The determinants of loan acceptance
A case study of French farms

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Abstract

This paper analyses the credit granting process to farms, by identifying the main criteria that are used by bank analysts to decide whether a loan has to be accepted, and along which modalities. Using individual data collected in a French bank and processing (ordered) logit models, we show that farms benefitting from a good capital structure and external income have higher opportunity to receive the requested loan. The analysts' opinion is central in the outcome of the loan process. Such information may be useful for the bank by making explicit the principal decision criteria, which are not only objective.

Keywords: Bank, Loan, Agricultural finance, France

JEL Numbers: G21, Q14

1 Introduction

Exploring the determinants of loans granted to farms appears as a key issue for banks, which are concerned with solvency issues, for them and for their customers. Farms development heavily relies on bank loans, which are necessary for their growth (Fecke et al., 2016). This method of financing has usually represented an attractive way of gathering funds insofar interest rates have been subsidized for farmers over time in many countries (Jansson et al., 2013). In the current context, with very low interest rates, loans are even more competitive if farmers show evidence that their projects to be financed will generate enough cash to pay back the borrowed money.

At the macroeconomic level, an extensive literature in banking and finance tackles the issue of assessing supply and demand side effects in order to explain the movements in credit. The seminal paper of Stiglitz and Weiss (1981) provides a theoretical explanation of credit rationing by banks due to information asymmetries on the credit market. Empirically speaking, the literature has been focusing on the distinction between these supply and demand effects using firm level data or bank lending survey data (Hempell and Kok, 2010; Ciccarelli et al., 2010; Puri et al., 2011; Belaid et al., 2016).

At the microeconomic level, other studies have examined the determinants of credit risk after the recent economic and financial crisis, while other researches have considered the determinants of loan quality or non-performing loans (Shimizu, 2011; Ikram et al., 2016). However, these *ex-post* analyses do not allow to understand the process which drove *ex-ante* a bank to grant a credit to a company. Only few studies focus on this topic like Murfin (2012), suggest that recent defaults inform the lender's perception of his own screening ability, thereby impacting his behaviour.

In the farm sector, few studies tackle the issue of credit granting process (Jansson et al., 2003; Featherstone et al., 2007). Most studies related to credits consider indeed credit rationing (Awunyo-Victor et al., 2014) and more specifically its consequences (Barry and Robison, 2001; Petrick, 2004). Some studies also consider the evaluation of credit default risk (Katchova and Barry, 2005). Because farms are mainly of small and middle size, the literature on the lending decision concerning small and middle enterprises can be useful to provide information on factors leading to loan acceptance or denial (Cassar et al., 2015).

In order to complement the literature, the main purpose of our study is to examine which factors lead a bank to accept to grant a loan to farmers. Our approach is original insofar we consider which explicit and implicit factors are decisive in the process. Banking activity relies indeed on objective criteria associated with the solvency of the borrowing company and its ability to pay back each month the principal and the interests (Briggeman et al., 2009). It is also a commercial activity which belongs to a competitive sector. Usually, banks and their customers have close relationships because of the long duration of credits. This situation is particularly reinforced in rural areas in which farms are located, so that analysts who grant loans may be influenced by subjective factors. While the literature highlights the need for information in the banking system, many empirical analyses pay little attention to the analysts' personal dimension, probably due to a lack of precise data (Heider and Inderst, 2012).

This paper aims at contributing to the literature on loan granting in three ways. Firstly, we use direct bank information, which allows improving precision regarding the individual, structural and financial characteristics of studied farms. Secondly, we take into account both the objective and the subjective dimensions in credit granting set out above. Thirdly, we differentiate loans according to their purpose, namely real estate investment, machinery investment and cash position improvement. We adopt an econometric modelling which relies on logit models. This kind of models seems to be the most appropriate to take into account the bank decision regarding the acceptance of requested loans (LaCour-Little, 1999). In a first stage, we consider a binary response, *i.e.* whether the loan is fully granted or not. In a second stage, we use an ordered logit which considers the graduation of the opinion exposed above, from 1 (full acceptance without guarantee) to 4 (refusal of the loan).

The paper is organized as follows. In the first part, we develop the theoretical modelling associated with our study. In the second part, we present the empirical framework. In the third part, we expose the results. In the fourth part, we conclude the analysis and propose some implications.

2 Theoretical framework

The literature on loan granting is mainly focusing on factors leading to a default from the borrower. Such *ex-post* analysis allows to understand the key factors that led to this situation. By contrast, *ex-ante* analyses focusing on factors used by banks and analysts to grant credits are less performed.

One of the keys in the loan granting process is the information available for the bank that will lead *in fine* to an acceptance or a reject of the requested loan. According to Berger and Udell (2006), banks use four primary methods to compensate for information asymmetries: (1) accounting-based lending, (2) credit scoring, (3) relationship lending, and (4) collateral-based lending. In the farming sector, Gustafson (1989) stated that agricultural lenders use the five C's of credit: (1) capacity, (2) capital, (3) collateral, (4) character, and (5) conditions. Because these two scales largely overlap, we propose to consider hereafter three key points.

2.1 Loan sustainability, information gathering and scoring methods

By definition, the holder has the best available information on his company performance and its default risk (Bharath et al., 2008). However, the bank needs to gather such information in order to assess the ability of the borrower to payback its debt. A double movement is identified: upstream lies the quality of (historical) accounting documents provided by holders during a loan application while downstream the bank needs to assess accurately the default risk though an estimation of (future) cash-flows. It is a way for banks to reduce information asymmetries and the associated adverse section and moral hazard phenomena.

Concerning this topic, the size of the company plays an important role: information asymmetries tend to be greater in small, private businesses, which often have little institutional history and are not required to publicly disclose company-specific information (Butler et al., 2007). As a result, these businesses tend to be more informationally opaque than larger, publicly-listed firms, increasing information risk and potentially influencing lending decisions.

Banks use scoring methods as a convenient way to aggregate available information. Globally speaking, the literature shows that the "hard", quantitative information in credit scores provides a cost-effective method for lenders to assess loan applications and monitor borrowers (e.g., Frame et al., 2001; Akhavein et al., 2005; Berger et al., 2005). Nevertheless, neither credit scores nor accruals may have a significant effect on lending decisions for small businesses. For banks, cash flow information is the most important factor in small business loan approval decisions, far above credit scores (Cowen and Cowen, 2006).

One must also refer to the loan in itself: amount, interest rate, intended purpose, effective use of the funds and repayment terms (Petrick, 2004). Many of these parameters are interdependent. For instance, a short-term borrowing is less risky from the bank's point of view because it is usually associated with a low amount and a fast payback. Thus, the effective interest rate and the collateral should be lower. However, a borrowing for a long-term investment may act as a signal of quality because of the commitment required (Kutsuna and Cowling, 2003).

2.2 Collateral

By nature, collateral can be used as a way to repay the debt in case of default. Therefore, it reduces the risk to be borne by the lender (Jiménez and Saurina, 2004; Voordeckers and Steijvers, 2006). Such guarantee is adapted to the loan characteristics and to the probability of default estimated by the bank. Following Coco (2000), Cassar et al. (2015) emphasize a double action of collateral against information asymmetries. Firstly, moral hazard is reduced by preventing borrowers to shift from low-risk to higher-risk projects. Secondly, collateral acts as a signal sent by quality borrower, which reduces adverse selection.

However, despite these potential benefits, empirical evidence on the value of collateral as an information asymmetry reducing tool is inconsistent. Steijvers and Voordeckers (2009) review conclude that a plausible explanation for the mixed results, and a major limitation of this literature, is examining the use of collateral in isolation of other information asymmetry reducing mechanisms such as hard and soft information sources. This conclusion is reinforced by Bharath et al. (2008) who find that the use of collateral is more frequent when accruals "quality" is lower.

In a farm context, collateral can concern both the farmer's personal wealth (real estate) and the equity of the company (farmland and machinery). Livestock and crop stocks can also be considered as guarantees (Henderson, 2015).

2.3 Banking relationships

In contrast to accounting reports and other figures, banking relationship is subjective (Cassar et al., 2015). It is a "soft information" in the sense that it is hard to quantify and communicate to others, and may not be verifiable by outsiders. While a loan request might be approved regarding sustainability and collateral, it could be rejected in case of bad banking relationships (Gustafson, 1989). For small business lending decisions, even more important may be the "soft" information obtained through ongoing banking relationships (Berger and Udell, 1995; Petersen, 2004; Petersen and Rajan, 1994).

Such information is firstly related to the knowledge of the potential borrower: his character (honesty, integrity and reliability), his skills and ability to operate his business. Secondly, loyalty and past transactions provide additional information on his attitude towards risk. Consequently, past dealings with a borrower may provide superior information for assessing credit worthiness (Diamond, 1991; Petersen and Rajan, 1994). All these elements directly reduce information asymmetries. Consequently, a close bank-borrower relationship might be associated with a lower level of screening on each individual loan (Jiménez and Saurina, 2004). However, a long-term relationship may also lock-in customers within an unfavourable relationship (Bharat et al., 2011).

Despite the potential informational advantages from ongoing banking relationships, their theoretical influence on lending decisions is unclear. Boot and Thakor (1994) show that interest rates decline as the better knowledge of customers and the associated savings enable the bank to reduce the interest rate proposed to the its borrowers. In contrast, Greenbaum et al. (1989) and Sharpe (1990) predict

that interest rates increase with relationship length as the bank's improved knowledge of its customers may "lock in" the borrower in the relationship. Unfortunately, these conflicting theoretical predictions are not clearly resolved by the empirical evidence (e.g. Petersen and Rajan, 1994; Berger and Udell, 1995; Cole, 1998; Bharath et al., 2011).

3 Empirical framework

To explain the process leading to granting a loan, we have developed an empirical framework, which relies on a description of a loan granting process, the use of an original database, and a two-stage econometric model.

3.1 Loan granting process

A loan request is basically examined through several stages. Firstly, the applicant has to submit a complete file including relevant information on his project, his activity, his accounts, and his request. The first step is an examination in the bank branch, which provides a notice and an opinion regarding the loan request on the basis of the supplied information and of the knowledge of the customer. The branch may grant the amount requested only for small amounts. The second step consists in sending the file to the bank loan service, located in the headquarters, which complements the file and decides to grant or not the loan. For major projects and distressed farms, a special Credit Committee shall take a decision on the request.

In all cases, the decision is then transmitted to the customer. It can take four forms: full acceptance of the loan without guarantee (51.30% of our sample), full acceptance of the loan with guarantee (32.51%), partial acceptance of the loan (6.69%) and rejection of the loan (9.50%). This key variable is used as the main independent variable of our analysis.

3.2 Database

We use data obtained from a partnership with Crédit Agricole, the second commercial bank in France, which provides loans to 9 farms out of 10, representing a total of 7.2 billion euros in 2014 (Crédit Agricole, 2015). Crédit Agricole was indeed created in 1894 to grant loans to farms. The group diversified later on its customers and customers, but it remains organized nowadays with the form of 39 independent regional branches, which are in turn divided into 2,474 credit unions.

Credits are granted by regional branches, our study being focused on Crédit Agricole Sud-Rhône-Alpes, which encompasses 3 departments (Ardèche, Drôme, Isère) in the South-East part of France. Our dataset consists in 677 farms located in the Auvergne-Rhône-Alpes region, the fourth producing area in France, which is characterized by a diversity of agricultural productions and a representativeness of the French agriculture (Agreste Auvergne-Rhône-Alpes, 2016). The data were gathered at the regional headquarters of the branch, with the service in charge of bank loans. Data collection consisted in the compilation of individual forms filled either automatically (financial data) or manually by bank analysts (individual data and remarks).

Available data include a wide set of individual, structural, accounting and financial components (balance sheets and income statements) for each farm, as well as measures of riskiness such as Basel II counterparty measure. An original feature of this database is to include the analysts' opinion, either positive or negative, regarding a loan request. This information takes the form of comments, *e.g.* "good capital structure", which are freely written by the analysts and relate both the financial situation of the farm or the relationship between the bank and the customer. We could group this information in two different ways: firstly, by using categories grouping similar comments; secondly, by counting the number of positive and negative comments written even if they overlap.

3.3 Econometric modelling

We adopt an econometric modelling which relies on logit models. This kind of models seems to be the most appropriate to take into account the bank decision regarding the acceptance of requested loans (LaCour-Little, 1999; Zambaldi et al., 2011).

In a first stage, the econometric approach relies on a binomial logit model (Mc Fadden, 1984). The endogenous variable, y_{it}, is dichotomous:

$$y_{it} = \begin{cases} 1 \; if \; the \; loan \; is \; fully \; rejected \; or \; partially \; rejected \\ 2 \; if \; the \; loan \; is \; accepted \; with \; or \; without \; guarantee \end{cases} \quad (1)$$

To the extent that this variable is related to another latent non-observable random variable, y^*_{it}, which takes the form:

$$y^*_{it} = \alpha + x'_{it}\beta + \varepsilon_{it} \quad (2)$$

Where ε_{it} conditional upon (x_{it}) follows a logistic distribution, *i.e.,* $F(a)=1/(1+\exp(-a))$.

If also the relationship is of the type $y_{it} = 1$ if $y^*_{it} > 0$, and zero otherwise, we obtain:

$$Prob(y_{it} = 1 \,/\, (x_{it})) = Prob(y^*_{it} > 0 \,/\, (x_{it})) = F(\alpha + x'_{it}\beta) \quad (3)$$

Where, therefore, Prob (y_{it}=1/(x_i)) is the probability of accepting the loan *i*.

The variable y^*_{it} can be understood as the quality of a loan, which is a function of the farm and farmer's characteristic, as well as the loan request. A farm will obtain its credit if the bank's utility is greater than that which it would not grant the loan, in terms of its expectations. In other words, the company will be granted the credit if $y^*_{it} > 0$.

The estimates of the parameters have been obtained by maximizing the log-likelihood function of y_{it}. For the purposes of our study this analysis has been performed using a total of 380 observations.

In a second stage, we use an ordered logit which considers the graduation of the analysts' decision exposed above. Such model appears suitable to take into account the graduation of the quality attributed to the loan request (Voordeckers and Steijvers, 2006; Belaid and Bellouma, 2016). Such analysis allows to take values as dependent variable:

$$y_{it} = \begin{cases} 1\ if\ the\ loan\ is\ rejected \\ 2\ if\ the\ loan\ is\ partially\ accepted \\ 3\ if\ the\ local\ is\ accepted\ with\ a\ guarantee \\ 4\ if\ the\ loan\ is\ accepted\ without\ guarantee \end{cases} \quad (4)$$

Again, this variable is related to the latent non-observable random variable, y^*_{it}, which takes the form describes in equation (2). For a very low y*, loan status is poor. For y* > ζ_1, the loan quality improves. For y* > ζ_2, the loan quality improves further, and so on. We can then define:

$$y_{it} = j\ if\ \zeta_{j-1} < y^*_{it} \leq \zeta_j, j = 1 \dots 4 \quad (5)$$

Where $\zeta_0 = -\infty$ and $\zeta_4 = +\infty$.

Then:

$$Prob(y_{it} = j\ /\ (x_{it})) = Prob(\zeta_{j-1} < y^*_{it} \leq \zeta_j\ /\ (x_{it})) = F(\zeta_j - x'_{it}\beta) - F(\zeta_{j-1} - x'_{it}\beta) \quad (6)$$

Regression parameters determine the extent to which the latent variable y^*_{it} increases with the independent variables. A positive sign increases the probability that the loan is accepted and decreases subsequently the probability of rejection or renegotiation.

4 Results

4.1. Descriptive analysis of the population

The descriptive statistics consider the main characteristics of the studied population according to the 4 possible decisions made in response to the loan request (Table 1). A clear distinction appears for most criteria between (fully/partially) accepted loans and rejected loans.

Table 1. Descriptive statistics

The results emphasize the importance of the counterparty risk (Basel II score), which is higher for rejected or partially accepted loans. This synthetic indicator, which is automatically computed by the bank according to the balance sheet and the income statements of the farm, appears to be a key element in the decision to grant a loan.

Rejection is also associated with smaller amounts of requested loans, while amounts already borrowed by customers do not seem to matter. Farmers at risk are not been able to finance important projects and they do not claim for important loans. Moreover, an accepted loan has a

lower maturity than a rejected loan, because of the uncertainty associated over the long haul. Agriculture is a risky activity due to volatility in yields and prices.

Not surprisingly, accepted loans (with or without guarantee) benefit from a better opinion of the bank analysts while rejected or partially accepted loans suffer from a clear negative opinion. The main significant strengths of an accepted loan encompass a good capital structure (enough equity is both collateral for the bank and financial risk-reducing factor for the farmer), the farmer's wealth (potential collateral) and the feasibility of the project (source of future cash flows). Factors such as the farmer's experience and good relationship between the customer and the bank do not appear to be discriminant. The analyst seems to take his decision according to the project's potential while taking into account some guarantees in case it fails.

The main weaknesses associated to rejection are a fragile capital structure and high indebtedness. These two aspects translate a financial distress due to inappropriate financial structure. However, a bank may grant a loan that provides cash to the farm in order to help this structure overcoming a temporary slump. To that extent, the occurrence of a poor season (due to bad weather conditions) is not a significant criterion for the decision, mostly because of its short-term influence on the farm.

Other parameters such as the loyalty to the bank, the tax situation and the farm holder's gender and age do not seem to matter in the loan granting decision, while the influence of the (personal) usable agricultural area cannot be precisely interpreted. Thus, the farmer's individual characteristics and the farm's main features do not influence the analyst's sensitivity, which is consistent with the results found by Janssen et al. (2013) in European countries.

Finally, some specializations such as cereals, vegetables, market gardening and cattle breeding are more subject to a loan rejection than fruit production, pigs, chickens and polyculture. This result may be explained by unfavourable market conditions, with strong decrease in prices, for the former productions.

4.2. The determinants of loan granting

The results of the econometric models confirm the descriptive statistics. The estimation of the logit and ordered logit models provide quite similar results.

Table 2. Econometric models

The counterparty risk plays a weak but negative role in a loan grant, which confirms the importance of this indicator. Banks are reluctant to lend money to customers which represent at least a medium solvency risk. Not only is the customers' default risk concerned but also the bank's one in case of multiple defaults.

The amount of existing loans also influences negatively the acceptation of a loan. The bank is not willing to take additional risk by multiplying its customers' loans. For that same reason, a longer maturity for the requested loans leads to a lower probability of acceptance, because of the uncertainty on future cash flows available to the farm. Surprisingly, the amount of the requested

loan does not appear to be a significant parameter in the acceptation or rejection process. The analysts seem to be more concerned by the nature of the project: investments in moveable assets are therefore favoured.

Some positive and negative points underlined by the analysts appear to be significant in the loan decision. One should note that the counters of positive and negative opinions play both respectively a positive and negative influence on the decision to grant the loan. The analysts encompass both financial and non-financial aspects and they clearly weigh the strengths and weaknesses of the loan and the requesting farm(er).

The most encouraging factors are the feasibility of the project to be financed by the loan, which is the source of future cash flows that will be used to pay back the credit. The farmer's wealth is also a critical issue because it can be used to pay back in case of failure. No discouraging factor is significant, the analyst being more sensitive to the number of drawbacks when he rejects the loan request. The loyalty is not a factor in favour of a loan request.

The technical features of the farm (acreage, tax situation) as well as the main characteristics of the farm holder (age, gender) do not seem to influence the outcome of the loan process. Finally, some specializations such as fruit, wine-growing and cattle breeding lead to a higher probability of acceptation of the grant.

5 Conclusion

This research has analysed in detail the credit granting process to farms. While investments on farms heavily rely on loans, the analysis allowed to understand the main criteria that are used implicitly or explicitly by analysts to decide whether a loan has to be accepted or not, and along which modalities. Unlike many of the existing empirical literature, we used precise individual data from Crédit Agricole, the main bank which lends money to French farms. We focused on a loan by loan basis, analysing a sample of 677 loans. While individual, structural and financial data were given by the information systems of the bank, the analysts' opinion was provided in a free-form format.

More precisely, the credit granting decision is examined through 4 modalities: full acceptation, with or without guarantees, partial acceptation and refusal. Explicative variables included criteria such as the financial situation of the farm, its structure, individual characteristics of farmers, the main features of the loan and the analyst's opinion. This allowed for a direct test of the relationship between the explanatory variables and loan acceptance. In particular, we have applied both logit and ordered logit models to the pool of data.

In addition to descriptive statistics, the results obtained with logit and ordered logit models provide clear evidence that loan grant heavily relies on the solvability of the farm, its existing commitments and the maturity of the requested loan. Farms benefitting from a good capital structure, external income and wealth have a higher opportunity to receive the requested loan, because of the guarantee they represent for the bank. The overall analysts opinion appear to play a key role in the outcome of the loan process, the number of positive strengths and weaknesses strongly influencing respectively the probabilities of acceptance and rejection. Finally, sectorial differences are also noticed: farms

involved in field crops or market gardening are less likely to receive their grant, mostly because of unfavourable market conditions.

Such information may be useful for the bank by making explicit the principal decision criteria, which are not only objective. It can also be of interest for farmers, when considering that a good capital structure and out-farm income lead to higher acceptance rate. Our findings also highlight the importance of taking into account precise individual data.

The study can be extended in different ways. Firstly, future analyses should take into account the outcome of an accepted loan, e.g. a full payback or a default, in order to confirm the efficiency of acceptance criteria. Secondly, it would be of interest to take into account with improved precision the stage of development of a farm. These future lines of research may provide elements for a better loan profiling, especially in France and Europe, in which banks represent a major source of financing for farmers.

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7 Appendix

Table 1. Descriptive statistics

Variables	All farms	Decision				Differences in distributions (Chi2 test)
		Rejection	Partial acceptation	Acceptation with guarantee	Acceptation w/o guarantee	
Decision	100.00%	9.50%	6.69%	32.51%	51.30%	/
Counterparty risk (Basel II score)						
Very low risk	18.23%	3.72%	10.53%	19.50%	21.62%	***
Low risk	24.95%	12.96%	34.21%	24.10%	26.57%	
Medium risk	40.41%	46.29%	36.84%	40.00%	39.53%	
High risk	15.61%	35.18%	18.42%	15.38%	11.62%	
Proven risk	0.80%	1.85%	0.00%	1.02%	0.66%	
Amounts already borrowed (k€)	257,636	231,768	282,243	262,070	254,326	n.s.
Motivation of the requested loan						
Cash increase	50.90%	52.00%	74.30%	42.54%	51.28%	*
Moveable assets	27.85%	22.00%	14.28%	34.48%	27.79%	
Property assets	21.25%	26.00%	11.42%	22.98%	20.93%	
Amount of the requested loan (k€)	100,208	63,314	88,451	104,032	105,543	***
Maturity of the requested loan (months)	63.89	75.95	67.13	68.64	59.25	*
Strengths noticed by the analyst (yes/no)						
Good capital structure	43.51%	16.36%	41.02%	46.66%	47.88%	***
Sources of income outside the farm	27.33%	18.18%	30.76%	29.74%	29.64%	n.s.
Farmer's wealth	44.69%	34.54%	33.33%	41.53%	51.80%	***
Feasibility of the project	25.00%	7.27%	15.38%	17.94%	35.50%	***
Good relationships between the bank and the farmer	32.91%	23.63%	28.20%	38.97%	32.67%	n.s.
Experience of the farmer	34.59%	30.90%	25.64%	35.89%	36.80%	n.s.
Weaknesses noticed by the analyst (yes/no)						
Fragile capital structure	14.53%	25.45%	5.12%	14.35%	12.70%	*
Low profitability	15.00%	20.00%	17.94%	14.35%	12.05%	n.s.
High indebtedness	29.85%	54.54%	28.20%	33.33%	24.42%	***
Poor season	10.11%	10.90%	10.25%	9.74%	9.44%	n.s.
No guarantee	8.70%	9.09%	5.12%	7.69%	10.78%	n.s.
Number of strengths (counter)	4.82	3.70	4.76	4.93	5.04	***
Number of weaknesses (counter)	2.61	4.25	3.07	2.46	2.32	***
Loyalty (years)	22.55	19.55	16.48	18.97	20.08	n.s.
Usable Agricultural Area (UAA, hectares)	84.97	82.58	84.48	97.56	77.55	***
UAA belonging to the farmer (%)	39.06%	33.12%	48.37%	33.85%	42.23%	***
Tax situation (flat tax/regular)	94.60%	92.85%	97.56%	93.46%	94.56%	n.s.
Gender of the farm holder (ref = man)	93.31%	90.90%	89.74%	93.33%	94.48%	n.s.
Age of the farm holder (years)	46.84	46.35	44.35	46.62	47.50	n.s.
Technical and Economic Orientation of the farm						
Cereals	24.58%	34.52%	21.99%	16.87%	21.96%	***
Vegetables / Market gardening	3.54%	5.17%	0.00%	1.53%	4.83%	
Fruits / Wine	29.93%	17.24%	31.70%	24.48%	35.16%	
Cattle / Sheep / Goats	20.52%	25.86%	9.75%	21.42%	20.00%	
Pigs / Chickens	5.24%	1.72%	9.75%	5.61%	5.16%	
Polyculture	6.48%	3.44%	4.87%	6.63%	7.09%	
Mixed livestock	2.00%	1.72%	4.87%	3.06%	1.29%	
Polyculture & Mixed livestock	6.48%	3.44%	17.07%	10.20%	3.87%	
Other farms	1.23%	6.89%	0.00%	10.20%	0.64%	

Source: Own database.

Key: A Chi2 test is performed to compare the differences in distributions for each variable according to the decision taken by the bank. A Kruskal-Wallis equality-of-populations rank test is specifically estimated for continuous variables. Significances are the following: n.s. not significant, * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Table 2. Econometric models

	Model 1 - Logit		Model 2 – Ordered logit	
Variables	**Coefficient (odds ratio)**	**Std. Dev.**	**Coefficient (odds ratio)**	**Std. Dev.**
Counterparty risk (Basel II score, ref = very low risk)				
Low risk	-1.762	1.17	-0.494	0.36
Medium risk	-2.362*	1.18	-0.649	0.37
High risk	-2.196	1.30	-1.180*	0.51
Proven risk	-2.135	1.95	-0.367	1.11
Amounts already borrowed (€)	-0.004**	0.00	-0.002**	0.00
Motivation of the requested loan (ref = cash increase)				
Moveable assets	1.885**	0.65	0.085	0.32
Property assets	1.312	0.77	0.289	0.41
Amount of the requested loan (€)	-0.000	0.00	-0.000	0.00
Maturity of the requested loan (months)	-0.021***	0.01	-0.010***	0.00
Strengths noticed by the analyst (yes/no)				
Good capital structure	1.368*	0.56	0.387	0.28
Sources of income outside the farm	0.836	0.54	0.426	0.26
Farmer's wealth	0.997*	0.51	0.610*	0.26
Feasibility of the project	1.430	0.80	1.245***	0.30
Good relationships between the bank and the farmer	-0.518	0.46	-0.428	0.25
Experience of the farmer	-0.100	0.47	0.160	0.25
Weaknesses noticed by the analyst (yes/no)				
Fragile capital structure	1.186	0.62	0.402	0.38
Low profitability	0.220	0.58	0.329	0.35
High indebtedness	0.616	0.49	-0.260	0.26
Poor season	1.047	0.80	0.633	0.43
No guarantee	2.544	1.01	0.678	0.42
Number of strengths (counter)	0.341	0.18	0.176*	0.09
Number of weaknesses (counter)	-0.981***	0.22	-0.422***	0.10
Loyalty (years)	0.018	0.00	0.016	0.00
Usable Agricultural Area (UAA, hectares)	-0.001	0.00	-0.000	0.00
UAA belonging to the farmer (%)	-0.915	0.69	-0.487	0.37
Tax situation (flat tax/regular)	-0.728	1.22	-0.402	0.54
Gender of the farm holder (ref = man)	-1.116	1.03	0.141	0.46
Age of the farm holder (years)	-0.004	0.02	0.004	0.01
Technical and Economic Orientation of the farm (ref = cereals)				
Vegetables / Market gardening	-0.236	1.25	0.984	0.78
Fruits / Wine	1.686*	0.71	0.922**	0.35
Cattle / Sheep / Goats	1.252*	0.64	0.728*	0.35
Pigs / Chickens	0.234	0.94	0.338	0.55
Polyculture	-0.487	0.85	0.390	0.49
Mixed livestock	-0.352	1.24	-0.440	0.62
Polyculture & Mixed livestock	0.134	0.81	0.081	0.45
Other farms	-3.254	2.14	-1.953*	0.93
Constant	6.327**	2.33		
Constant/cut1			-3.260**	0.98
Constant/cut2			-2.437*	0.97
Constant/cut3			-0.306	0.96

Log-likelihood	-90.6570	-345.7687
Prob > chi2	0.0000	0.0000
Pseudo-R2	0.4356	0.1639
Number of observations	380	380
BIC	401.1	923.2

Source: Own database.

Key: * p<0.05, ** p<0.01, *** p<0.001.