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CREDIT RATIONING OR OVERLENDING: WHO IS RIGHT?

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Abstract:

There is a widespread belief in both academic literature and policy circles that small firms are unable to obtain sufficient banking loans. This idea finds a strong theoretical support in credit rationing theory, as initiated by Stiglitz and Weiss (1981). However, this is vigorously challenged by De Meza and Webb (1987, 2000) suggesting contrastingly that firms can benefit from an excess of credit. This empirical article is the first to test these two theories using data on the access to credit for new French businesses during the mid 1990s. Our results show that credit rationing was not highly spread among French new firms. The story described by De Meza and Webb (1987) appears to be a much more realistic model. Finally, we identify factors closely associated with credit rationing and overlending.

Key words:
Credit Rationing, Overlending, Asymmetric information, New business.

JEL Classification:
L26, M13, D82, G21

1- Introduction

Banks exist because they screen and monitor borrowers more efficiently than other investors can (Goodhart, 1989, Bhattacharya and Thakor, 1993, Allen and Santomero, 1998, Fama, 1985). They are specialized in gathering private information and treating it (Freixas and Rochet, 1999). Managing money and deposit accounts, banks own highly strategic information on firms' receipts and expenditures as well as the way that firms develop (Ruhle, 1997, Diamond and Rajan, 2001). Despite this plethora of information, relationships between bankers and firms are not perfect. Banks suffer from informational asymmetries (Freixas and Rochet, 1999) such that evolution of prices (interest rates) cannot clear the credit market. Finally, a non-walrassian equilibrium arises with a fringe of unsatisfied agents.

According to the seminal Stiglitz and Weiss (1981) paper, unsatisfied agents are borrowers. Asymmetric information leads to credit rationing, as lenders cannot distinguish between high quality and low quality borrowers. However, this dominate view is not without criticism. In particular, De Meza and Webb (1987) vigorously contest this result. They show that asymmetric information in credit markets can lead to the inverse result, which is an excess of credit (overlending).

The objective of this paper is to collect evidence that identifies the most prevalent credit market phenomenon: credit rationing or overlending. Although the empirical literature is abundant with regard to credit rationing, we cannot identify any work analyzing the existence of overlending and/or its coexistence with credit rationing. In this article, we focus on the market of credit to new firms. Indeed, new firms are opaque, producing little credible information and, inherently, cannot exhibit any track record to bankers. They are also the subject of specific attention from policymakers because they are supposed to suffer structurally from financial constraints.

We address this issue using firm level qualitative data produced by the French National Institute of Statistics and Economic Studies (INSEE). The dataset relates to an original survey that was initially carried out on a cohort of new firms set up, or taken over, in 1994. This survey is very interesting as it is the only one in France to collect information on both the demand of credit by new firms and on their actual access to banking loans.

Our results show that overlending was a much more common occurrence than credit rationing on the credit market for French new firms in the mid-nineties. Thus, De Meza and Webb (1987) appear to have a more realistic view than Stiglitz and Weiss (1981). We also

identify the determinants of credit rationing and/or overlending, while underlining factors that limit credit rationing without negatively affecting the efficiency of the credit market.

The remaining of the paper is structured as follows. In the section 2 we present the different views concerning the influence of asymmetric information on the access of firms to credit. Section 3 presents the methodology. Section 4 introduces the data and section 5 gives the main results. The paper ends with a discussion of the findings and implications for policy makers.

2- Asymmetric information and access of firms to credit market: the different views

There is a longstanding belief in both academic literature and policy circles that small firms are unable to obtain sufficient banking loans. This view of a small business credit gap is indeed very old and is largely shared by the scientific community. Classical economists, like Turgot (1766, 1770) and Smith (1776), supported the premise that usury laws were responsible for the regular shortages of credit, thereby limiting economic development and market expansion. Keynes (1930) emphasizes the existence of unsatisfied borrowers on the credit market. New Keynesian economists contributed greatly to this analysis of financial constraints (Romer, Mankiw, 1991a and 1991b). They stress that the role of nominal rigidities (institutional barriers like usury laws and/or habits in the banking sector) explain disequilibrium on the credit market. Stiglitz and Weiss (1981) is the culmination of credit rationing theory. They directly link credit rationing to asymmetric information that does not depend on any exogenous factors.

In Stiglitz and Weiss (1981), all entrepreneurs launching projects require the same external finance and have the same mean return, differing only in risk. The individual characteristics of entrepreneurs are privileged information owned by entrepreneurs and imperfectly shared with outside investors. In this model, bankers only know the distribution of entrepreneurs' characteristics. Consequently, the risk of projects cannot be easily and perfectly accessed. Bankers may not be able to differentiate adequately between high risk and low risk debtors. Moreover, once loans are granted, borrowers may not be able to perfectly monitor firms. In all these cases, increasing the interest rate may be disastrous. A rise in the interest rate would drive the "best" firms (lower risks) to refuse loans proposals that they consider too costly (adverse selection). Additionally, it may incite firms to launch riskier projects, leading to an excessively risky portfolio (moral hazard). Ultimately, because of these

informational imperfections, bankers may prefer not to lend credit at all and equilibrium on the credit market may arise with rationing.

The scientific community is largely impressed by the quality of this demonstration, such that few papers highlight possible objections to this mainstream idea. The articles written by De Meza and Webb (1987, 2000, 2002, 2006) broke this consensus. Indeed, De Meza and Webb (1987) show that by marginally changing some hypothesis in the seminal model of Stiglitz and Weiss (1981), asymmetric information can produce the inverse result: overlending.

In De Meza and Webb (1987), like in Stiglitz and Weiss (1981), all projects require the same initial investments and the same level of external finance. In both models bankers are assumed to have no prior information on entrepreneurs' characteristics, but they know the distribution of the characteristics of these. Additionally, banks are risk-neutral profit maximizers. Contrary to Stiglitz and Weiss (1981), the expected return differs between projects. Entrepreneurs differ from each other in expected return and not in risk. This change in the hypotheses has serious consequences. De Meza and Webb (1987) identify no further credit rationing. On the contrary, they demonstrate the possible existence of over-lending; opaque firms can benefit from an excess of credit.

By combining the assumption that entrepreneurs differ in intrinsic quality (and not only in risk) with a moral hazard problem, De Meza and Webb (2000) show, as well, that even a credit-rationing equilibrium may involve excessive lending. Rationing occurs as a result of moral hazard and can coexist with overinvestment due to heterogeneous types of agents. If banks randomly screen applicants for credit, the result may be more lending than the optimal situation under full information[1].

This theoretical controversy can find some elements of support in the empirical literature focused on financial constraints supported by firms. Despite the fact that, as in the theoretical literature, most papers consider credit rationing as an established and incontrovertible fact, some studies question its reality. Much of the criticism focuses on the methods to measure credit rationing. But behind some of these technical analyses on methodological aspects, we can identify elements that finally foster the controversy

[1] De Meza and Webb (2006) also criticize the implicit hypothesis in Stiglitz and Weiss (1981) that the marginal cost of funds to the borrowers is infinite. They show that, under this hypothesis, entrepreneurs have an overwhelming incentive to cut their loans in order to avoid rationing. Following this argument, De Meza and Webb finally show that, in the theoretical framework of Stiglitz and Weiss, credit rationing would only emerge for indivisible projects when delay causes sufficient deteriorating.

surrounding the consequences of asymmetric information on the credit market. We address this by considering the two main streams of the empirical literature focusing on financial constraints.

A first strand of the empirical literature on financial constraints is based on the assumption that investment of financially constrained firms displays an "excess sensitivity" to movements in cash flow. Fazzari, Hubbard and Petersen (1988) suggest that when firms are financially constrained, that is when they cannot raise funds externally, investment spending may be sensitive to the availability of internal finance. This idea is popular despite the critical view taken by Kaplan and Zingales (1997). Reconsidering the firms identified by Fazzari, Hubbard, and Petersen (1988) as having unusually high investment-cash flow sensitivities, they find that firms that appear less financially constrained exhibit significantly greater sensitivities than firms that appear more financially constrained. They criticize the usefulness of investment-cash flow sensitivities for detecting financing constraints and they also stress the fact that financial constraints may not be as strong as Fazzari, Habbard and Petersen (1988) suggest.

A second strand of empirical literature on financial constraints focuses on the situation of new firms and, more precisely, on the links between the potential entrepreneur's wealth and his decision to start a new firm. This literature derives from a significant positive relationship between entrepreneur's wealth and the probability to become self-employed that start-ups might suffer from capital gap (see, as the seminal paper, Evans and Jovanovic, 1989; This literature also includes Fairlie, Krashinsky, 2012, Nykvist, 2008, Cagetti, De Nardi, 2006). This interpretation is strongly criticized by Cressy (1996), who supports the idea that the correlation between financial capital and the survival of new firms is spurious and that the treatment of endogeneity between the determinants of banking loans and those of entrepreneurial activity mainly stresses the role of human capital[2].

To sum up, it is undeniable that asymmetric information makes a fringe of agents unsatisfied on credit market. Due to asymmetric information, bankers cannot perfectly discriminate between "good" and "bad" firms. In this context, they can make errors; either they refuse credit to "good" firms (credit rationing) or they finance "bad" ones (overlending).

[2] "Provision of finance is demand-driven, with banks supplying funds elastically and business request governing take-up. Firms self-select for funds on the basis of the human capital endowments of the proprietors with 'better' business more likely to borrow. A reason why others have seemingly identified start-up debt-gaps may be the failure to test a sufficiently rich empirical model" (Cressy, 1996, p. 1253).

However the empirical literature principally focuses on credit rationing. Overlending is only mentioned by Cressy (1996) and has never been the focus of an empirical work. In the following we attempt to fill this gap.

3- Research methodology

The objective of this study is to identify the errors made by bankers when they screen applicants for credit in the context of a credit market with asymmetric information. We consider the two polar opposite cases directly derived from the theoretical literature: credit rationing and overlending. Credit rationing corresponds to the situation of firms that are denied credit by banks, even though they are not so bad. Overlending corresponds to the situation of firms that get banking loans, even though they are not so good. Due to asymmetric information, banks cannot perfectly assess the quality of applicants for credit, thus they cannot perfectly discriminate between good and bad firms. Banks grant credit to firms that they consider to be good, with the anticipation that the firm will survive. They reject the credit application if the expected risk of default is high. In our analysis a firm is considered to be really good when it survives. It is considered to be bad when it fails.

Bankers' errors are identified by crossing information on the decision of bankers (acceptance or refusal of the credit demand) and information on the status of firms (survival or death) several years after the application for credit.

Table 1. Asymmetric information and credit: the different views

Ex post quality Decision of bankers	Good (Survival)	Bad (Exit)
Credit is accepted	Good discrimination	**Overlending**
Credit is refused	**Credit rationing**	Good discrimination

Let's assume that:

- P('G') is the probability to be *ex ante* declared as a "good" firm; in this case, the credit application is accepted by bankers.
- P(G) is the probability to be *ex post* a "good" firm, that is to be still alive several years after the credit application.
- P('B') is the probability to be *ex ante* declared as a "bad" firm; the credit application is denied by bankers.
- P(B) is the probability to be *ex post* a "bad" firm, that is to be closed down several years after the credit application.

As the survival rate of firms is, *ex ante*, unknown, we use a Bayes approach.

- The probability of credit rationing is the probability to be declared by banks as a “bad” firm (bank loan is refused) given the fact that the firm is *ex post* a “good” firm (firm is still alive several years later). It corresponds to P(‘B’/G) and is equal to: P(‘B’)*P(G/’B’)/P(G).
- The probability of overlending is the probability to be declared by banks as a “good” firm (bank loan is accepted) given the fact that the firm is *ex post* a “bad” firm (firm is closed down several years later). It corresponds to P(‘G’/B) and is equal to: P(‘G’)*P(B/’G’)/P(B).

In this article, after identifying the probabilities of credit rationing and overlending, we look for their determinants by using logistic models. In the credit rationing empirical model, the endogenous variable is equal to 1 if bankers ration credit and zero otherwise. In the overlending model, the endogenous variable is equal to 1 if overlending is identified and zero otherwise. All estimated models include several control variables characterizing the firm and its context: origin, branch of industry, financial public aid, size, and investment. Other variables describe the entrepreneur. These comprise of the entrepreneur’s human capital measured through his (or her) previous status, previous occupation, level of diploma, skills acquired during previous activity, length of the experience in the same branch of activity, size of the firm in which experience was acquired, the main motivation for the business to be established, the present managing experience, and the number of firms set up before. We also control for the entrepreneur’s social capital linked to entrepreneurship and business ownership (family antecedents, or friends), and other individual characteristics (gender, age and nationality).

4- Data

This empirical analysis is conducted on the population of individuals drawn from the New Enterprise Information System produced by the French National Institute of Statistics and Economic Studies (INSEE). This information system serves to analyze the start-up and development conditions of enterprises. This dataset gives, in particular, information on the financing policy of young firms when they are established and, where applicable, their financial problems in the following three years. Additionally, they allow the characterization of the entrepreneur, his/her track record, and the context.

The SINE dataset does not refer to the general entrepreneurial intention in the French population, but to entrepreneurial projects that are formalized through new firms. As a consequence, entrepreneurial intentions that are aborted due to a lack of financial resources are not taken into account. The SINE database concerns firms and not potential entrepreneurs and our analysis concerns existing firms applying for credit and not potential entrepreneurs that anticipate either receiving or being denied credit. The point is important, as firm financing conditions are considered.

In this study, we focus on the representative cohort of new firms established in 1994. This survey gives specific information on the potential quantitative constraint that new firms encounter when applying for banking loans at birth. In this survey, new firms were questioned on their application for banking loans and on the response of banks. Consequently, this database makes possible the identification of constrained firms that applied for banking credit but were denied it[3].

In the framework of the SINE database, each cohort is the object of several surveys. Concerning the cohort of new firms set up in 1994, the first-wave survey (SINE 94-1) was conducted among a sample of 30,778 firms that were established or taken over during the first half of 1994, and survived at least for one month. The sample[4] is representative of the total population, which consisted of 96,407 new firms belonging to the private productive sector, active in the fields of industry, building, trade and services. A second-wave survey (SINE 94-2), was carried out in 1997; it provides information about the status of the same firms three years after birth (still running or closed down).

In the following study, and for the sake of consistency, we consider only new firms that were active in the same field over the entire period, i.e. without change of (branch of) activity during the period; with unvarying legal status;[5] and established by individuals in

[3] These questions on the access of new firms to credit at birth were removed from the following surveys carried out in 1998 and 2002. In SINE 2006 and 2010, new firms were questioned more broadly on their difficulties accessing credit, without determining if they finally succeed in accessing to banking loans and if financial difficulties are based on a quantitative restrictive supply of credit or an excessive cost of debt.

[4] It is a compulsory survey that obtained a 98.8 % rate of reply. The sample was built by randomly drawing out samples from 416 (2x8x26) elementary strata: origin (start-up or takeover: 2 modalities), branch (8 modalities) and localization (22 French regions plus 4 overseas *départements*). The exploitation of the database involves the use of a weight variable (the reverse of the draw rate per branch, per region and per origin).

[5] Very often, when a firm changes its status, it has important financial consequences that transform our vision of the enterprise. It is not totally the same firm. For example when we notice the shift from the limited liability status of SARL (Société Anonyme à Responsabilité Limitée) to a SA (Société Anonyme) status, which is also a limited liability's status, we record a large increase of the social capital (mandatory private equity) from 7623 euros to 38112 euros, as well as a large increase of managerial team, which encompasses a greater number of partners (at least 7, versus 2 for firms with SARL status). If we take a specific case, we find that this change is

Metropolitan France, meaning that firm subsidiaries and French overseas department are excluded. Finally we consider only new firms with banking relationships, i.e. new firms that have applied for banking loans, at their birth. Our sample consists of 8,855 units, representing 22,760 new firms.

5- Results

5.1. The determinants of the bankers' decision

In Table 2 we report factors that influence the decision of bankers to grant credit to new firms. The factors that positively influence the decision to grant credit demand are, among firms' characteristics, to buy out an existing firm rather than to start, *,ex nihilo,* a new business; to belong to a sector where customers are individuals rather than firms; to receive public aid; and to have high financial capital (more than 15,245 €) at start. Among entrepreneurs' characteristics, the factors that make it likely to receive a bank loan are some status of the owner-manager before the start-up (being craftsman or skilled worker) and experience close to this new venture. On the contrary, the factors that negatively influence the application for credit demand include producing services for firms; having two employees or more; having a low level of financial capital (less than 15,245 €). Entrepreneur's characteristics that negatively affect loan applications include being foreign; male; formerly unemployed or without activity; to be workers and executives; to be a graduate (bachelor or undergraduate); to create the firm by necessity; and not to benefit from an entrepreneurial milieu (family or friends).

Our results are consistent with previous studies on the determinants of banking loans received by new firms. Finally, these results stress the role of financial capital to increase access to credit of new firms. Public aid produces quite the same effects. The role of human capital, in particular the status of entrepreneur, i.e. his professional and academic background, is more ambiguous: being a graduate makes new firms' access to credit decrease whereas past experiences in the same field play a positive role in access to credit.

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also accompanied by a huge and quick increase of the numbers of employees (from 7-8 to more than 22). This last result shows that from one day to the next, the firm is not the same firm; it changes in size as well. Finally it also changes branch of activity, from 74.1G, advices for business and management, to 748K, secondary services in the production.

Table 3. The decision of bankers to grant credit

	Explanatory variable	**Model 1 Grant credit**
Variable Reference modality	Intercept	2.305***
Bank loan asked accepted	Denial of credit	X
Origin Start-up	Buy out	0.649***
Branch of Activity Trade	Agriculture and food industry	1.124***
	Manufacturing	0.120
	Transportation	0.400***
	Construction	0.178*
	Catering	0.534***
	Household services	0.864***
	Services to firms	-0.236**
Public financial aid Non obtained	Obtained	0.736***
Initial size of the firm No employee	1 employee	-0.102*
	2 – 5 employees	-0.182***
	+ 5 employees	-1.014***
Total amount of money invested at the beginning 7623 - 15244 euros	Less than 1525 euros	-1.018***
	1525 – 3811 euros	-0.514***
	3812 – 7622 euros	-0.184***
	15245– 38112 euros	0.286***
	38113 – 76225 euros	0.701***
	76226 – 152450 euros	1.028***
	+ 152450 euros	2.539***
Nationality French	European foreigner	-0.306**
	Non European foreigner	-1.315***
Gender Woman	Man	-0.252***
Age of the entrepreneur 30 – 35 years old	- 25 years old	0.183**
	25 – 30 years old	0.256***
	35 – 40 years old	0.0826
	40 – 45 years old	0.316***
	45 – 50 years old	0.140*
	+ 50 years old	0.197**
Previous professional status Employee	Craftsman	0.354***
	Manager	-0.151
	Supervisor worker	0.219**
	Middle management position	-0.182**
	Executive	-0.137*
	Worker	-0.154**
	Student	-0.0691
Previous occupation of the entrepreneur Labor force	Short term unemployed	-0.830***
	Long term unemployed	-1.111***
	Non-working	-0.686***
Level of diploma Intermediate level	No diploma	0.00707
	Secondary school diploma	-0.154**
	Till two years at university	-0.210***
	From three years and more at university	-0.047
Experience in the same branch of activity No experience	Close vocational experience	0.254***
	Different experience	-0.209**
	Close experience for the partner	-0.213*
Length of the experience More than 10 years	No experience	-0.358**
	3 years experience	-0.421***
	3 – 10 years experience	-0.141**
Size of the firm in which the experience was acquired Between 4 and 9 employees	Less than 3 employees	0.006
	Between 10 and 49 employees	0.158**
	Between 50 and 99 employees	-0.471***
	Between 100 and 199 employees	0.273**
	Between 200 and 499 employees	-0.588***
	More than 500 employees	-0.301**
Entrepreneurship "milieu" Family or friends	No	-0.148***
Main motivation to set up his firm Taste for entrepreneurship	Start for new idea	-0.0911
	Catch an opportunity	0.0553
	Start for necessity	-0.481***
	Example of the surrounding	0.014
Present exercise of entrepreneur role No	Yes	-0.206**
Previous setting up of new firms No	1 start up	-0.391***
	2 or 3 start ups	-0.512***
	+ 4 start ups	-0.759***
LR ratio: null hypothesis β=0	DF: Degree of Freedom: 64	2547.515***
Percent Concordant		75.3%

Note: * (respectively **, ***) means the rejection of the null hypothesis for a 10 % threshold (respectively 5 %, 1 %).

5.2. Overlending is more frequent than credit rationing

Table 3 describes the distribution of new firms with credit demand among different cases bound to both the status of firms three years after their start (still alive or died) and the errors of bankers (credit rationing or overlending). At first glance, we find errors occurred with 35.49% of the sample. Credit rationing only concern 5.03% of the total sample and overlending 30.47%. These findings supports the theory of De Mezza and Webb (1987) that bankers would grant too much credit taking into account the final risk of default among new firms. This result contradicts the notion of a banking credit constraint that is usually postulated in the literature on small firms. We observe that, when entrepreneurs apply for banking loans, the rate of refusals is finally very low (12.31%). Out of these 22,760 firms, only 2,801 firms were denied banking loans. In the meantime the rate of firms that ceased operations is 37.75%.

Table 3. Distribution of new firms with credit demand

***Ex post* quality of firm** ***Ex ante* discrimination of bankers**	**Good (Alive)**	**Bad (Closed)**	**Total**
Errors	***Credit rationing*** 1 143 5.03%*/14.15%**/8.08%	***Overlending*** 6 935 30.47%*/85.85%**/80.71%	Errors 8 078 35.49%*/100%**/35.49%***
Non Errors	Non errors 13 024 57.22%*/88.71%**/**91.92%***	Non errors 1 658 7.28%*/11.29%**/19.29%***	Non errors 14 682 64.51%*/100%**/64.51%***
Total	14 167 62.25%*/62.25%**/100%***	8 593 37.75%*/37.75%**/100%***	22 760 100%*, **, ***

Lecture of the table: * % of the cell in the total sample, **% of the cell in the line, ***% of the cell in the column

As survival is unknown from bankers at the date of application for the loan, a Bayes analysis is used.

- The probability of credit rationing, which corresponds to P('B'/G), is now equal to 8.08%.
- The probability of overlending, which corresponds to P('G'/B), is equal to 80.71%.

These results confirm our first findings: overlending is much more frequent than credit rationing. The analysis given by De Mezza and Webb (1987) appears to be much more realistic than Stiglitz and Weiss (1981).

Our results are in line with previous studies that assess the frequency of credit rationing on the French credit market. Using approaches based on disequilibrium econometrics, they all stress that credit rationing concerns a minority of borrowers (Cieply, Paranque, 1998, Aubier, Cherbonnier, 2007, Kremp, Sevestre, 2012). For the last crisis period (2007-2012), Kremp and Sevestre (2012) show that the proportion of firms partially credit rationed is around 7% and the proportion of firms experiencing full rationing is around 2%. For young firms, which are close to our sample, partial rationing is equal to 10.3% and full rationing concern 4.10% of firms. The authors stress the proximity of their results with those given by surveys carried out on credit rationing in France. Using the results of survey, they reckon an average probability of credit rationing that is around 8% (8.5% for partial rationing and 7.9% for full rationing), which is very close to our estimations. We have not identified any empirical study that measures the proportion of firms that benefit from an overlending situation on credit market and our analysis is the first to stress that excess of credit is much more frequent than credit rationing on the credit market.

5.3. Limits of results and robustness analysis

Our findings highlight the relatively low frequency of credit rationing on the credit market. Credit rationing would have indeed affected less than 10% of new firms in France in 1994, whereas overlending would have affected 80% of our sample. To explain this wide spread between the frequencies of each error type, we need to account for two potential biases.

First, we only observe projects that were actually undertaken, but not those that were aborted due to bank loan refusals. However, some could have been successful. This bias may lead to an underestimation of financial constraints. In our empirical study, credit rationing only concerns firms that applied for credit. However, some entrepreneurs will end their new firm project because they anticipate the refusals of banks. Less radically, we must mention the cases of firms that grow more slowly because they do not ask for credit because they anticipate the bankers' refusal. In these two cases, entrepreneurs are said to be discouraged (Kon, Storey, 2003), but as they do not ask for credit they cannot be identified. We only observe that, out of a population of 66,873 new firms established in 1994, only 34% (22,760 firms) asked for credit at their birth. This relatively low proportion of new firms that asked for

banking loans illustrates this self credit rationing phenomenon, but we cannot be more precise.

Secondly, we must note the existence of a potential bias of endogeneity: receiving a bank loan indeed extends the life span of firms significantly. We assess this impact of obtaining a credit on the firm's survival. We use a logistic model with the firm status (alive or closed down) as the binary endogenous variable (equal to 1 when firms are still alive three years after founding; equal to 0 otherwise) and the access to credit among exogenous variables. Table 4 confirms the view that the decision of bankers is an important determinant of the likelihood of firms to survive. Refusals of credit to new firms negatively influences the likelihood of firms to survive, as does belonging to the Catering branch of activity, employing more than five persons, benefiting from a grant, or a high level of equity[6].

We detect as well an asymmetric situation of bankers according to the *ex post* statute of new firms. In fact, bankers discriminate quite well with respect to, *ex post,* good firms. In the population of firms that were still alive three years after birth, we observe a very high rate (91.92%) of bank loans that were applied for and subsequently granted by bankers. Credit rationing concerns a low proportion of the total population of surviving firms (8.08%). It is much more difficult for the banker to discriminate on *ex post* bad firms. Some 80.71% of firms that failed had actually received a bank loan.

To finish and to assess the robustness of our analysis, we confront among the firms that have asked for bank loans, firms still alive that have obtained a bank loan against closed down firms that did not obtained a bank loan. Given the fact that the bank is not wrong, it appears that the sub-samples are significantly different. This means that we have adequate information to identify the discrimination (more of 82% good ranking with a logistic model). If the model does not have any significant relationships, we would find that the banker discriminates using variables unknown omitted from the data. From this result we infer that the unobserved heterogeneity is a relatively subsidiary problem.

[6] A short firm life span is related to entrepreneurs under 35 years old or from 45 to 50 years old; with a professional status of middle management executive; long term or short-term unemployed, without activity, without any degree and with an experience that is not strictly in the same sector.

Table 4. Factors affecting the survival of the firm

	Explanatory variable	**Model 2 Survival**
Variable Reference modality	Intercept	0.395***
Bank loan asked accepted	Denial of credit	-0.676***
Origin Start-up	Buy out	0.677***
Branch of Activity Trade	Agriculture and food industry	0.198**
	Manufacturing	0.350***
	Transportation	0.498***
	Construction	0.632***
	Catering	-0.326***
	Household services	0.612***
	Services to firms	-0.050
Public financial aid Non obtained	Obtained	0.147***
Initial size of the firm No employee	1 employee	0.030
	2 – 5 employees	-0.042
	+ 5 employees	-0.330***
Total amount of money invested at the beginning 7623 - 15244 euros	Less than 1525 euros	-0.042
	1525 – 3811 euros	0.066
	3812 – 7622 euros	0.073
	15245– 38112 euros	0.350***
	38113 – 76225 euros	0.737***
	76226 – 152450 euros	0.910***
	+ 152450 euros	1.216***
Nationality French	European foreigner	0.334***
	Non European foreigner	-0.104
Gender Woman	Man	0.084**
Age of the entrepreneur 30 – 35 years old	- 25 years old	-0.551***
	25 – 30 years old	-0.251***
	35 – 40 years old	-0.087*
	40 – 45 years old	-0.101*
	45 – 50 years old	-0.179***
	+ 50 years old	-0.124*
Previous professional status Employee	Craftsman	0.062
	Manager	0.177**
	Supervisor worker	0.416***
	Middle management position	-0.049
	Executive	0.245***
	Worker	0.232***
	Student	-0.108*
Previous occupation of the entrepreneur Labor force	Short term unemployed	-0.271***
	Long term unemployed	-0.353***
	Non-working	-0.692***
Level of diploma Intermediate level	No diploma	-0.308***
	Secondary school diploma	0.104**
	Till two years at university	0.151***
	From three years and more at university	0.673***
Experience in the same branch of activity No experience	Close vocational experience	-0.465***
	Different experience	-0.867***
	Close experience for the partner	-0.847***
Length of the experience More than 10 years	No experience	-0.419***
	3 years experience	-0.234***
	3 – 10 years experience	-0.139***
Size of the firm in which the experience was acquired Between 4 and 9 employees	Less than 3 employees	-0.0035
	Between 10 and 49 employees	-0.205***
	Between 50 and 99 employees	-0.268***
	Between 100 and 199 employees	-0.0439
	Between 200 and 499 employees	-0.1486
	More than 500 employees	-0.336***
Entrepreneurship "milieu" Family or friends	No	0.075**
Main motivation to set up his firm Taste for entrepreneurship	Start for new idea	-0.070
	Catch an opportunity	0.124***
	Start for necessity	-0.216***
	Example of the surrounding	-0.185**
Present exercise of entrepreneur role No	Yes	0.090
Previous setting up of new firms No	1 start up	-0.035
	2 or 3 start ups	-0.670***
	+ 4 start ups	0.2013
LR ratio: null hypothesis β=0	DF: Degree of Freedom: 64	3617.064***
Percent Concordant		71.3%

Note: * (respectively **, ***) means the rejection of the null hypothesis for a 10 % threshold (respectively 5 %, 1 %).

5.4. The determinants of errors

In Table 5, we identify the determinants of credit rationing (Model 3) and the determinants of overlending (Model 4).

In the population of firms that were still alive three years after their founding (14,167 firms), credit rationing affects 1,143 firms. Credit rationing is more frequent for firms with a relatively high number of employees (more than five) and for those with a very low amount of equity at birth (less than 1,525 €). Credit rationing is more frequent as well when entrepreneurs are not French, when they are men, when they are unemployed (short and long term) or without any activity before start, when they are undergraduates, when their experience is less than 3 years, when starting a new firm is linked to necessity motive, or when they created more than one firm in the past. Past experience in a large firm incrases the probability of credit rationing as well. On the contrary, credit rationing is negatively linked with buyouts, all sectors except services to firms, the allowance of public aids, high equity at beginning, a past experience of entrepreneurs as craftsmen or supervisor workers, a close experience before starting and a motive to create based on a new idea and in an entrepreneurial context.

Out of the population of firms that did not survive three years after founding (8,593 firms), overlending affected 6,935 firms. Overlending is more frequent in case of buyouts, for some sectors (Agriculture and food industry, Hotels and restaurants, Household services), when firms beneficiate from public aids, when they own a high level of equity (more than 250 kF) and when entrepreneurs possess a past experience as craftsmen. Overlending is less frequent when firms have at least one employee, when entrepreneurs are non European, when they are men, when they are unemployed (short and long term) or without any activity before start, with diploma (A-level or postgraduate), when their motive to create is based on necessity and when they were supervisor workers or workers before starting a new business.

Table 5. Factors affecting the likelihood of bankers to make errors

	Explanatory variable	**Model 3-Rationing**	**Model 4-Overlending**
Variable Reference modality	Intercept	-2.01***	2.348***
Status of the firm closed down	Still alive	X	X
Bank loan asked accepted	Denial of credit	X	X
Origin Start-up	Buy out	-0.693***	0.387***
Branch of Activity Trade	Agriculture and food industry	-1.966***	0.608***
	Manufacturing	-0.332***	-0.115
	Transportation	-0.642***	0.081
	Construction	-0.59***	-0.365***
	Catering	-0.902***	0.418***
	Household services	-1.446***	0.220**
	Services to firms	0.036	-0.440***
Public financial aid Non obtained	Obtained	-0.656***	0.740***
Initial size of the firm No employee	1 employee	-0.102	-0.269***
	2 – 5 employees	-0.051	-0.366***
	+ 5 employees	0.522***	-1.349***
Total amount of money invested at the beginning 7623 - 15245 euros	Less than 1525 euros	0.540***	-1.376***
	1525 – 3811 euros	0.034	-0.840***
	3812 – 7622 euros	-0.135	-0.455***
	15245– 38112 euros	-0.717***	-0.135
	38113 – 76225 euros	-0.878***	0.434***
	76226 – 152450 euros	-1.100***	0.870***
	+ 152450 euros	-3.678***	1.267***
Nationality French	European foreigner	0.722***	0.244
	Non European foreigner	0.621***	-1.839***
Gender Woman	Man	0.217**	-0.309***
Age of the entrepreneur 30 – 35 years old	- 25 years old	-0.347**	0.332***
	25 – 30 years old	-0.445***	0.258***
	35 – 40 years old	-0.333***	-0.080
	40 – 45 years old	-0.250**	0.472***
	45 – 50 years old	-0.280**	0.172
	+ 50 years old	-0.020	0.417***
Previous professional status Employee	Craftsman	-0.385**	0.412***
	Manager	-0.012	-0.093
	Supervisor worker	-0.794***	-0.352**
	Middle management position	0.129	-0.190
	Executive	0.168	-0.036
	Worker	0.090	-0.262***
	Student	-0.081	-0.128
Previous occupation of the entrepreneur Labor force	Short term unemployed	0.788***	-0.794***
	Long term unemployed	1.283***	-0.830***
	Non-working	0.985***	-0.341**
Level of diploma Intermediate level	No diploma	0.039	0.165*
	Secondary school diploma	0.178*	-0.111
	Till two years at university	0.516***	0.043
	From three years and more at university	0.006	-0.195
Experience in the same branch of activity No experience	Close vocational experience	-0.690***	0.031
	Different experience	0.118	-0.061
	Close experience for the partner	-0.024	-0.227
Length of the experience More than 10 years	No experience	1.463***	0.565**
	3 years experience	0.791***	-0.130
	3 – 10 years experience	0.131	-0.058
Size of the firm in which the experience was acquired Between 4 and 9 employees	Less than 3 employees	-0.109	-0.176
	Between 10 and 49 employees	0.022	0.33***
	Between 50 and 99 employees	0.622***	-0.156
	Between 100 and 199 employees	0.401**	0.833***
	Between 200 and 499 employees	0.402*	-0.850***
	More than 500 employees	0.523***	-0.057
Entrepreneurship "milieu" Family or friends	No	0.061	-0.248***

Main motivation to set up his firm Taste for entrepreneurship	Start for new idea	-0.298**	-0.287***
	Catch an opportunity	-0.113	0.031
	Start for necessity	0.652***	-0.301***
	Example of the surrounding	-0.836***	-0.081
Present exercise of entrepreneur role No	Yes	0.228*	-0.257**
Previous setting up of new firms No	1 start up	0.640***	-0.174
	2 or 3 start ups	0.932***	-0.125
	+ 4 start ups	1.357***	0.059
LR ratio: null hypothesis β=0	DF: Degree of Freedom: 63	1438.065***	1203.068***
Percent Concordant		74.9%	71.6%

Note: * (respectively **, ***) means the rejection of the null hypothesis for a 10 % threshold (respectively 5 %, 1 %).

Being active in the manufacturing sector and having an appropriate vocational experience before establishment decrease credit rationing without any significant effect on overlending. In contrast, to be undergraduate and to have been committed in previous new businesses increase credit rationing without any significant effect on overlending. Some factors have an influence on overlending, without any significant effect on credit rationing. We observe such a result when the size of new firms is small (fewer than 5 employees) and when the initial equity is less than 7,622 euros. Initial equity above 38,113 euros significantly decreases credit rationing and increases overlending.

Finally, we conjointly analyze the determinants of credit rationing and overlending.

Table 6. Factors affecting both credit rationing and overlending

Modalities	SW errors	DMW errors
No experience Between 100 and 199 employees	+	+
Long term unemployed No working 5 employees Less than 1525 euros Non European foreigner Short term unemployed Between 200 and 499 employees Man	+	-
Public financial aid Catering - 25 years old 25 – 30 years old 40 – 45 years old Craftsman Buy out Agriculture and food industry Household services 38113 – 76225 euros 76226 – 152450 euros + 152450 euros	-	+
Construction Supervisor worker Start for new idea	-	-

Some factors influence both credit rationing and overlending in the same way. Most exert a complementary influence; when they increase credit rationing, overlending decreases, and *vice versa*. Some others, most interesting, improve (or deteriorate) as a whole the efficiency of the credit market; influencing, in the same sense, both phenomena. For example, we observe that specialization in the construction sector, closely related vocational experiences, past supervisory experience, and a start up driven by new ideas will decrease both credit rationing and overlending. In contrast, no past experience and experience in a firm with between 100 and 199 employees will increase both credit rationing and overlending.

6- Conclusion

Our applied research sought to challenge existing and competing theories about the consequences of asymmetric information on credit access of new businesses during the mid-nineties in France. Regarding this goal, we show that the constraint described by Stiglitz and Weiss (1981) was not widely spread across French new firms. The imperfection of the credit market described by De Mezza and Webb (1987, 2000) appears to be a more realistic model.

Additionally, our results identify factors associated with credit rationing, overlending or both. We particularly note the influence of public aids that make the frequency of credit rationing decrease, but result in an increase in overlending. With public aids, banks grant more credit, but some is granted to future bad firms. If the goal of policy makers is to increase the availability of credit, public aids meet it. But if the criteria are to increase both the efficiency of credit market and the efficiency of public transfers, then public aids are not the best way to intervene.

Our empirical analysis stresses that there are other ways to exert a more positive influence on the global efficiency of the credit market. Indeed, we identify variables that make credit rationing decrease without simultaneously increasing overlending. Closely related experience prior to establishment decreases credit rationing without significantly affecting overlending. We also observe that some factors globally improve the efficiency of market credit by decreasing both credit rationing and overlending. In particular, this is the case for past supervisory experience and if a new idea was the underlying motive for the firm.

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