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# Collateral, bank monitoring and firm performance: the case of newly established wine farmers

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The present study aims to learn how collateral affects firm performance in the case of newly established wine producers. The issue is to identify the effects of collateral in situations of asymmetric information when the bank is the main financial partner of the entrepreneurs involved. On the one hand, the use of collateral may reduce the risk of overinvestment by entrepreneurs and thereby reduce the risk of repayment default. On the other hand, collateral may induce bad performance linked to a reduced monitoring of the investments by the bank. We herein test both hypotheses in two different cases: when the bank monitors the investments and when the bank does not.

**Key words:** bank monitoring, collateral, disciplinary effect, incentives, lazy bank effect.

## 1. Introduction

Like most farms in France, French wine estates rely heavily on debt to finance their activities. Therefore, the nature of the contracts in place between farmers and banks determines the ability of the former to invest, as well as their availability of cash flow. In most countries, a number of different types of financial intermediaries exist (Barry and Ellinger 2010), including commercial banks, specialist farm lending institutions that are organised corporately or cooperatively, government lending programs, and farming-related trade or agribusiness firms. An important part of any contract between these lending institutions and farmers is the amount of collateral pledged by the latter. Indeed, the ability to collateralise, that is, to secure a loan using collateral, is especially high in the farming sector because of the value of land and the resale market for machinery. This ability to collateralise should reduce the financial constraints that limit the development of a farm because lending institutions can cover their risks through collateralisation.

The role of collateral in lending depends on the policy of the lending institution. For example, in the United States of America, the Farm Services Agency provides much of its support through partial guarantees of loans made by commercial lenders. In contrast, in France both the

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cooperative banks such as Crédit Agricole and Crédit Mutuel, and the commercial banks such as BNP or Société Générale, offer credit to farms at subsidised interest rates. The French government then pays the difference between this subsidised interest rate and the market interest rate directly to the bank, thereby minimising the risk borne by the lending institutions.

However, both the nature and the amount of collateral pledged to banks are subject to rigorous negotiation by farming entrepreneurs who seek to retain as much control over their businesses as they can. As a result, collateralisation varies widely among entrepreneurs: some accept pledges made against the value of their land (i.e. mortgages), others prefer personal guarantees, and a small number obtain loans without having to pledge any collateral at all.

The level of risk taken by entrepreneurs depends on how such collateral affects both them and the banks. On the one hand, in the presence of asymmetric information, collateral may be used by entrepreneurs to ‘signal’ to investors that their projects are not risky (Bester 1985), or lead entrepreneurs to display ‘safe’ investment behaviour (Boot and Thakor 1994). In other words, collateral can have a *disciplinary effect* on the entrepreneurs’ behaviour. On the other hand, as collateral reduces the banks’ exposure to risk, this can lead them to moderate their monitoring efforts (Manove *et al.* 2001), and thus their ability to avoid lending to unprofitable or risky projects. Manove *et al.* (2001) termed this notion the *lazy bank effect*. We expect the disciplinary effect to be more prevalent when the bank does not monitor the activities of the entrepreneurs through a careful analysis of the business plan, meeting with the entrepreneurs proceeded by a personal visit to the farm.

Conversely, the lazy bank effect exists only in those cases where the bank is expected to monitor the activities of the entrepreneur. In other words, the effects of collateral on firms’ performance should differ according to whether the bank monitors or does not. The objective of our paper is to provide the empirical evidence to this hypothesis using an original data set from the first French agricultural bank. To our knowledge, both effects have never been tested simultaneously.

To observe the link between collateral and performance requires data on firms’ performance, collateral and monitoring. Most of the empirical papers on collateral use loan-level data (Berger and Udell 1995; Elsas and Krahnen 2002; Elsas 2005; Chakraborty and Hu 2006; Jimenez *et al.* 2006) instead of firm-level data, as proposed by Ono *et al.* (2012). To our knowledge, there are no papers dealing with this issue for farms, which is surprisingly overlooked given that farming is generally related to a large amount of pledgeable assets. Moreover, this has never been done for newly established farmers, while information asymmetry between the bank and the entrepreneurs is much higher at this stage of the farm’s life cycle.

We consider two performance variables, namely the personal income of the entrepreneur, defined as the money that he or she withdraws from the business for personal use, and repayment delay, which is taken here to be a proxy for default. These two variables have the advantage that they are easily observable by the bank. Banks can monitor the funds transferred by an entrepreneur from the business to his or her personal account, and are informed of any repayment delay by an automatic warning provided by information systems. These two variables, therefore, play an important role from the point of view of the bank. Indeed, in contrast to financial statements, these variables are immediately observable and constitute an early signal of the financial health of the business (Rougès 2007).

Some types of collateral are linked to the assets of the firm, such as land mortgages or other business collateral (equipment and stock), whereas a personal guarantee implies that an entrepreneur pledges part of his or her personal wealth. This distinction is important (Jimenez *et al.* 2006) because it determines the degree to which the collateral acts as an incentive for the entrepreneur (Elsas and Krahnen 2002). The data described herein allow us to distinguish between these different types of collateral.

Moreover, we herein propose an innovative proxy for the monitoring based on the presence of financial statements used by bank agents to agree contracts with entrepreneurs. These statements include business plans and the commentaries of agents on the policy to be adopted with regard to the entrepreneur. Only about half of these include financial statements for the period following the granting of initial credit. The collection and retention of financial statements may show an intent to monitor from the bank.<sup>1</sup> Therefore, we consider entrepreneurs to be financed through a ‘monitoring contract’ when the bank holds financial statements and through a ‘non-monitoring contract’ when it does not. Note that we do not distinguish hard and soft information. In our view, the collection of hard information implies an effort to monitor and is, as such, more a complement to than a substitute for soft information (Berger *et al.* 2009).

Our empirical results provide evidence of the *lazy bank effect* but find that the *disciplinary effect* is less significant. This finding confirms the distinguishable incentives of collateral according to the monitoring by the bank. Moreover, it highlights the importance of land mortgages because we find evidence of the existence of incentives only for this type of collateral. Finally,

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<sup>1</sup> Note that this is close to the Ono *et al.* (2012) proxy of monitoring, given by the frequency of a firm’s document submissions to its main bank. Moreover, our approach of monitoring is in a certain extent similar to what we call the ‘bank relationship’. The authors of the ‘bank relationship literature’ often relate monitoring to contract characteristics such as contract duration (used by Petersen and Rajan (1994), Degryse and Van Cayseele (2000) and Chakraborty and Hu (2006)), or the number of bank services (Ono and Uesugi 2005; Chakraborty and Hu 2006). Elsas (2005) is one of the rare examples to use a declarative approach.

the significant effect of revenue constraints on the levels of personal income and on increasing levels of financial risk highlights the financial constraints faced by newly established wine growers.<sup>2</sup> This, in turn, implies a critical role for their financing partners (especially banks).

The remainder of the paper is organised as follows. We provide a brief literature review and form our hypotheses in Section 2. In Section 3, we describe the data and research methodology, and we present our results in Section 4. In Section 5, we provide some conclusions.

## **2. Asymmetric information and the incentives of collateral**

### **2.1. Incentives of collateral in a non-monitoring contract**

The financing by banks of newly established wine farmers poses specific informational problems. Firstly, banks know neither the quality of the project nor the ability of the entrepreneur to manage it effectively. However, because lending to farmers is subsidised by government policy, loans are interesting even for bad projects. Moreover, investment in tangible assets can increase the likelihood of future access to finance (Almeida and Campello 2007). This is particularly true for farms because of the tangibility of their assets and the flexibility of their investment (Barry and Robison 2001).

As a result, banks deal with entrepreneurs who are willing to benefit from favourable credit conditions and who may therefore have a tendency to invest more than optimally required. According to Bester (1985), collateral provides a means of self-selection by entrepreneurs. Indeed, some entrepreneurs may be willing to signal that they represent less of a risk by pledging collateral.

Secondly, moral hazard is also prevalent because the entrepreneur can either fix his or her personal income on a discretionary basis, or overinvest. Debt, of course, is a specific financial contract the use of which can solve this problem, according to the financial intermediation theory of Diamond (1984). Nevertheless, taking out more cash than the Pareto-optimal amount may well be a rational decision for an entrepreneur who would then benefit from its immediate consumption, as set against the losses that they would share with banks. A second moral hazard lies in overinvestment. As for adverse selection, banks have three ways of circumventing moral hazard, namely credit rationing, monitoring or designing contracts that have proper incentives. For Bester (1985), the use of collateral discourages voluntary default. According to Boot and Thakor (1994), collateral is used to reallocate risks and prevent overinvestment.

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<sup>2</sup> Note that Benjamin and Phimister (2002), using the investment-cash flow sensitivity methodology, showed that French farmers face financial constraints. Barry *et al.* (2000) showed that information asymmetry between banks and farms is greater for young farmers.

## 2.2. Bank monitoring and collateral

Bank monitoring is an empirical issue for small businesses since the release of the seminal paper of Petersen and Rajan (1994) on lending relationships by banks. For Petersen and Rajan (1994), the lending relationships consist of an information-sharing process through the multiple interactions between the banker and the entrepreneur. LaDue *et al.* (2005) show that these interactions are costly and that the bank has to consider the trade-off between the costs and the benefits of the relationship, that is, if the bank chooses to monitor or to not. Diamond (1991) further showed that the decision of whether to monitor or not depends on adverse selection and moral hazard.<sup>3</sup> The decision, therefore, depends on a strategic cost/benefit trade-off. For this reason, we prefer to focus on the monitoring, as an active yet costly process, rather than the relationship, as a passive and free process.

The question posed herein is in how monitoring interacts with collateral. The disciplinary effect supposes that collateral implies a good performance by entrepreneurs financed through non-monitoring contracts. As a result, collateral, as a sufficient device to solve the informational problem, may be used in place of monitoring. Furthermore, the presence of collateral may limit the interest of banks in monitoring (i.e. the lazy bank effect). Thus, collateral may induce poor performance of the business because the bank is not monitoring it effectively.

Conversely, collateral may be associated with monitoring because collateralisation is a means by which banks can access information on firms, as shown by Elsas (2005) and Ono and Uesugi (2005) in Germany and Japan, respectively. An alternative explanation for this finding may be that collateral incites banks to monitor, as shown by Rajan and Winton (1995). Insofar, collateral may induce more monitoring and so better firms' performance.

To sum up, the theory remains ambiguous on how collateral and monitoring interact on performance. We therefore formulate the following two testable hypotheses on how collateral influences performance:

**Hypothesis 1:** Collateral leads entrepreneurs financed via a 'non-monitoring contract' to behave safely.

**Hypothesis 2:** Collateral increases the probability of financing risky projects for entrepreneurs financed via 'a monitoring contract'.

## 3. Methodology

### 3.1 Data and general statistics

We constructed a firm-level cross-sectional data set through a survey financed by and realised in partnership with the major French agricultural bank Crédit

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<sup>3</sup> More specifically, Diamond (1991) showed that monitoring is more likely when it provides incentives to act optimally and is not just a screening device.



Agricole, who wished to gain a better understanding of the financial health of recently established wine farmers<sup>4</sup> to help formulate a strategy for dealing with these entrepreneurs.

We collected technical and economic data, actual and projected financial statements,<sup>5</sup> and bank account information on a total of 272 newly established wine growers, including repayment delays and cash inflows into the personal accounts of the entrepreneurs concerned.<sup>6</sup> We also collected a wide range of disaggregated data on debt contracts such as loan purpose, loan type and the amount of collateral. Such a level of disaggregation of data is quite rare in academic studies, and this data-rich platform provided a unique opportunity to study how collateral acts as an incentive for financial institutions. It also allowed us to distinguish between land mortgages, personal guarantees, and pledges based on equipment, that is, types of collateral based on assets either outside or inside the firm. This categorisation helps determine the incentives of collateral (Bester 1985; Elsas and Krahnen 2002; Jimenez *et al.* 2006).

The data set shows that farming entrepreneurs rely heavily on debt to finance large investments. Our data show that the average investment is 10 000 Euros per hectare, with average levels of debt and sales of 8000 and 11 000 Euros per hectare, respectively. These high levels of investment and debt may be explained by the life cycle effect, in that newly established entrepreneurs tend to modernise their farms to increase their size and productivity. Moreover, investment is driven by government subsidies for *Jeunes Agriculteurs*.<sup>4</sup> The high level of debt may explain the relatively high incidence of entrepreneurs (15 per cent) who are late making their debt repayments. Sixty-seven per cent of the debt that is late being repaid is covered by collateral, compared with 55 per cent for safe entrepreneurs. To a certain degree, therefore, the bank efficiently preserves its interest in limiting its *Loss Given Default*.

Moreover, 29 per cent of the farmers have bank loans in the form of land mortgages. One-quarter of these are in financial distress compared with only

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<sup>4</sup> To meet this aim, we selected a sample of 'Jeunes Agriculteurs', which is a status that gives farmers the right to apply for investment and revenue subsidies in order to encourage farming. According to Traversac *et al.* (2007), the Jeunes Agriculteurs represent about 35 per cent of the newly established wine farmers. This status is granted to newly established farmers, conditional upon meeting certain criteria: a minimum grade in agricultural training; to be between the age of 18 and 39 years old; to be earning an income sufficient for the household livelihood (and not too high to justify state subsidies). Our sample only contains entrepreneurs who have already been granted this status. According to Traversac *et al.* (2007), the Jeunes Agriculteurs represent about 35 per cent of the newly established wine farmers.

<sup>5</sup> These financial projections were realised when the initial loans were credited to the entrepreneur.

<sup>6</sup> Assessment of the real incomes of farm households is generally problematic. Here, we observe the cash going into the entrepreneur's personal bank account. This separation between personal and professional bank accounts is common practice whatever the legal status of the firm. In our view, it allows banks to monitor the amount of cash that entrepreneurs take from the business and thus provides a direct measure of farmers' incomes.

12 per cent of those who do not have land mortgages.<sup>7</sup> Of those entrepreneurs who have personal guarantees in their contract (60 per cent of our sample), 18 per cent are in financial distress compared with 12 per cent for those who do not have personal guarantees, although this difference is not statistically significant. It should be noted that these statistics are not sufficiently significant to argue for the existence of a causality link between collateral and risk.

## 3.2. Variables

### 3.2.1. *Dependent variables*

Given the aims of the present study, we focused on the performance variables observed by the bank, namely repayment delay and personal income. The data provided did not enable us to use financial statement-based variables, because the most recently available financial statements dated from one or two years before the collection of the data (i.e. immediately after the first rounds of investment), whereas repayment delay and personal income were measured at the date of the data collection. Nevertheless, these variables seem relevant to our study as they are important performance indicators from the bank's point of view. Indeed, Rougès (2007) showed that financial statements are often published too late to act as performance alerts for banks. Instead, as discussed earlier, it is bank statements that offer the first signals of the financial distress of account holders.

The incidence of repayment delays does not necessarily imply that the firm in question is experiencing serious financial distress. However, even if the entrepreneur and the bank can quickly fix the problem by renegotiating the debt, such delays signal the absence of financial 'slack' on the part of the entrepreneur. In this respect, repayment delay is a relevant proxy of financial distress. In the multivariate analysis, we use the repayment delay variable (*RD*), which is a binary variable that takes a value of 0 if the firm is up to date with debt repayments and a value of 1 otherwise.

Likewise, the transfer of funds by entrepreneurs from their professional to their personal bank accounts is not a perfect measure of personal income because some personal accounts include debt devoted to professional activities. Moreover, some are joint bank accounts and may therefore include the wages earned by the partner of the entrepreneur. We partly control for this bias in the multivariate analysis by introducing a binary variable that reflects whether the partner has a salaried job outside the farm or not.

In addition, although we are unsure whether entrepreneurs use their professional bank accounts for personal expenditure, descriptive analysis shows that the average annual revenue of our farms is approximately 22 000 Euros, which corresponds to the average recorded for French farms by Chassard and

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<sup>7</sup> The difference is statistically significant at the 1 per cent level of significance ( $\chi^2$ ).



Chevalier (2007). We find a similar figure when we calculate cash flow per capita according to the data obtained from the latest financial statements. In our view, this provides evidence that the proposed measure is a relevant proxy of personal income. We name this variable *PI* and measure it as a continuous variable truncated at the zero-level, expressed in thousands of Euros.

### 3.2.2. Explanatory variables

*Collateral.* Some previous models have dealt with the collateral associated with external (Bester 1985; Boot and Thakor 1994) and internal (Rajan and Winton 1995) assets. We are also able to distinguish between personal guarantees, land mortgages, and business collateral; this enables us to discuss the internal/external dimension as well as the informative properties of different collateral types and how they influence farm performance. We denote the land mortgages variable *LM* and measure it as the proportion of debt covered by land mortgages, and we denote the personal guarantee variable *PG*, which is the proportion of debt covered by personal guarantees. We denote the proportion of debt covered by equipment collateral *BC*. Note that we measure performance of the firm for the 2005 year while the entrepreneurs started their activity between 1998 and 2003. They generally contract debt and collateral in the first years of their activity. Therefore, we expect a time lag between the measure of performance and the agreement of the bank contract which reduces potential endogeneity.

*Bank monitoring.* To study monitoring, we need proxies on what the bank does to grasp information on the entrepreneurs, such as the frequency of a firm's document submissions to its main bank, as used by Ono *et al.* (2012), rather than more 'passive' proxies such as contract duration (Petersen and Rajan 1994; Cole 1998) or bank services (Berger and Udell 1995; Chakraborty and Hu 2006; Kano *et al.* 2010).

In the present setting, we consider an original proxy of monitoring generated by the data collection process. Indeed, thanks to our partnership with the bank in question, we collected data on how bank agents decide to finance entrepreneurs. As stated earlier, we view the collection and retention of financial statements as an intent to monitor. We, therefore, consider entrepreneurs to be financed through a monitoring contract when the bank holds financial statements and through a non-monitoring contract if not. We denote this variable for bank monitoring *BM*, and it is a binary variable that takes a value of 1 if the bank holds such information and 0 otherwise.

*The collateral and monitoring interaction variable.* Bank contract theorists propose that the use of collateral influences performance in a number of different ways. We have explained some of these differences using the interaction between collateral and monitoring. Collateral can thus act as a substitute, a disincentive, or an instrument of monitoring. As a result, we

propose a focus on the interaction between collateral and monitoring:  $(BM \times LM)$ ,  $(BM \times PG)$ , and  $(BM \times BC)$ .

### 3.2.3. Control variables

We group the control variables into three categories of financial risk (*FR*), revenue constraint (*RC*) and context (*CN*).

Among the variables of financial risk, we distinguish between current leverage, which relates debt to sales, and credit availability, which relates real to expected debt (i.e. that agreed in the business plan at the time of investment).<sup>8</sup> Firms that are highly leveraged firms are expected to be more risky. Furthermore, if bank monitoring were effective, the availability of credit should be linked to high firm performance. We also introduce the level of short-term debt. We expect this to be related to a higher financial risk and less income (the entrepreneur withdraws less cash from the business) as the entrepreneur must be able to face the repayment in the short run.

The introduction of these variables as control variables should prevent the risk of confusing the effects of leverage and collateral on the likelihood of repayment delay.

Revenue constraints are a fundamental factor in the decision of the bank to finance entrepreneurs. Kiyotaki and Moore (1997) demonstrated that the budget constraints of the entrepreneur may be binding during the initial period of investment. This implies that the level of revenue constraints (depending on the family circumstances of the entrepreneur) directly influences the financial risks of the firm. Thus, we require a proxy for personal financial needs, and here, we use the age of the entrepreneur. Indeed, in our sample, most entrepreneurs are relatively illiquid. However, the youngest entrepreneurs often live in their parents' homes, whereas the oldest often have children. This age effect on personal income requirements may disappear if the partner of the entrepreneur earns a wage from work outside the farm. Therefore, we introduce the binary variable named partner wage. We also introduce the personal debt of the entrepreneur, which should constrain him or her to take out more cash than is desirable. We expect a positive effect of household financial needs on both personal income and repayment delay.

In the present context, the variables encompass those that may influence firm performance, such as year of settlement, which might affect the growth cycle or the size of the firm. We present summary statistics for these independent variables in Table 1. Table 1 demonstrates the great variability of coverage either with land mortgages or with personal guarantees through the high standard deviation values for these two variables. In reality, these variables are often equal to zero.

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<sup>8</sup> To a certain degree, this variable is a direct measure of ex post credit rationing, when the bank finances the entrepreneur's project less than expected.

**Table 1** Summary statistics for the independent variables

	Variable	Obs	Mean	SD
Collateral	<i>LM</i> , Land mortgages to total debt (%)	254	17	29
	<i>PG</i> , Personal guarantees to total debt (%)	254	36	37
	<i>BC</i> , Business collateral to total debt (%)	254	13	24
Financial risks	<i>D</i> , Debt to sales (%)	228	92	117
	<i>Av</i> , Credit availability (real to expected debt) (%)	250	97	73
	<i>STD</i> , Short-term debt to sales (%)	255	9.0	28.7
Revenue constraint	Age (year)	272	28	5
	<i>PD</i> , Personal debt (thousands of Euros)	242	39	65
Context	Size, Sales (thousands of Euros)	258	156	178
	Years, Years of settlement (years)	272	4.7	1.7

Note: All variables are in percentages except for age (years), personal debt (thousands of Euros), yield (hl per hectare) and years of settlement (years).

### 3.3. Regression equations

Our methodology consists of the regression of cash out and repayment delay on collateral and on the collateral–lending relationship interaction variable. The regression equations take the following forms:

$$\begin{aligned}
 RD = & \beta_1^{RD} BM + \beta_2^{RD} LM + \beta_3^{RD} LM * BM \\
 & + \beta_4^{RD} PG + \beta_5^{RD} PG * BM + \beta_6^{RD} EC + \beta_7^{RD} EC * BM \\
 & + \beta_8^{RD} FR + \beta_9^{RD} RC + \beta_{10}^{RD} CN + \alpha^{RD}
 \end{aligned} \quad (1)$$

$$\begin{aligned}
 PI = & \beta_1^{CO} BM + \beta_2^{CO} LM + \beta_3^{CO} LM * BM + \beta_4^{CO} PG \\
 & + \beta_5^{CO} PG * BM + \beta_6^{CO} EC + \beta_7^{CO} EC * BM \\
 & + \beta_8^{CO} FR + \beta_9^{CO} RC + \beta_{10}^{CO} CN + \alpha^{CO}
 \end{aligned} \quad (2)$$

According to our two hypotheses, we expect that:

- $\beta_2^{RD}, \beta_2^{CO}, \beta_6^{RD}, \beta_6^{CO} \approx 0$  because land mortgage is a collateral that is associated with assets and therefore has no consequences for the behaviour of the entrepreneur;
- $\beta_3^{RD}, \beta_7^{RD} < 0$  and  $\beta_3^{CO}, \beta_7^{CO} < 0$  because the existence of land mortgages may relax the bank monitoring efforts and so increase the risk of investment in a bad project;
- $\beta_4^{RD} < 0$  and  $\beta_4^{CO} < 0$  because personal guarantees, being collateral not associated with assets, may imply a disciplinary effect where there is no monitoring.

## 4. Results

Table 2 presents the relationship between collateral and repayment delay (logit regression). The regression shows no influence of collateral when we ignore the interaction with monitoring (Model 1). However, when we

**Table 2** Collateral and repayment delay

	Expected sign	Repayment delay		
		Model (1) Without monitoring interaction	Model (2) With monitoring interaction	Model (3) Focus on land mortgage
Monitoring				
<i>BM</i>	—	1.10213*	0.6673997	0.6475379
Collateral				
<i>LM</i>	0	−0.0069824	−0.0359463*	−0.0356076*
<i>LM*BM</i>	+	—	0.0432548*	0.0445214**
<i>PG</i>	—	−0.0035898	−0.0001221	—
<i>PG*BM</i>	0	—	−0.0054962	—
<i>BC</i>	0	0.2588994	−0.0488894	—
<i>BC*BM</i>	+	—	0.919169	—
Financial risks				
<i>D</i>	+	0.0066444***	0.0098734***	0.0098553***
<i>Av*BM</i>	—	−0.0089007**	−0.0108092**	−0.0114321**
<i>STD</i>	+	0.0575761***	0.0593549***	0.0563981***
Revenue constraints				
Age	+	0.1371577***	0.1320975***	0.1285807***
Partner Wage	—	−0.4366831	−0.4694889	−0.4655607
Personal debt	+	−0.0004175	−0.0008855	−0.0007733
Context				
Size	0	0.0020063*	0.0022317*	0.0022722**
Years	0	0.189955	0.237709	0.1983944
Intercept		−7.713391***	−7.797043***	−7.511966***
Number of obs		205	205	205
LR $\chi^2$		(12) 44.86	(15) 51.52	(11) 50.38
Prob > $\chi^2$		0.0000	0.0000	0.0000
Pseudo $R^2$		0.2355	0.2704	0.2644

Note: \*\*\*, \*\*, and \* indicate statistical significance at the 1, 5 and 10 per cent test levels, respectively.

consider the interaction with monitoring, the variable that measures the interaction between land mortgages and monitoring is related to an increased risk of repayment delay, whereas the existence of collateral without monitoring decreases this risk. Although the first result is in line with the lazy bank effect, the second is not expected. This contradicts the idea that land mortgages do not influence the behaviour of the entrepreneur because they are backed by the assets of the firm rather than his or her personal wealth. The regression shows no effect of personal guarantees and equipment collateral on repayment delay.

In Model 3, we suppress these last two variables. This reinforces the significance of the interaction between land mortgages and monitoring as a risk factor for repayment delay. As a result, the regression supports our second hypothesis. In other words, the presence of collateral reduces bank monitoring and thereby increases the probability of financing risky projects when the lending relationship is supposed to be strong.

The control variables highlight the clear role of debt, especially short-term debt, on financial risk. Interestingly, the results show that when banks monitor, the entrepreneurs who benefit from more debt relative to the debt agreed in the business plan are less prone to repayment delay. In other words, the availability of credit reduces the default risk in the context of a lending relationship. The regression also emphasises the role of revenue constraints. In other words, the more entrepreneurs have to meet household expenses, the riskier their behaviour. The highly significant effect of age is unambiguous on this point.

Table 3 presents the result of the regression of personal income to collateral (tobit regression). We find that land mortgages negatively influence revenue for entrepreneurs who are financed via a monitoring contract. Firstly, this confirms the special role of land mortgages compared with personal guarantees and equipment collateral, which have no significant effect. It confirms that land mortgages are related to a riskier behaviour,

**Table 3** Collateral and personal income

	Expected sign	Personal Income		
		Model (4) Without monitoring interaction	Model (5) With monitoring interaction	Model (6) Focus on land mortgage
Monitoring				
<i>BM</i>	+	-4.645234	5.39674	-1.548808
Collateral				
<i>LM</i>	0	-0.1441655	0.0062609	0.0120313
<i>LM*BM</i>	-	—	-0.3120492**	-0.2642988**
<i>PG</i>	-	-0.0460935	-0.0180228	—
<i>PG*BM</i>	0	—	-0.0602877	—
<i>BC</i>	0	-7.690011	-0.4603407	—
<i>BC*BM</i>	-	—	-16.13518	—
Financial risks				
<i>D</i>	-	0.0225537	0.0131827	0.0124162
<i>Av*BM</i>	+	0.0578478	0.0590625	0.0722357**
<i>STD</i>	-	-0.4453062***	-0.4334899***	-0.4261782***
Revenue constraints				
Age	+	1.724654***	1.915754***	1.899393***
Partner Wage	-	-16.27422***	-15.66612***	-15.74254***
Personal debt	+	0.0803659**	0.0802851**	0.0798453**
Context				
Size	0	0.0443387**	0.0446997***	0.0412432**
Years	0	-0.3125411	-0.4708977	-0.3165166
Intercept		-23.34551	-32.20404*	-32.64715**
Number of obs		156	156	156
<i>F</i>		(12, 144) 2.28	(15, 141) 2.14	(11, 145) 2.72
Prob > <i>F</i>		0.0112	0.0110	0.0032
Pseudo <i>R</i> <sup>2</sup>		0.0306	0.0334	0.0324

Note: \*\*\*, \*\*, and \* indicate statistical significance at the 1, 5 and 10 per cent test levels, respectively.

because of looser bank monitoring. One alternative explanation might be that the threat represented by land mortgages leads the entrepreneurs to reduce their personal incomes to preserve the financial position of the firm (disciplinary effect).<sup>9</sup> However, there would be no reason that this does not affect non-monitored entrepreneurs. This lends support to the lazy-bank hypothesis.

The control variables also provide interesting results. Debt level does not imply less personal income, whereas short-term debt does so in a highly significant way. Moreover, credit availability implies higher personal incomes (see Model 6) for the entrepreneurs who are monitored by the bank. The regression gives prominence to revenue constraints: the older entrepreneurs are, the more they take cash out. Moreover, external revenue earned by the partner has a highly significant and negative influence on personal incomes. This means that when entrepreneurs have the choice, they prefer not to take cash out. In other words, the revenue constraints are binding. Finally, the regressions show that firm size increases the risk of repayment delay as well as the level of personal incomes. This implies that financial conditions increase with firm size: entrepreneurs benefit from a larger liquidity slack, and banks are therefore ready to take more risks.

## 5. Conclusions

The present study shows that the way in which collateral influences performance depends on the prevalence of bank monitoring initiatives. Where there is an absence of monitoring activities, the *disciplinary effect* may imply that entrepreneurs take less risk when bank contracts include the provision of collateral. When monitoring activities are in place, the lazy bank effect can overcome the disciplinary effect. Our first observation is that land mortgages are the only collateral to have a significant effect on performance, which means that the issue of collateral incentives might be particularly critical for farming and especially for activities which require a significant investment in land. The presented empirical test further shows that the lazy bank effect is significant in terms of the interaction between monitoring and land mortgages, whereas there is no such evidence for the disciplinary effect of land mortgages. Indeed, we see a negative relationship between land mortgages and default risk, but the result is significant only at the 10 per cent level.

Moreover, we interpret the combined results of default risk and low personal income as evidence that riskier and lower quality projects are

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<sup>9</sup> We test endogeneity of collateral and of financial risk proxies with the Wu-Hausman test (in both cases the  $P$ -value is higher than 0.15). We use the initial training and the proportion of leased land in the total of land farmed as instrumental variables for collateral and the take-over context, the date of the opening of the first personal bank account and the forecasted investments for financial risks. In the two cases, the partial  $R^2$  of the first stage regression is higher than 0.15 and the  $P$ -value of the Sargan test is higher than 0.15.



selected because of a lack of screening on the part of the bank. However, the disciplinary effect could explain the low level of personal income that is demonstrated in the present study. In this case, land mortgages make risky projects feasible because the bank knows that entrepreneurs must manage their project budgets tightly, especially their cash flow reserves.

In addition, the described analysis confirms that the revenue constraints of newly established entrepreneurs are binding. In other words, all entrepreneurs are financially constrained. As a result, entrepreneurs who operate in the wine sector must expect extremely low earnings for the first 3–5 years of the project. This helps explain the decreasing number of entrepreneurs in the wine sector in France. For the main financial partners of entrepreneurs in this sector, namely banks, solutions must be found to solve what seems to be a general problem of undercapitalisation.

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