrained credit, Abdoulaye (2017) and Adamon et al. (2017) showed that access to credit of by agricultural households is significantly affected by the risk factor and the transaction costs. These studies found that the absence of collateral increases the banks' transaction costs.

The contexts of sub-Saharan African countries are marked mostly by the predominance of customary land tenure. Based on social trust, this system motivated several studies (Basset, 1993; Bruce et al., 1994; Mathieu, 1995; Baland and Platteau, 1998). These studies ascertain that customary land tenure is flexible, dynamic and adjusts to changes. For these reasons, it may play a positive role in access to credit. For these authors, the effect of belonging to a community reduces the information asymmetry, which reduces the insolvency risk.

All this literature ignores the endogenous character of the relationship between land tenure and the credit market. Many studies show that the credit market influences

participation in the formal land market (Stiglitz, 1974; Jaynes, 1982; Binswanger and Rosenzweig, 1986; Colin and Bouquet, 2001). The influence of the credit market on participation in the formal land market operates at two levels: land demand and supply.

Regarding demand, the imperfections in the credit market lead to the exclusion of some households from access to credit. Yet, the acquisition of land requires financing. Only households eligible to bank loan or those which have their own resources are able to formally obtain a piece of land (Feldstein, 1980; Manji, 2010). This context of financial exclusion encourages informal land transactions and fuels land insecurity.

On the land supply side, the imperfections in the credit market oppose two categories of agricultural households: the unconstrained and the constrained households. For the non-constrained households, land is a safe asset. As such, land retention is a strategic precaution, which consequently generates land speculations leading to the increase of land prices. This situation results in the inefficiency of the land market. For the constrained households, an inverse behaviour is observed. To compensate for their limited access to credit markets, those households realize distress sales. These kinds of transactions also imply an inefficiency of the land market and a huge loss of revenues for rural farmers (Bardhan, 1980; Alderman and Paxson, 1992; Laffont and Matoussi, 1995; Colin and Bouquet, 2001; Dercron, 2002; Deininger, 2003).

This literature reveals that the effects of land property rights on access to financing by agricultural households, as well as the direction of the relationship remain controversial. An assessment of the issue in the context of Cameroon requires using an appropriate methodology.

4. Methodological framework

In this section, we first specify the analytical model. Then, we describe the variables and present the data used in the study.

4.1. Model specification

This study aimed to investigate the impact of land security on access to financing by agricultural households in Cameroon. In particular, the study analysed the impact of land security on access to credit by agricultural households, and examined the effect of land security on the volume of credit extended to agricultural households. The access to credit by agricultural households takes place in a context where the agricultural households have to do with two financing sources: internal or external. The internal financing represents self-financing, while external financing implies a formal or informal financing. Based on these considerations, we assume that there are two categories of agricultural households: those in need of external financing and those resorting to self-financing. It implies that the impact of land security will have less effect on the households resorting to self-financing. The volume of credit extended is only observed for persons who are part of the population participating in the credit market, and this may concern a selected group. To take into account of the selected group, it is common to include a bias correction of the sample in the credit equations following the procedure proposed by Heckman (1979)

Furthermore, access to credit can affect land security. The assumption in this case is that households which have access to credit can better secure their land transactions, which implies two kinds of bias: the selection bias and the endogeneity bias. To account for both methodological issues, we use a regime-switching model known as the “Endogenous Switching Regression Model” (Freeman et al., 1998; Lokshin and Sajaia, 2004; Ali and Deininger, 2012). The estimation procedure is implemented in two steps.

In the first step, a selection equation is estimated. This equation allows the selection of the households that participated in the credit market. Assuming that the participation distribution follows the normal distribution law, we use the probit model to estimate the effects of the variables used. Participation in the credit market is modelled as a function of age, squared age, sex, matrimonial status, size of the

household, education level and income. The residuals of the selection equation allows estimation of the control factor of the selection bias. This factor is called Lamda. It corresponds to the inverse of Mills ratio. The estimated value is retained and subsequently introduced in the set of equations of the second step.

In the second step, we estimate two equations. The first equation allows evaluation of the impact of land security on access to credit. Access to credit may be achieved through formal or informal sources. Each source of credit has three components: classical banks, microfinance institutions and non-governmental organizations. Regarding informal financing, the three components include the tontines (Rotary Savings and Credit Associations), money lenders and associations.

The second equation allows one to assess the effects of land security on the volume of credit extended to the households. To estimate the second equation, the formal and informal financing are taken into account.

In a formal way, we present an equation that allows us to select in a probabilistic way the households that are likely to express a financing need. Let the variable B_i represent the financing needs of the households. That variable is assumed to be a binary variable. Moreover, the variable is the result of a latent variable D_i^* which is continuous and expresses the credit demand. We assume that the latent variable is a function of two components: one deterministic component represented by socio-demographic characteristics of the households represented by X_i^* and a random component ϵ_i representing the unobserved variables. We formulate that equation as follows:

$$D_i^* = \alpha_0 + \alpha_1 X_i + \epsilon_i \tag{1}$$

The parameters $\hat{\alpha}$ are estimated using the probit model. From the results obtained, we predict the residuals of the model. This prediction allows the construct the control factor of the selection bias (ρ_i) corresponding to the inverse of the Mills ratio. Based on that selection equation, we formalize the access to credit, and the volume of credit obtained. We assume that these two variables are linked in the sense that the volume of credit is conditional on access to credit.

Let A_i be the variable “Access to credit” assumed to be binary. This variable results from a latent variable A_{ij}^* , which is continuous. Following the formalization of Deininger (2012), access to credit is formulated as follows:

$$A_{ij}^* = \beta_0 + \beta_1 Z_i + \beta_2 S_i + \beta_3 \rho_i + \pi_i \text{ with } j = 1, 2$$

(respectively formal and informal) (2)

In Equation 2, Z_i represents the vector of variables simultaneously influencing access to credit and the volume of credit extended (socio-demographic characteristic and land tenure security). S_i denotes the factors that do not have a direct influence on the credit extended. ρ_i stands for the selection variable corresponding to the inverse of the Mills ratio estimated from Equation 1. π_i represents the error term. The parameters β are the unknown parameters to be estimated.

Considering the two sources of financing, the variable “Access to credit” may be expressed as follows:

$$A_{i1}^* = \begin{cases} 1 = \text{Banque} \\ 2 = \text{Microfinance} \\ 3 = \text{ONG} \end{cases} \quad (3)$$

$$A_{i2}^* = \begin{cases} 1 = \text{Tontine} \\ 2 = \text{Usurier} \\ 3 = \text{Association} \end{cases} \quad (4)$$

The volume of credit is represented by a continuous variable V_i . We also consider that the credit extended to households may come from formal and informal sources. In this case, the equation of the extended credit is formulated as follows:

$$V_i = \begin{cases} V_i^1 = \theta^1 Z_i + \delta^1 W_i + \mu_i^1 \\ V_i^2 = \theta^2 Z_i + \delta^2 W_i + \mu_i^2 \end{cases} \quad (5)$$

In Equation 5 V_i^1 and V_i^2 represent the volume of credit from formal and informal financing. The vector W_i includes only the variables explaining the credit extended without affecting the selection of households. The parameters $\hat{\theta}$ and $\hat{\delta}$ are the unknown parameters to be estimated. The error terms μ_i^1 and μ_i^2 are assumed to have a normal bivariate distribution with zero mean and a covariance matrix Ω .

4.2. Description of the variables

The variables used in this study are constructed on the basis of theoretical assumptions, previous works and the Cameroonian context. We first justify the choice and then describe the variables used.

4.2.1. Justification of the choice of the variables

The dependent variable in this study is the “Access to credit”. In most studies, the

access to credit is captured by a loan grant. The financing needs of the household are thus expressed by credit application to financial structures. In this study we need to know if the credit applied for by the household has been extended. The “Access to credit” is the first indicator of financing of agricultural households. In theory, the credit obtained by the household is an investment leverage built on a rather long horizon. Yet, in most cases, agricultural households obtain small credits. In such high risk contexts the micro-credit serves as survival financing. Such financing does not lead to sustained development of rural agricultural activities. This provides evidence that agricultural households should be granted substantial credits allowing them to face multiple uncertainties. The literature does not focus enough on the specific aspect of the credit granted. Yet, if land tenure and financing are related, this assumes that there is a pre-eminence in the influence of private property on the access to credit. Credit institutions can integrate this influence in their credit portfolio. Consequently, the amount allocated to credit will depend on each type of property. For these reasons, we consider another financing indicator: the “Volume of credit granted”.

The main explanatory variable of this study is “Land tenure security”. In theory, land tenure security is captured through the private property. Drawing on property rights, the classic literature considers the possession of a legal land title as the land security indicator. Previous works have strongly relied on this indicator to examine access to financing by the agricultural households. Though this may be easily understood, this way of capturing land tenure security does not accurately account for the realities on the ground in countries in sub-Saharan Africa. This is because in these countries land possession is marked by a strong socio-cultural influence. In Cameroon land security reflects first of all a social consensus. The legal land title is not the only security indicator. In this country 90% of rural properties are held under the customary land tenure regime. Hence it was necessary to integrate a second indicator, namely, the “Customary land title”.

However, the two indicators do not capture all the features of land tenure security. Different practices characterize land ownership in Cameroon. These practices may be traced back up to the physiocratic period. Land property may be transferred through two mechanisms: sharecropping and tenant farming. The first mechanism refers to private property based on exploitation rights conditioned on a variable rent payment depending on the yield of the plot. The second is private property based on exploitation rights conditioned on a fixed rent payment. These two mechanisms regulate most rural agricultural activities in Cameroon. Hence it is warranted to examine the financing schemes used by the two categories of actors. Given the unstable character of that category, we consider those farmers as having limited private property status. In fact, we refer to them as “Land squatters”. In most of rural areas, the limits of land properties were set following the historical logic based on kingdom lineages, newcomers and the capacity of families to exploit available land. In these conditions, it appears that land distribution is unequal. However, the areas of land exploited is a function of households’ economic capacities. In such a context where customary land tenure is predominant, the land surface may determine access

to financing. This aspect of the problem has not been examined in the literature. Our study introduces an explanatory variable accounting for the “Area of exploited lands”.

In empirical studies dealing with determinants of access to financing by agricultural households, socio-economic variables are widely discussed. In our study, we include the following socio-economic variables:

- “The age”: Following the life-cycle theory (Modigliani, 1954), age is considered as an important factor in the accumulation of wealth. Households whose family head has a higher age may have accumulated a more important land property, which may be used as a financing instrument.
- “The sex”: Studies on credit market imperfections in rural areas recognize sex as an important determinant in the exclusion of households from access to credit (Buehren et al., 2017). Moreover, the socio-cultural considerations characterized by the patriarchal lineage right dismiss women from the land rights. This exclusion of access to land rights based on sex, would limit the access to credit of households headed by a female.
- “The area or exploitation region”: This variable is included in our study to account for the territorial differences because some regions present a stronger community organization than others. From this point of view, putting in place community credit structures may constitute a financing instrument for the members. Moreover, intensifying the establishment of microfinance institutions in certain areas may be a financing leverage for the agricultural households. Besides, not all regions enjoy identical geographical conditions. Climatic risks and being landlocked are uncertainties that can reduce the financing opportunities for agricultural households (Titus, 2009).
- “The main activity”: We use this variable to assess the influence of the real status of the household. In most cases, agricultural households are engaged in multiple activities. This may affect land tenure security to the extent that households which mainly work in agriculture may be more inclined to securitize their plot than others. Moreover, the fact that a household is mainly working in agriculture gives it a sedentary status. This status allows the household to reinforce its insertion in the community and may enhance credibility for access to financing.
- “The possession of equipment”: In the literature (Niee et al., 2012), equipment may be used as collateral for financing. Agricultural households can have more or less modern equipment that may reinforce their credibility with formal and informal credit structures.
- “The participation in the financial market”: In theory, access to financing depends on the level of participation in the financial market. The literature identifies the savings account as an instrument to participate in the financial market. Even though possession of a savings account by agricultural households is marginal in Cameroon, rural microfinance institutions exist in which rural households may open savings accounts. For some works, having a savings account is a determinant of access to credit (Dower and Potamites, 2012).
- “The education level”: The literature recognizes level of education as a determinant

of access to financing of agricultural households (Ali and Deninger, 2012). In most sub-Saharan African countries, the agriculture sector is home for an increasing number of youth whose technical agricultural capacities are reinforcing in the course of the time. The population of agricultural households is much diversified in Cameroon. It includes young members with diverse skills. The level of education can influence access to financing in two ways. First, obtaining high agricultural yield implies the use of modern agricultural techniques and new technologies. The level of education allows to reinforce the capacity to assimilate new production technologies, which can help to increase the yield level and increase also the capacity to pay back the credit obtained by the agricultural households. Second, the level of education can contribute to improving the quality of projects presented for financing. It can also encourage agricultural households to securitize the exploited land, reinforcing their credibility with the credit structures. Moreover, the level of education can improve the bargaining capacity of the households with the financing structures.

- “The income”: According to some studies, households wealth is considered as a determinant of access to financing (Guiringer and Boucher, 2008). Hence, income is considered as a component of a households’ wealth. In the case of Cameroon financing of agricultural households is based on two features: the credit to the project and the credit to the individual. The credit to the project depends on the quality of the agricultural project, to be specific, on the return of the project and the level of the risk. The credit to individual depends on the individual economic capacity of the household. In this case, the agricultural household presents a personal contribution which is complemented by the credit granted. In practice, that financing leverage may be substantial. We then assume that the level of the income can improve the impact of land tenure security on access to financing.

Table 1: Summary of variables retained

Nature of variables	name of variables	Definition of variables	Authors
Dependent Variables	Acces to crEdit (Accescredit)	this is a binary variable that takes the value 1 if the household obtained a credit and 0 if not. it is made up of several variants. the first variant concerns the type of credit : formal and informal. the second variant refers to the different sources of credit from formal credit (bank, microfinance and ngo) or informal credit (Rotary Savings and Credit Associations, Money lenders ¹)	Nikas et al. (2017) ; Pender et al. (2009)
	Volume of credit granted (Volcredit)	this is a continous variable. it is made of of five modalities (1=300 thousand; 4=from 301 to 400 thousand; 5= 400 thousand:	Shaudhary and Ishfaq (2003) Dower and Potamites (2012).

Independent variables	Age of the head of household (Age)	This variable is continuous and comprises four modalities: 1 ≤ 30 years; 2 = from 30 to 39; 3 = from 40 to 49; 4 = 50 years and more	Sajaia (2004) ; Ali and Deininger (2012).
	Sexe du chef de ménage (Sexcm)	binary variable that takes the value 1 if the head of the household is a man and 0 if not	Sajaia (2004) ; Ali and Deininger (2012)
	matrimonial situation of households (Statamat)	categorical Variable made up of five elements : 1=not married ; 2= married ; 3=divorced ; 4=widow/widower; 5= free union	Sajaia (2004); Ali and Deininger (2012)
	The size of the household (Taillm)	categorical variable with four modalities : 1=6	Guirkinger and Boucher (2008)
	The region of activity (region)	dummy variable with six modalities : centre, littoral, extreme-north, west, south-west, et north-west. these regions correspond to the large agricultural production basin.	Niee et al. (2012)
	The size of the exploitation	It is the surface area of the land exploited. it is given in hectares.	Niee et al. (2012)
	principal activity (Actprin)	binary variable that takes the value 1 if the principal activity of the head of the household is agriculture and 0 if not	Niee et al. (2012)
	Level of education (niveaueduc)	Qualitative variable that takes three modalities : 1= primary education; 2 = secondary school; 3 = university level	Sajaia (2004) ; Ali and Deininger (2012)
	Income of the household (Rev)	Income is a proxy of wealth of the household. it is measured by the annual income of the head of household. thus, we use the quintils of income.	Guirkinger and Boucher(2008)
	Land security (Secufon)	Categorical variable that takes three modalities : 1= legal owner (legowner), 2=customary owner (custowner), and 3=squatter (squat)	Niee et al. (2012) ; Carly et al. (2009) ; Niklas et al. (2017) ; Carter and Olinto (2003)
	Presence of equipment (EquipAgri)	Binary variable that takes the value 1 if the household possesses modern agricultural equipment and 0 if not	Niee et al. (2012)
Participation on the financial market (Partmarcf)	Binary variable that takes the value of 1 if the household possesses a savings account in a financial institution and 0 if not	Dower and Potamites (2012),	

Source : by the Author drawing on other studies and data from third Cameroon Household Survey (2007).

4.3. Presentation of the data

The data used in this study are drawn from the Cameroon Household Survey (ECAM 3, 2007). Although more recent survey data, dated 2014, were available, only preliminary reports were known; the whole database was not yet available. Our study therefore refers to the third edition of the survey. The survey focuses on the poverty issue in Cameroon. The issue of financing in rural areas has been dealt with in particular in that

survey from several points of view. The land securitization related to credit markets is one the major aspects examined. Sections 12 and 13 dealing respectively with the land properties of the households, their access to credit and with rural agriculture, constitute the core of our study. The database comprises 11,391 observations distributed in the 10 regions of Cameroon. However, given the issue examined, we focused on five regions, namely Centre, Coastal, South-West, Far-North and the West. These regions constitute not only densely populated areas, but they are also the main agricultural region. In these regions the type of farming includes cash crops (cocoa, coffee, etc.) and food products (banana, apple, cassava, potatoes, yam, rice, tomatoes etc. Food products account for 80% of the total agricultural production. This study focuses on food products for two reasons.

First, food products play a crucial role in the nutrition of rural and urban populations. In this regard, 80% of urban consumption is provided by rural food production (NIS, 2018). Second, food products contribute to social stability and the food crisis experienced in Cameroon in 2008 provides evidence of that reality. Moreover, the food products also contribute to the stability of foodstuffs. Any deficit in these products would no doubt lead to inflation.

5. Results and discussions

This section presents the results of the study. The first result is related to the descriptive analysis related to the link between access to credit and land tenure security. The second result deals with the econometric analysis of the impact of land tenure security on access to financing.

5.1. Result of the descriptive analysis

To provide a preliminary trend of the relationship between land tenure security and access to financing by the agricultural households, we only considered the variables related to financing, namely access to credit and volume of credit granted. Table 2 summarizes the estimated results.

Table 2: Descriptive results on the relationship between access to financing and land tenure security

Variables	Legal land property	Customary land property	Squatters	Total
	Mean	Mean	Mean	
Access to credit:				
Formal credit	59(.4932)	29.5(.2936)	11.5(.2784)	100%
Informal credit	43.9(.4985)	36(.3137)	20.1(.2968)	100%
Volume of credit ≤ 100000	44.6(.4978)	43.3(.3269)	12.1(.2848)	100%
[100000–200000]	47.2(.4978)	42.8(.2953)	10(.2953)	100%
[200000–300000]	59.6(.4967)	33.1(.2606)	8(.3277)	100%
[300000–400000]	61.7(.4923)	32.4(.2886)	5.2(.2886)	100%
>400000	66.7(.4887)	30.1(.273)	3.2(.2576)	100%

Source: By the author drawing on the data from third Cameroon household survey (ECAM 3, 2007). The figures in parentheses are standard errors and the credit is in thousand CFA francs.

Results in Table 2 show that there is a close relationship between land tenure security and access to financing by agricultural households. More specifically, regarding access to credit, Table 2 shows that: the households which have a legal land title have higher access to formal credit (59%), than those which have customary land titles (29.5%). In contrast, only 43.9% of households with informal credit possess a legal land title, against 36% of households which have a customary land title and 20.1% of households classified as squatters.

With regard to the volume of credit granted, an increasing relationship is observed between volume of credit granted and legal possession of land. On the other hand, this relationship is less established with regard to households with a customary land title or in a squatter situation. Table 2 also shows that from a specific threshold, the relationship between customary land title and credit granted decreases. For squatters, the results show a consistently decreasing relationship between the volume of credit granted and the squatters' status.

5.2. Econometric results on the relationship between land tenure security and access to financing by agricultural households holds

Three results are presented. The first result deals with the selection equation of participation in the credit market. The second result is related to access to credit by households. The third result deals with the volume of credit extended to households.

5.2.1. Econometric results on the participation to credit market

The results are presented in Table 3.

Table 3: Selection equation for households having expressed a demand for credit

Variables	Coefficients
Sex (ref: male)	-0.240 (2.74)**
Age	0.376 (2.39)*
Age 2	-0.069 (3.05)**
Matrimonial status (Ref : free union)	Ref
Married	0.194 (1.27)
Bachelor	0.063 (0.37)
Widow	0.105 (0.49)
Divorced	-0.014 (0.06)
Exploitation area (ref : small agricultural basins)	0.027(2.79)**
Size of household (Ref : more than 8 persons)	Ref
Less than 3 persons	-0.428 (2.30)*
From 3 to 5 persons	-0.381 (2.18)*
From 6 to 8 persons	-0.329 (1.63)
Education level (ref : university level)	Ref.
Primary	-0.276 (2.34)*
Secondary	0.035 (2.35)*
Income (ref : Quintile 5)	Ref
Quintile 1	-0.027 (0.24)
Quintile 2	0.029 (0.26)
Quintile 3	-0.100 (0.90)
Quintile 4	-0.212 (1.74)
Cons	-1.589 (10.21)*
Log likelihood	-872.79577
Pseudo R-squared	0.2000
Predict xb if e (sample), xb	
Mills ratio : normalden (-xb)/(1-normal (-xb))	

Notes: *p< 0.05; **<0.01. The variables between parentheses refer to Z statistic

Source: By the author drawing on data from Third Cameroon Household Survey (ECAM 3, 2007).

The results suggest that the variables used are appropriate to distribute households into two categories: those who applied for credit and those who did not. The explanatory power of the model is good for a probit model (0.20). The results show that at 1% significance level, the sex, age of the household head and the exploitation area influence the likelihood of applying for credit. In a specific way, being headed by a female lowers the probability of a household participating in the credit market. As far as the age is concerned, the results indicate that the probability participating in the credit market is an increasing function of the age up to a certain threshold above which the relationship becomes negative. Regarding the exploitation area, the results suggest that, having its farm in the main agricultural regions increases the likelihood to participate in the credit market for the household. Moreover, the findings reveal that at the 5% significance level, the size of the household negatively affects the probability of participating in the credit market. Small households are less inclined to apply for credit compared to larger households. Concerning the education level, the results show that having an undereducated household head reduces the incentive to participate in the credit market. The households whose heads are undereducated do not have access to information related to the functioning of the credit market. Moreover, the households do not have the capacity to analyse the available information in order to make rational decisions.

5.2.2. Impact of the land tenure security on the access to credit

Tables 4 and 5 present the results related to the access to formal and informal credit respectively.

Table 4: Impact of the land tenure security on the access to formal credit

	Rotary Savings and Credit Associations	Moneylenders	Associations	Marginal effects (dy/dx)
Legal land property	-1.670 (-1.14)	0.903 (2.42)**	0.872 (1.70)*	0.196 (1.92)*
Customary land property	-13.077 (-0.02)	1.475 (2.62)**	-0.673 (1.03)	0.206 (3.17)**
Main activity ²	1.151 (0.74)***	0.054 (0.14)	-0.002 (-0.01)	0.006 (-0.06)
Exploited surface	0.002(0.04)	-0.027 (-0.77)	-0.114 (-0.40)	0.004 (0.84)
Possession of a savings account	0.019 (0.01)**	0.978 (3.12)**	0.930 (2.10)**	0.200 (3.14)**
Possession of modern equipment	1.663 (1.12)	1.931 (2.54)**	-0.253 (0.42)	0.196 (0.63)
Mills ratio	-0.522 (-0.22)	-0.866 (-1.68)*	0.720 (-1.02)	0.172 (1.82)*

Log likelihood: 226.6486

Chi²: 0.0112

Pseudo R²: 0.0783

Notes: ***, ** and * refer respectively to significance level of 1%, 5% and 10%. The values between brackets refer to Z statistic. Households with squatter status are used as a reference with regard to land security. ²The main activity is agriculture.

Source: By the author drawing on data from Third Cameroon House Survey (ECAM 3, 2007)

Table 5: Impact of land security on the access to formal credit

	Bank	Microfinance	Non-governmental organizations	Marginal effects (dy/dx)
Legal land property	0.541 (0.76)	0.887 (1.73)*	-1.235(-1.17)	0.054 (0.32)*
Customary land property	0.624 (0.70)	-0.447(-0.65)	-0.040(-0.03)	0.001(0.02)
Main activity ²	-0.938(-1.80)*	0.433 (0.73)	1.704(1.74)*	0.022 (0.07)
Exploited surface	-0.142(-1.51)	0.006 (0.39)	-0.020(-0.45)	0.004(1.36)*
Possession of a savings account	1.207(2.24)**	0.361 (0.79)	1.597 (1.39)	0.717 (0.38)*
Possession of modern equipment	1.005 (1.82)*	0.373(0.61)	-12.354(-0.03)	0.067(1.02)**
Mills ratio	3.448(4.99)***	2.213(3.44)**	1.877(1.42)	2.729(-1.69)*
Log likelihood	153.44932			
Chi ²	0.000			
Pseudo R ²	0.1946			

Notes: ***, ** and * refer respectively to significance level of 1%, 5% and 10%. The values between brackets refer to Z statistic. Households with squatter status have been taken as reference with regard to land security. ²The main activity is agriculture.

Source: By the author drawing on the data from Third Cameroon Household Survey (ECAM 3, 2007)

Interpretation of results

Concerning access to informal credit, the results show that, all other things remaining equal, land security has a differentiated impact. If we consider financing from the tontines, having legal or customary land title has no impact on access to credit. This result is consistent with the functional philosophy of the Rotary Savings and Credit Associations as they work with a sense of ethnical and cultural membership. It is mainly a question of a community grouping that underlies the development of the members. In this context, access to credit depends on individual financial contributions. Moreover, the credit collateral is backed on a guarantor who stands as a moral security. Besides, as all the members know each other, the notion of guarantee is mainly based on the social information. This result is reinforced by the main activity of the household. Being mainly engaged in agriculture improves the likelihood of access to credit from tontines.

In the case of financing from moneylenders, the results show a significant impact of both the legal land property ($z = 2.42$; $p = 0.015$) and the customary land property ($z = 2.42$; $p = 0.009$). The two land property titles increase the likelihood to obtain credit from moneylenders. The second interpretation is linked to the functioning of the market. The moneylenders do not have access to all the information related to

borrowers. In his context, to avoid default risks, they have two options. The first is to increase the interest rates far beyond the legal margin. The second is based on the requirement related to the repayment conditions. In rural areas, land constitutes the best guarantee for the moneylenders. However, the positive impact of the customary land property is in contrast with the results obtained by Petracco and Pender (2009). Conversely, variables such as having a savings account ($z = 3.12$; $p = 0.002$) and the acquisition of modern equipment ($z = 2.54$; $p = 0.011$) have a significant impact on the access to credit from the moneylenders.

Regarding the credit from the associations, possession of a legal land title property or a savings account significantly improved the probability of access to credit ($z = 1.70$; $p = 0.090$); ($z = 2.10$; $p = 0.036$). Generally, the associations have community funds. To avoid payment default from borrowers, the associative group can require land title whose value can be transferred to all members of the group. Having a savings account establishes a relationship between the household and the credit market (Stiglitz and Weiss, 1981). This characteristic can be an indicator of credibility of the household to the lenders.

The results obtained with the marginal effects confirm the ones already mentioned. Indeed, having a legal or customary land property increases by 20% the probability of access to formal credit. A similar result is obtained when the household has a savings account. Moreover, the socio-demographic variables increase the probability of access to informal credit by 17%.

With regard to access to formal credit, the empirical results reveal that: possession of a legal land title has no impact on the access to bank credit. This finding implies that conventional financing from classical banks does not fit the rural environment. The classical banks generally operate in a profit-maximizing logic. Yet, rural agricultural activity is exposed to such multiple developments that do not guarantee to meet the financial debt repayment conditions. In addition, the fact that the legal land title is not immediately transferable in case of payment default changes the banks' behaviour. Indeed, the high transaction costs associated with the procedures related to transfer of the land title in case of payment default incite banks to limit credit backed by land property as collateral. In contrast, access to credit from microfinance is significantly influenced by the possession of a legal land title ($z = 1.73$; $p = 0.084$). This result is consistent with the functional structure of microfinance institutions. Their adjustment to the rural area environment allows them to ease the eligibility conditions to credit. Some credibility is conferred to the possession of a land title. However, the effect of a land title on the access to credit is reinforced by the socio-demographic and economic characteristics of the households ($z = 3.44$; $p = 0.001$).

As to the financing from non-governmental organizations (NGO), it is exclusively based on the nature of the agricultural activity. Being exclusively engaged in agriculture improves the probability of obtaining a financing front the NGO ($z = 1.74$; $p = 0.08$). This result is line with the missions assigned to NGO in rural areas. In general, NGO mainly support vulnerable rural households. These households do not have the required collateral to obtain formal or informal credit. Their activity alone constitutes

a financing guarantee. However, in most cases the credit granted is associated with an action plan that must be respected by the household in order to reinforce the level of productivity of his farm.

Finally, the results from the marginal effects are consistent with the mentioned. The fact that a household moves from the squatter status to a legal owner status improves by 5.4% the likelihood to access credit. In contrast, moving from squatter status to customary owner status does not improve the likelihood to obtain formal credit.

5.2.3. Effect of the land security on the volume of credit extended to agricultural households

The results of the effect of land security on the volume of credit extended to households are presented in Tables 6 and 7.

Table 6: Effects of land security on the volume of informal credit extended to households

Variables	Rotary Savings and Credit Associations	Moneylenders	Associations
Legal land property	-1288.706 (-0.81)	225.66 (1.96)*	253.477 (0.97)**
Customary land property	-1347.085 (-0.86)	229.601 (2.29)**	269.341 (0.98)**
Main activity	532.060 (1.19)**	-422.7058 (-1.62)	48.976 (0.63)
Exploited surface	-5.870 (-0.59)	-5.960 (-1.88)*	-1.592 (-0.35)
Possession of a savings account	-735.21 (-1.24)**	59.262 (0.68)	-214.004 (-0.69)
Possession of modern equipment	-9.495(-0.03)	-140.964 (-1.23)	13.55741 (0.15)
Mills ratio	1463.748 (1.85) *	374.052 (1.12)	2668.278 (0.90)
R-squared	0.1468		
Root-MSE	530.68		
Fisher	0.4068		

Notes: ***, ** and * refer respectively to significance level at 1%, 5% and 10%. The values between brackets refer to student statistic. Households with squatter status have been taken as reference with regard to land security. The main activity is agriculture.

Source: By the author drawing on data from Third Cameroon Household Survey (ECAM 3, 2007)

Table 7: Effects of land security on the volume of formal credit extended to agricultural household

Variables	Banks	Microfinance	NGO
Legal land property	4375.895 (1.02)**	1619.448 (1.07)**	339.393 (1.11)
Customary land property	-1405.609 (-0.48)*	-465.702 (-0.32)*	326.969 (0.96)*

Main activity	-7184.215 (-1.03)	-68.996 (0.06)	-341.969 (-5.46)
Exploited surface	-124.837 (-0.96)	24.988 (0.64)*	-41.969 (-2.35)
Possession of a savings account	5178.574 (1.12)**	-2944.479 (-0.91)	-23.030 (-0.07)
Possession of modern equipment	-6079.882 (-1.07)	-1585.468 (-0.57)	293.488 (0.98)
Mills ratio	374.053 (1.12)	2668.278 (0.90)	488.400 (1.98)**
R-squared	0.089		
Root-MSE	530.68:16270		
Fisher	0.4068:0.948		

Notes: ***, ** and * refer respectively to significance level of 1%, 5% and 10%. The values between brackets refer to student statistic. Households with squatter status have been taken as reference with regard to land security. The main activity is agriculture.

Source: By the author drawing on data from Third Cameroon Household Survey

Interpretation of results

Two levels of interpretation are made. The first level regards the volume of credit from the informal financing. The second level deals with the volume of credit extended by the formal structures.

Regarding the informal financing, the findings show differentiated effects, all other things remaining unchanged. In the case of tontines, land security did not have any effect on the credit granted. Instead, the socio-demographic characteristics of the households positively influenced the credit extended by the tontines. In contrast, possession of a legal or customary land title positively affects the credit extended by the moneylenders. This result shows that in the cases where the lender does not perfectly make the difference between borrowers, possession of a land title may be used as collateral (Deininger, 2003). Concerning credit extended by associations, the results show a positive impact of land security.

As far as formal credit is concerned, the findings reveal that possession of a legal land property title increases the volume of credit requested. In contrast, possession of a customary land title reduces the volume of credit extended to the household. This result is in line with theory in the sense that the customary land property does not always provide for a systematic transferability of the title (Binswanger, 1995; Deininger, 2003). To avoid the risk of repayment default, banks extend relatively small credit amounts, given the anticipated transaction costs linked to judiciary procedures to legalize the customary land property rights (Stiglitz and Weiss, 1981).

Regarding NGO, the customary land property title positively influenced the volume extended to households. Given their specific features, the NGO seek first to support agricultural activities. However, to securitize the farming businesses, NGO ensure that the households have at least working authorization.

6. Conclusions and implications

The objective of this study was to assess the impact of land tenure security on access to financing by agricultural households in Cameroon. Two specific objectives of the study were: to evaluate the effects of land tenure security on access to credit by agricultural households; and to investigate the impact of and tenure security on the volume of credit received by the households. The data used were sourced from the third Cameroon Household Survey (ECAM 3, 2007). Given these objectives, we used a dynamic regime-switching model with two regimes. The first regime deals with the access to credit, and the second regime assesses the volume of credit. This study was carried out to highlight the land issue, which is at the centre of development in rural areas. Land is the main asset of rural households. It may be used at the same time as the farming framework and as a financing instrument. In the latter case, it is associated with the land property rights. The different rights imply the idea of land securitization. Consequently, the economic theory of land property rights distinguishes three categories of rights, namely the legal land right, the customary land right and the sharecropping and tenant farming rights. In addition, it establishes a hierarchy in the land rights recognizing predominance of the legal land right. Consistent with this theoretical framework, a positive impact of the legal land property right on access to credit by rural households is assumed. Moreover, this study posits that in the context of informal financing, customary land property right can also back access to credit by rural households.

The findings reveal in particular that the rural area is strongly supported by informal financing. This can be explained by two reasons. First, the traditional character of rural agricultural activities is an obstacle to formal financing. Second, the lack of collateral excludes most rural households from formal financing (56%). In addition, the results indicate that the land security has a differentiated effect on access to financing. In this regard, a legal land title improves the likelihood of obtaining financing from formal structures. In contrast, customary land rights can back informal financing. This result is not favourable to sustained development of activities in rural areas, because the credit obtained from informal financing is generally small. This credit is not enough to allow rural households to finance sustained and productive activities. Finally, the empirical results suggest important reforms are needed to encourage financing in rural areas. These reforms should in particular seek to reinforce the value of customary land rights. This will reduce the risks associated with the rights. Another

reform direction would be not only to popularize the securitization of rural land, but also to reconcile customary and legal land rights. Finally, setting up a rural finance scheme based on a public–private partnership would increase access to financial services by rural households.

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(Footnotes)

- 1 These are individual lenders who use regulation loopholes.

Notes

1. The reform was implemented by Decree No 2005/481 dated 16 December 2005 which modifies and complements some of the provisions of Decree No 76/165 dated 27 August 1976 determining conditions for obtaining land title.
2. This programme has three components: component 1: improving microfinance environment (US\$1.48 million); component 2: access to rural financial services (US\$14.1 million), improving access of targets to financial services adjusted to their needs; component 3: coordination and project management (US\$3.76 million).



Mission

To strengthen local capacity for conducting independent, rigorous inquiry into the problems facing the management of economies in sub-Saharan Africa.

The mission rests on two basic premises: that development is more likely to occur where there is sustained sound management of the economy, and that such management is more likely to happen where there is an active, well-informed group of locally based professional economists to conduct policy-relevant research.

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