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► **To cite this version:**

Nadine Levratto, Luc Tessier, Messaoud Zouikri. Small, alone and poor: a merciless portrait of insolvent French firms, 2007-2010. 2011. hal-04140945

HAL Id: hal-04140945

<https://hal.science/hal-04140945>

Preprint submitted on 26 Jun 2023

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Document de Travail Working Paper 2011-36

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Small, alone and poor: a merciless portrait of insolvent French firms, 2007-2010

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5th October 2011

(Preliminary version)

Abstract: This empirical paper investigates the path to bankruptcy for a sample of French firms in default, in particular the decision to file a petition for bankruptcy, the arbitrage between rescuing and liquidation and the effective survival. The procedure is depicted as a sequence of three steps in which judges play a crucial role as they decide whether a company is insolvent or not and determine whether an insolvent company deserves to be rescued or, on the contrary, should be liquidated, the market having the last word since the effective success depends on the capability of the firm to recover from the judicial proceedings. We test different hypotheses about the variables influencing each possibility which include i) the role of the market in the firm's health, ii) the influence of financial structures, iii) the importance of corporate governance and iv) the inherent corporate factors of probable survival. Using three linked LOGIT models, our first finding is that the probability to default depends mainly on the market. Secondly the probability to be rescued depends essentially on the financial structure. Finally, the probability for the firm to remain in business in the long term is largely influenced by the market and profitability. Our results also support the idea that governance, size and resources are the main determinants of exit from the market or success of any company.

Key words: Insolvency, bankruptcy, firm default, financial indicators, size, logit models.

JEL classification: D20, G32, G33, K20

Small, alone and poor: a merciless portrait of insolvent French firms, 2007-2010¹

1 Introduction

In his seminal paper on corporate insolvency, Armour (2001) makes a distinction between six different meanings of the term “*insolvency*”. Departing from the colloquial sense of the word that has to do with an inability to pay creditors, he attempts to clarify between the accounting concepts of balance sheet insolvency, cash flow insolvency and economic failure on one hand and the judicial aspects of default that follow a path from insolvency proceedings, reorganization to liquidation on the other. This extensive approach to firms in distress presents the huge advantage of encompassing the diversity of possible judgments made by commercial courts in cases of corporate insolvency. Moreover, such a complex and refined typology of failure is hardly compatible with an empirical analysis of the phenomenon which is most of the time centered on the determination of a discriminant function able to distinguish two classes of firms according to their respective economic health (Rahman *et al.*, 2004; Sun *et al.*, 2005; Bose and Pal, 2006). The problems emerge because corporate insolvency is still missing a general definition broadly accepted by the community of authors working on this topic.

Most of the time, a firm is considered as financially distressed whenever the book value of its assets is less than those of its liabilities. From this point of view, the Basel II criteria define a firm as being “*in default*” when its scheduled payments are delayed for more than 90 days. This approach which is focused on a cash flow conception is advantageously complemented by a stock perspective which compares the available assets to current liabilities (Belcher, 1997). If such a definition presents an indisputable use as far as one is interested in the particular situation of a specific company, the expert judgment it rests upon does not fit with the study of the general situation of a large number of companies or with the determination of a function that permits to separate operating firms from insolvent ones. To do so, a simpler but clearer definition of insolvency is required. This is the reason why most of the papers dealing with discrimination between going concerns and insolvent ones refer thus to legal rules to draw a clear separating line between these two classes. In this case, a company is thus considered as insolvent when it files for bankruptcy or when a court decides it should be liquidated.

However, this binary vision of firms that can either be safe or insolvent, does not fit with the large array of outcomes in use in the commercial courts on one hand and with the blurred frontier between going concerns and distressed companies on the other. This paper aims at producing an empirical analysis compatible with the complexity of legal rules governing corporate bankruptcy. To do so, and following Marco (1989) we propose a dynamic conception of firm distress that begins with liquidity problems, passes through balance sheet disequilibrium and finishes in a commercial court where judges have to decide whether it is worth rescuing the company. This insolvency path is perceived thanks to the determination of a judicial path resulting from the analysis of a large sample of French commercial courts’ decisions in line with the Insolvency Law enacted in 2006. Our aim is to provide an operative framework that makes it possible to understand the various forms of failure currently applied in the commercial courts and to highlight the intricate relationships between judicial and economic points of view on

¹ This work comes from a study funded by the bank OSEO and published in the book "La défaillance des entreprises. Etude sur données françaises entre 2000 et 2010," Collection Regard sur les PME, Paris, Oséo-La Documentation Française, 2011. We are grateful to the members of the steering committee for their advices and suggestions; usual disclaims apply.

insolvency. This research contributes to the bankruptcy literature by examining the decisions made as a process scheduled by the law and implemented by the judges advocating social and economic interests. Unlike previous studies considering the default resolution as a binary process illustrated by a simple logit or probit approach, we model it as a three-step dynamic process which makes it possible to shed light on the rationale of the commercial courts' decisions.

Our first purpose is to test whether the firms that file a petition for bankruptcy present significant differences from firms that are normally operating or that have not yet discovered or disclosed their distressed situation. We argue that this first stage of the bankruptcy proceedings is crucial as the cessation of payments is the first decision made by the commercial judge who has to decide if the company is really insolvent or not. Giving the judge the legal right to discriminate between safe and insolvent companies transforms the courts into a screening device or a gate between the economic and judicial spheres. However the opening of proceedings does not mean that the insolvent firms will be automatically liquidated. Indeed, even if nearly 90% of French bankruptcy filings end up in liquidation (Domens, 2007) it is officially possible for the court to decide on a rescue of distressed companies. Our second purpose is then to focus on the characteristics of the distressed companies which lead the judges to opt in favor of reorganization (judicial settlement) instead of deciding on an immediate liquidation. As underlined by an abundant literature on this topic, the crucial stake at this stage of the insolvency path consists in minimizing the occurrence of type 1 and type 2 errors, i.e. to liquidate firms whose probability of recovery is definitely compromised whereas the companies which still have either credit or capability to restore their market share should be supported. This alternative and the priority given to the firm's survival is one of the most commented on characteristics of the French insolvency law and is often considered as the most tangible orientation in favor of the debtors' interests to the detriment of the creditors' rights (among many, Bhandari and Weiss, 1996; Claessens and Klapper, 2005). Despite the lengthy judicial process and the integration of the various viewpoints and interests of the different stakeholders in the judgment, reorganized companies often fail to recover and, after some time, the liquidation is finally decided. The economic and social cost of what may be considered as the ineffectiveness of the commercial court to rescue firms with a capacity to recover (type 2 error) is high enough to justify an analysis of the differences between the firms which are able to start a new venture and the ones that will finally go bankrupt. This is thus what our third purpose consists in.

The analysis is based on an original dataset collected from the official bulletin of civil and commercial notices (BODACC) usually collected sequentially but, for the purpose of this paper, transformed in such a manner that any event having to do with insolvency is connected to one company. This makes it possible to reconstruct its judicial history. We show that the characteristics of the distressed companies significantly differ depending on the stage of the process under review. The organization of the judicial proceedings attests to different degrees of insolvency. Our analysis also shows that French commercial judges are not motivated by a single aim consisting in promoting continuation in order to prevent social difficulties. Indeed, financial and commercial considerations are intricately mixed with employment and industrial criteria to determine the insolvency path of a given company, its probability to be immediately liquidated instead of being rescued and, finally, the success or the failure of the reorganization.

The remainder of the paper is organized as follows: section 2 specifies the analytical framework elaborated in reference to the French bankruptcy code and presents the analytical model of insolvency to be tested; section 3 describes the dataset, the hypotheses posed and the three-step logit model estimated; section 4 presents and discusses the empirical results; section 5 concludes.

2 Analytical framework: from a binary perspective to a three-stage process

2.1 A dynamic definition of insolvency

2.1.1 From separating functions...

Since Altman (1968), most of the models devoted to prediction of insolvency have tried to determine the best function to distinguish reliable companies from those that will possibly default in the near future². The main task consists then firstly to identify explanatory variables of default and to estimate their contribution estimating the coefficients that make it possible to classify accurately a set of firms in two *a priori* defined categories. Since the implementation of a linear function, proposed in the 1960s, numerous refinements have been proposed. They mainly concern the estimation technique and consist in the implementation of semi-parametric (logistic) or non-parametric (neural networks) techniques. Regardless, the result is always the same: once validated, the function becomes a predictive model of insolvency. The crucial point is that this method requires a strict definition of failure resulting from a review of the literature and knowledge of default organization prior to any empirical analysis. Two polar points of view coexist in the literature: an economic and a judicial one.

From the economic point of view, failure is defined as a set of situations that reveals the distress of a company, such as the non-repayment of a debt used as the signal of failure by many scholars (Beaver, 1966, Deaken 1972, Ward and Foster, 1997). Because of the low level of correct classification provided by this fuzzy definition, the term “default” is no longer used to empirically illustrate the concept of failure. In order to escape the strict assimilation between insolvency and default, some authors have considered other events. A company is then considered as insolvent if it is no longer able to meet its economic, financial, and social objectives on a regular basis. Some go even further by considering that firms enter in periods of decline when they fail to anticipate, recognize, neutralize or adapt to external and internal pressures that threaten their long-term survival. The separation between the failing companies and the others based on different performance criteria is proposed by Platt and Platt (2002). They draw a line between going concerns and distressed firms having experienced either several years of losses, or decreases in the distribution of dividends or a major restructuring. Beaver (1966) is representative of this approach and defines the failure as the result of the inability of a company to meet its commitments once they have reached maturity. The results are quite poor and become even worse when the purpose is to discriminate between profitable firms and non-profitable ones because no function properly separates the two classes (Peel and Peel, 1988). More recently, this approach has also been adopted by Bose and Pal (2006) who obtained prediction rates ranging between 65% and 75% in their attempt to separate companies *a priori* considered as financially healthy from those which are not.

The problems encountered in testing the different border lines between viable firms and those that are going to fail come from the fact that the separation between these two situations is both porous and blurred. That is why numerous studies agree that the cessation of payments is the final step of a process, sometimes called "a spiral of failure", from which a firm can escape thanks to the adoption of corrective and preventive measures consisting in a modification of its operating cycle.

The second set of papers considers failure from a legal point of view. It is then defined on the basis of judicial criteria introduced in the insolvency act enacted in a given country at a given

² Bellovary et al. (2007) propose an exhaustive analysis of 165 bankruptcy prediction studies published from 1965 to 2006 and the changes in model development.

period. Most legal rules considered a firm as bankrupt when the judge decides it is not able to make its repayments when the claims fall due (Cabrillo and Depoorter, 1999). Insolvent companies always conform to this mix of legal and accounting logic. At each stage of the judicial process, accounting considerations are introduced to strengthen the rationality of the decision made by the judges. Indeed, the proceeding always begins with a cessation of payments and ends up with a liquidation or continuation plans. To fix a point of time to signal the transition from a reliable and sound company to a failing one, many scholars consider that the failure occurs from the moment a company presents to the courts the legal documents required for its liquidation or reorganization. The failure is then assimilated to the entry in the insolvency proceedings.

Although the meaning and nature of the proceeding may differ, the arrival in a commercial court which registers the cessation of payments gives a simple criterion to "objectively" separate two classes of firms: those that are governed in accordance with the rules of collective proceedings and those which are still operating in a economic world dominated by the respect of contractual commitments. As in the previous set of papers, the robustness of this conception rests upon the binary choice provided by the judicial perspective: either the company is sound, or it is insolvent. The judicial definition of insolvency has given rise to much research of which we provide only a brief glance.

Proposing an empirical analysis to check out the differences between legally insolvent firms and those only reporting financial difficulties, Agarwal et al. (2001) and Anandarajan et al. (2001) determine a performing function whose exact classification rates are above 93% for both groups. It appears that models relying on a legal definition and separation of businesses into two classes lead to more reliable results than the ones based upon financial performance levels. Different reasons explain this superiority. Firstly, the differences between failing and viable firms are clearer as one is closer to the cessation of payments. Secondly, the transition between an economic order, dominated by commitments and contracts on one hand, and a judicial universe in which pure market logic is supplanted by a legal order on the other is clearer than an assessment based on corporate performance. Therefore, in the legal order, the sequence is structured by a threefold stage. Firstly, it consists in the statement of cessation of payment. Secondly, it is followed by an arbitrage between direct liquidation and rescue which depends on the particular situation of the insolvent firm and the context in which the decision is made. Thirdly, the validity of this decision is known later if the rescued firm effectively survives.

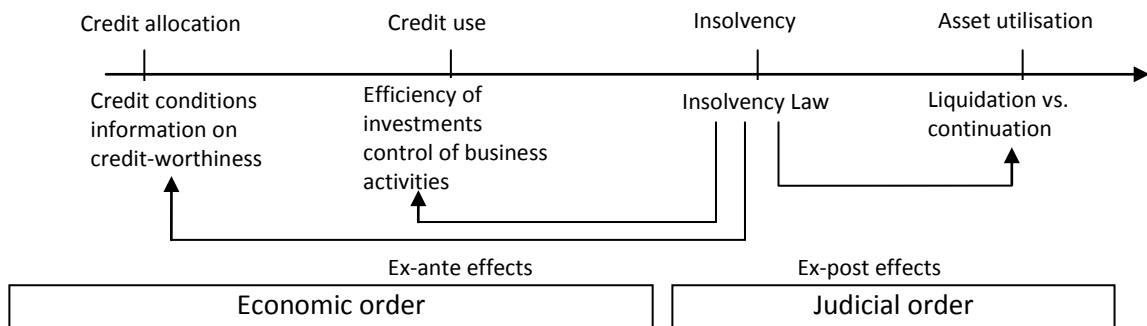
Focusing only on the judicial decision taking place in the first or second stage presents a serious drawback as, in itself, it is not representative of the gradual process followed by a distressed firm. As the path towards insolvency of a company must be analyzed continuously (Daubie and Meskens, 2002) the next section is devoted to the presentation of an insolvency path suitable for an analysis of ordered market exits.

2.1.2 ...to an insolvency path

In general, insolvency does not happen overnight. On the contrary, disruption in payments can be expected from previous signals. Empirical works try to identify these signals using either *zeta* score based models or a more qualitative approach. Empirical evidence does not show a clear causal relationship between good governance practices and good corporate performance. It is almost impossible to discriminate between a favorable economic conjuncture and good practices as causes of success. Corporate insolvency will usually be a predictable result of bad corporate governance when the company is still a going concern.

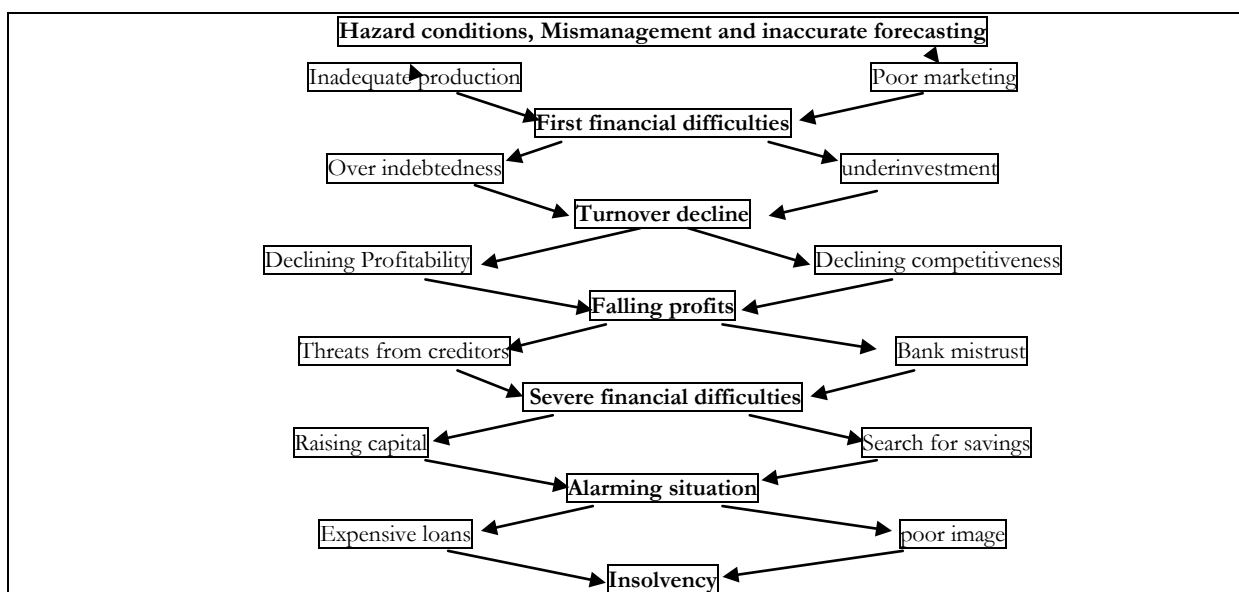
Moreover, governance arrangements instituted in ordinary corporate life can still persist when companies face financial distress. If so, it is very possible that what fits a sound company may turn out to be completely inappropriate for an endangered firm. For instance, even though creditors are protected collectively in insolvency, the interests of secured creditors over their collateral or security are expressly excluded from the collective distribution scheme. Alternatively, creditors can stipulate in their contracts with the company much stricter initiating terms than the general requirement in insolvency law. This form of credit rationing which is not based on price terms is however scarcely studied from a theoretical point of views. Consequently, creditors may intervene in corporate governance when such terms are satisfied rather than when rescue efforts will be tried in vain. Figure 1 illustrates the coexistence of two different worlds separated by the application of the insolvency law.

Figure 1 Corporate insolvency system



All along this path, a mix of economic, financial and judicial criteria prevails ordered according to their consequences on the firm's survival. Figure 2 illustrates what can be described as a cumulative scenario towards insolvency which may lead to either a direct liquidation or a judicial settlement involving the continuation of the undertaking (creditors are obliged to accept certain deadlines) or the transfer of the business (the undertaking and its main contracts are sold to a third party who accepts certain commitments).

Figure 2: Insolvency path (Source: Marco, 1989).



The decline of a company begins most of the time by mismanagement and unmarketable products (Crutzen and van Caillie, 2009) which may cause a decline in sales over several years (and a correlative decrease in earnings if nothing is done to improve the market position). In the worst case, the fall-off in turnover results in a decrease in profitability, followed by a deterioration of operating conditions which are at the origin of a solvency crisis. At this stage of the vicious circle, the company's managers have a strong incentive to accept less favorable market conditions (rebates or longer terms of payment, etc.) in the hope of restoring sales and profitability. Such a reaction can however be counterproductive as it can cause an increase in trade debts and inventories, especially in the manufacturing industry. As a consequence, the company may be short of cash and, therefore, may face a liquidity crisis which could lead lenders to practice credit rationing and increase interest rates since the simultaneous increase of indebtedness and decrease in self-financing deteriorates the probability of repayment of such a debtor. Subject to a shortage of financial resources, to a decrease in the EBIT aggravated by an inability to repay the claims once they fall due, the company may decide to file a petition for bankruptcy before the creditors decide to present one to the commercial court. Once one of these two possible events happens, the insolvency turns into bankruptcy.

The arrival in a judicial world changes the rules of the game drastically as the first consequence of this switch lies in the automatic stay that halts actions by creditors trying to collect debts. The stake is thus no longer to decide whether the company should repay or not all the claimants but, instead, to make a decision concerning how much debtors should repay in case of rescue or liquidation. The arguments in favor of each solution may differ according to the institutional context on one hand and the company situation on the other as detailed in the next paragraph devoted to the description of an empirical model of insolvency-bankruptcy adapted to the French situation.

2.2 The operative model

The bankruptcy act in force in France was enacted in 2006 as French legislators decided to go one step further in the attempt to rescue distressed companies as the value of going concerns is always considered as superior to the amount of the assets sold in case of liquidation. After a brief reminder of the legal rules governing bankruptcy, we propose a three stage model suitable to an empirical application.

2.2.1 Insolvency proceedings in France

Corporate insolvency law tends to provide trade-offs between continuing operation of viable businesses and the elimination of irreparably damaged companies. Its main purpose is not to obtain a criminal punishment of the entrepreneur. The opening of insolvency proceedings against a debtor does not actually have a stigmatizing character that would deter the request before the situation is definitively compromised. It is, above all, the rescue of an economic activity, potentially able to create wealth and, therefore, jobs.

The bankruptcy, reorganization and liquidation proceedings in force in France are the product of a legal history that began in the 19th century (Hautcoeur and Levratto, 2010). Focusing on rescuing companies to preserve jobs, the 1984 Prevention of Difficulties Act (Law 84/148, March 1 1984) and 1985 Insolvency Law (Law 85-98, 26 January 1985), as amended by the 1994 reforms, have significantly contributed to the "*de-stigmatization*" of economic failure. They mainly result from the need to establish a legal system facilitating the rescue of insolvent firms by introducing an automatic stay often leading the tenants of a *Law and economic* approach to

consider it as a good example of a pro-creditor system in its attempt to protect the enterprise even to the extent of undermining creditors' rights.

These laws have, however, partially failed in their initial mission to save businesses: bankruptcies were numerous, the creditors were poorly paid and the costs were high. Creditors have, moreover, not been sufficiently encouraged to participate in negotiations with debtors.

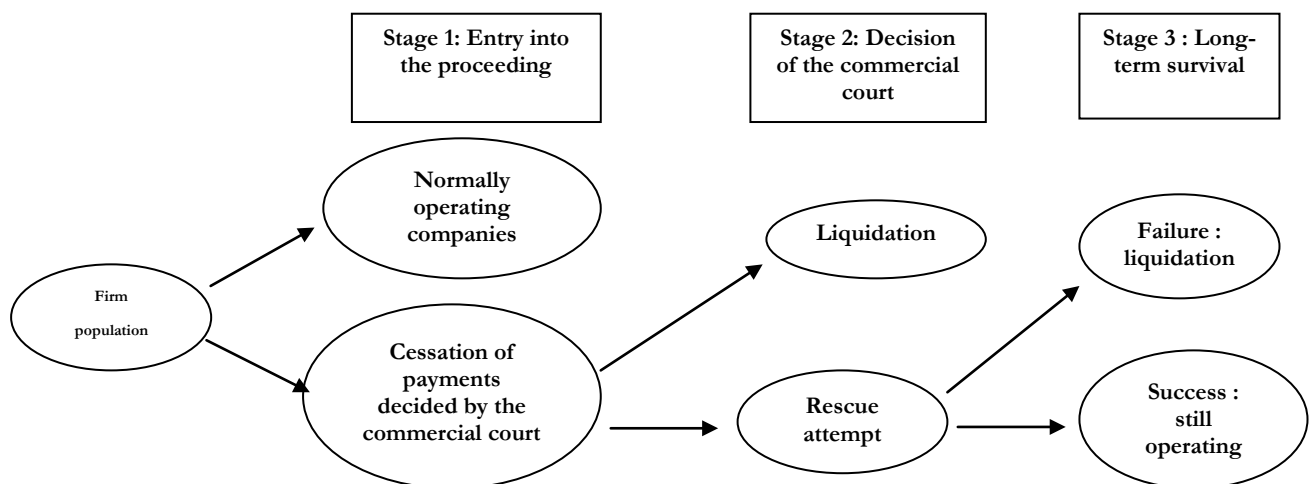
The latest advance, the law No. 2005-845 on the Protection of firms in difficulty (SADE), enacted July 26, 2005 and supplemented by decrees and ordinances³, gives priority to the processing of business difficulties ahead of bankruptcy. This text is intended to limit the number of bankruptcies in France. It establishes an early procedure for bankruptcy protection, called "rescuing procedure" and creates a new conciliation procedure approved by the judge. Within the context of the new insolvency law, a distinction is now made between:

- procedures selected by the debtor, i.e. conciliation procedure and the safeguard procedure,
- procedures imposed on the debtor, i.e. rescuing (*redressement judiciaire*) and liquidation.

Indeed, insolvency and liquidation procedures are henceforth viewed as default procedures within the framework of which senior management will pay the price for its lack of foresight. It will be unable to profit from the advantages reserved for those who have taken the initiative of a conciliation or safeguard procedure. Insolvency and liquidation procedures will only apply in cases where conciliation or safeguard procedures have not been implemented because senior management did not foresee the difficulties facing the business or when these procedures have failed.

From this complex judicial system may be drawn a simplified sequence of decisions presented by figure 3.

Figure 3: Bankruptcy path



³ A decree (No. 2005-1677) of 28th December 2005, enacted on 1st January 2006, specifies laws relating to the prevention of business difficulties, corporate rescue, reorganization and liquidation. An ordinance (No. 2008-1345) of 18 December 2008 reformed the Law relating to firms in difficulty. This ordinance includes seven chapters devoted respectively to: the improvement of ad hoc mandate, conciliation, the attractiveness of rescuing procedure, the development of the insolvency proceedings, the improvement of the liquidation proceedings, responsibilities and sanctions, administrators and legal representatives.

Made up of three linked alternatives, this three-stage pattern provides an appropriate structure to be tested on a sample of companies. Indeed, three different tests may be implemented to determine the factors explaining the differences:

- between firms that file a petition for bankruptcy and those which do not,
- between rescued and liquidated companies,
- between survival and liquidation after a rescue attempt or reorganization

3 Empirical analysis

3.1 Data

The data base comes from four French sources. The first consists in the accounting documents provided by the Annual Business Survey (Enquête annuelle d'entreprises), undertaken by the French National Institute of Statistics and Economic Studies (INSEE). This database is exhaustive for firms employing more than 20 workers in the manufacturing industry or more than 10 employees in services. It is complemented with the Diane database provided by Bureau Van Dijk, which combines balance sheets, profit and loss accounts, and other elements describing corporate structures. The third source is the 'financial linkages' survey (LIFI database) which provides information about the main shareholders and the subsidiaries fully or partially owned by any company located in France. The fourth one is the Register of insolvent firms (Bulletin des annonces civiles et commerciales) which provides details about the practical details of the proceedings concerning any insolvent firm.

From these sources, we are thus able to compose a data set in which any firm is characterized by qualitative information (size, industry, age, location governance), quantitative ratios (cash flow, financial debt, trade debt, interest charges...) and a judicial history. This last piece of information is in fact an original variable coming from a concatenation of the events corresponding to each firm from the moment it has been declared insolvent by a commercial judge between 2007 and 2010. It is constructed following these basic rules:

- **Step 1:** A set of events and quotations associated with a form of failure are extracted from the Register of insolvent firms (Bulletin Officiel des Annonces Civiles et Commerciales - BODACC)
- **Step 2:** Quotations are aggregated into six categories depending on legal standards (assets sales, rescuing, liquidation, dissolution, cancellation, closing for lack of assets)
- **Step 3:** By classifying a series of 10 consecutive legal operations according to the dates of decisions, we obtain a consistent legal history for more than 98% of firms from the sample. They are then classified in 4 distinct situations:
 - o Normally operating,
 - o with assets sales in progress
 - o under a legal decision to maintain the activity
 - o Judicially insolvent.

The sample consists then in a set of 143,114 firms with 10 employees or more operating in the major sectors of the French economy. All these companies were operating in 2007 and 7,831 (5.47%) experienced an insolvency leading them to file a petition for bankruptcy between 2007 and 2010. Among these firms whose cessation of payments has been considered as effective by a judgment, 1,816 have been liquidated and 6,015 have been reorganized. Among these rescue attempts, 3,324 can be considered as successful as the firms were still operating in 2010 whereas

2,691 failed as the companies were finally liquidated later on. Table1⁴ sums up this breakdown whereas tables 3, 4 and 5 present details about activity, size and integration within a corporate group for the different sub-samples.

Table 1: Characteristics of the sample

Stage 1 : Entry into the bankruptcy proceedings		Stage 2 : Initial decision of the commercial court		Stage 3 : Long term survival	
Still operating companies in 2010	Bankruptcy proceedings between 2007 and 2010	Liquidated companies between 2007 and 2010	Attempted restructuring	Liquidated companies between 2007 and 2010	Still operating companies in 2010
135,283	7,831	1,816	6,015	2,691	3,324

From these three stages one can identify 3 possible bifurcations which correspond to 3 models seeking to explain what differentiates between the companies at each stage of the process. Three explained variables are then identified:

- i) Entry into the proceeding,
- ii) Rescue attempts,
- iii) Long term survival.

3.2 Hypotheses and explanatory variables

This section gathers the previous theoretical arguments and considers more recent empirical findings in order to propose four hypotheses (H1 to H4) on the motives that are expected to drive the arbitration between the different possible judicial solutions to firm distress. Each developed hypothesis does not lead to a definitive prediction but rather highlights a balance between the main variables that may influence the way of resolving default.

Hypothesis 1 focuses on the market and suggests that the firms able to sell their products are less likely subject to a cessation of payments. It follows the '*Porterian*' view according to which firms benefiting from a dynamic geographical or industrial environment have a higher probability of success than companies that do not benefit from such positive externalities. Indeed, business failure is all the more probable as the firm faces difficulties in selling its product which may cause a continuous decline in turnover as well as a decrease in profitability. We might thus expect a positive sign associated with turnover declines and a negative one for profitability. Conversely, the chances to obtain a reorganization plan or to survive in the future are lower in a context of economic crisis which significantly impacts both variables. The proportion of inventories and receivables in the total assets can become more and more important leading to a lack of cash-flow that can be a signal of insolvency. Inventories and receivables are then positively correlated to the cessation of payments. Things may differ when one considers rescuing. Indeed, in assessing the capacity of recovery of a distressed company, judges have to estimate its operability which depends on the volume of available inventories and net cash-flows. These two indicators are thus positively correlated to any rescue attempts or firms' survival in the long run.

The second hypothesis deals with the cost and the availability of the different financial sources and with the financial structure. Descriptive statistics (table5) show that companies in cessation

⁴ For a more detailed presentation of the initial sample and the different sub-samples, see tables N° 5 and beyond in appendices.

of payments are characterized by a lower level of long term financial resources than sound ones. This difference is still valid, even if less visible, when one firstly compares firms that benefit from a rescue attempt to the ones that are immediately liquidated and secondly compares surviving firms to definitely bankrupt ones. Even if one no longer considers that a unique optimal financial structure may be identified, the pecking order theory supports the idea that companies prioritize their sources of financing (from internal financing to equity) according to which the principle of least effort, or of least resistance, preferring to raise equity as a financing means of last resort. Hence, internal funds are used first, and when they are depleted, debt is issued. When it is not sensible to issue any more debt, equity is issued (Donaldson, 1961; Myers and Majluf, 1984). The ability of the firm to finance its investments by itself appears as a crucial factor for its stability. Thus, a high initial level of financial resources (equity and long-term debt) can protect the firm from a risk of failure. However, as shown by table 5, the rate of indebtedness (long and short-term debts, financial debt, tax debt and payables) is also positively correlated to the probability of i) cessation of payments and ii) liquidation. Creditors demand immediate payments of prior amounts due. Pressures on the firm become so high that the firm can no longer respect its commitments. On the contrary, the attempts of recovery and, consequently, the improvement of the firms' situation, are associated with a significant reduction in the proportion of debt in total liabilities. This relationship supports the idea that companies in a favorable position towards creditors have more chances to be rescued and/or to survive than the rationed ones.

Hypothesis 3 insists upon the corporate governance considering that firms integrated in large corporate groups are more likely to be supported by the parent company and thus less likely to be insolvent.

Hypothesis 4 takes into account Gibrat's law as it introduces firm's age and size as a factor of resilience but also as arguments used by judges to determine whether the insolvent company must be reorganized. Such a question is one of the main focuses of the *Law and economics* approach as the comparisons between French law, considered as an archetype of civil law, and English insolvency law taken as representative of common law countries often underline the primacy of employment to explain the decisions made by the French commercial courts. Descriptive statistics do not permit to observe clear differences between defaulting, immediately liquidated and liquidated after a rescue attempt compared to normally operating, rescued and finally successful companies. However, we introduce size corrected by age in the different models to bring some evidence to the debate on this question.

To verify these hypotheses, we test a number of financial variables used in research over the last three decades (see e.g. Beaver 1966; Altman 1968; Altman et al. 1977; Ohlson 1980; Zmijewski 1984; Casey and Bartczak 1985; Gentry et al. 1985; Jones 1987). These financial measures include ratios based on operating cash flow; working capital; profitability, turnover; financial structure; and debt-servicing capacity. Let us now briefly comment on the contextual variables. In contrast to previous research, which has tended to be restricted to industrial or manufacturing firms (Jones 1987), this study tests the predictive value of financial variables on ten disaggregated sectors: This classification approach has been adopted for a variety of reasons: (1) it recognizes that industry sectors are structurally different and have different financing, operating, and investing characteristics which can undermine inter-sector comparability and generalization (Ohlson 1980). We attempt to capture sector-specific effects in our modeling in order to make determinations about the generalization of our results; (2) the classification approach gives explicit recognition to the economic characteristics of the French economy, particularly the unequaled importance of the services sectors. Structural variables such as size, age and integration in a corporate group matter too. We assume that the larger the firm, the higher the probability to operate normally, to benefit from a reorganization decision and to

survive after a rescue. The same relationships are in force as one observes age and integration in a large group. Alternatively, the failures mostly concern independent, small and young firms.

Finally, four sets of explanatory variables are introduced in the equation to be estimated:

- Structural variables: Size, age, business group affiliation, industry, localization
- Financial variables: Total debt to total assets, debt cost
- Commercial variables: turnover, inventories
- Performance variable: profitability

Table 2 sum up the signs of the estimated coefficients.

Table 2: Expected signs of explanatory variables

<u>Variables</u>	Stage 1 : cessation of payments vs. normal activity	Stage 2: rescue vs. liquidation	Stage 3 : long term survival vs. subsequent liquidation
<i>Size (Employees)</i>	-	+	+
<i>Age</i>	-	+	+
<i>Group affiliation</i>	-	+	+
<i>Turnover decrease</i>	+	-	-
<i>Long-term financial resources</i>	-	+	+
<i>Financial debt</i>	+	-	-
<i>Tax payable ratio</i>	+	-	-
<i>Profitability ratio</i>	-	+	+
<i>Inventories ratios</i>	+	+	+
<i>Receivables ratio</i>	+	-	-
<i>Cash flow ratio</i>	-	+	+

3.3 Estimation technique

Contrary to the previous works, which considered default resolution as a static process (simple LOGIT or simple PROBIT approaches), we model the arbitration between the various legal solutions as a dynamic process which consists of the following steps:

- First step: the judge and/or the debtor arbitrate between either embracing bankruptcy or staying in business.
- Second step: based on the fact that bankruptcy was opted for in the first step, debtors, creditors and judges are left with two options: to opt for a rescue of the company or to prefer an immediate liquidation.
- Third step : the rescue attempt may be either a success in the sense that the company is still in business some years after the decision is made or a failure if the rescued company finally re-files a petition in bankruptcy or is liquidated

Facing a situation of insolvency can be regarded as a random event and, therefore, analyzed by discrete probability choices. Different probability distribution functions have been proposed in the literature to analyze dichotomous variables. A discussion of some of these functions can be found in Cox and Snell (1989). The choice of the logistic distribution function in the present

study has two advantages. Its mathematical formulation allows flexibility of the analysis and thus facilitates the interpretation of results thanks to the possibility to calculate odds ratios and marginal effects of explanatory variables.

Three logistic models have been estimated corresponding to as many stages of the insolvency process. In each stage a different probability is estimated indicating the firm's position in the bankruptcy process. The first model estimates the probability of a firm entering the bankruptcy proceedings within the next three years, while the second one evaluates the probability that it will obtain a plan of business reorganization from the commercial court judge. The third model estimates the likelihood of exiting the bankruptcy process and staying in business.

These three models describe the insolvency path using the same set of explanatory variables. The main concern here is to try to assess whether there are different explanations which can be given for each stage or whether the entire insolvency process may merely be explained by the same variables, which is a rather strong assumption.

In different models, the estimated probability depends on the size of the firm, its age, its possible affiliation to a group, its financial resources, its profitability and its production capacity. We adjust for the specific local characteristics by taking into account the company location based on our breakdown of French territory into six regions (Greater Paris region, North West, North East, South West, South East, Central region). The sectoral affiliation may also be a source of differences between firms in terms of insolvency. We distinguish ten sectors: manufacturing industries, food industries, communication technologies industry, restaurants and hotels, construction, retailing, transport, business services (except personal services), intellectual services and business administration. We control for this effect by adding a dummy variable for each sector minus one.

For the three logistic models, let y_i be a binary variable equals to 1 if we observe the event of interest (entry into bankruptcy proceedings, obtaining a plan of reorganization, still in business at the end of the process, respectively) and 0 otherwise. For the first stage model, for instance, let π_i denote the probability that a firm will enter into bankruptcy proceedings. The probability that the firm does not experience this situation is noted $(1 - \pi_i)$. The logistic procedure models the ratio of these two probabilities as a linear function in the explanatory variables. We can formulate in the same way the likelihood of observing events of interest in the second and third stage of bankruptcy proceedings.

The logistic equation to estimate for each stage using the corresponding 2007 cross section data, can be written as follows:

$$\begin{aligned} \log \frac{\pi_i}{(1 - \pi_i)} = & \alpha_0 + \alpha_1 \text{Size} + \alpha_2 \text{Age} + \alpha_3 \text{Group} + \beta_1 \text{Turn_Dec} + \beta_2 \text{Fin_Res} \\ & + \beta_3 \text{Receiv} + \beta_4 \text{Tax} + \beta_5 \text{Profit} + \beta_6 \text{Fin_Debt} + \beta_7 \text{Raw_Mat} \\ & + \beta_8 \text{Outstand_Invent} + \beta_9 \text{Finish_Invent} + \beta_{10} \text{Cash_Flow} \\ & + D_1 \text{Sector}_j + D_2 \text{Region}_k \end{aligned}$$

with:

Size: Number of employees at the end of the year 2007

Age: Firm age in 2007

Group: Dummy variable indicating a possible firm affiliation to a group

Turn_Dec: Dummy variable indicating three successive decreases in annual turnover

Fin_Res: Long term financial resources ratio

Receiv: Receivables ratio

Tax: Tax payable ratio

Profit: Gross operating surplus to total assets

Fin_Debt: Financial debt ratio

Raw_Mat: Raw materials inventories ratio

Outstand_Invent: Outstanding inventories ratio

Finish_Invent: Finished products inventories ratio

Cash_Flow: Cash-flow ratio

Sector_j: Sectoral dummies ($j=1, \dots, 10$)

Region_k: Regional dummies ($k=1, \dots, 6$)

The above equation is estimated by the Maximum Likelihood using Stata 11.2 software for the three stages. Each model has been run on a different sample of the year 2007. These samples were determined by the firm's situation in bankruptcy proceedings. The results are given in table 7 in appendices.

In the following section we discuss the main empirical results before concluding with some comments on their theoretical implications.

4 Results and discussion

The results for estimating three models are presented in Tables 2, 3 and 4 and commented on in this section.

4.1 Cessation of payments vs. normal activity

The results we obtained for this first model (Table 7) confirm the economic part of the path to insolvency described in section 2.1.2. Insolvent firms have a lower level of working capital, are more indebted (trade and financial debt), pay more interest on debts, experience a significant decrease in sales combined with an increase in inventories (regardless of the type of goods considered, raw materials, finished products or outstanding) and, finally, exhibit a net cash degradation as well as a declining profitability. The firm's accounting and strategic path dependencies are adjusted for structural and environmental effects. Beyond a certain level, age and size protect against failure. Indeed, insolvency primarily concerns young, small and independent companies. The integration within a corporate group always protects companies from failure, in particular because of the greater security of funding provided by this form of organization. As a result of this first model, one can state that firms with the lowest endowments and whose operating costs are the highest more often experience a cessation of payments than efficient ones.

The modeling of the probability of filing a petition for bankruptcy confirms the set of hypotheses. It is inasmuch higher as the company faces problems accessing the market (positive sign associated to 3 continuous decreases in turnover, inventories ratios and receivables), has to solve problems linked to availability and/or cost of financial resources: the probability of failing is greater for firms whose financial debts, tax and social insurance debts are the highest whereas self-financing is significantly lower. Hypothesis 3 is also verified as the sign associated to the

variable “*being integrated into a group*” is negative whereas large and old firms are significantly more able to resist failure, as suggested by hypothesis 4.

4.2 Liquidation vs. rescue

As an extension of the first model focused mainly on the economic part of the insolvency path, this second model aims at highlighting the rationality of the judges when they have to decide to close a business or rescue it. The results of the estimation firstly bring some evidence about the order that prevails in the sequence of events leading up to liquidation. Indeed, when compared to firms liquidated immediately after having filed for bankruptcy, reorganized companies are characterized by a lower level of debts. This situation attests to the facts that creditors still trust these debtors and are ready to lend them more money in order to make it possible the restructuring of the business. No difference is however observed as far as the other kinds of debts are concerned as the coefficients are not significant. Hypothesis 2, which concerns the role of financing structure and availability, is thus partially verified in this second stage.

On the contrary, hypothesis 1 is confirmed since upon deciding to rescue a company, commercial judges systematically take into account the relationships between the firm and its customers. Indeed, firstly, rescued companies have more important inventories of raw materials and outstanding production than others. The importance of these operating assets indicates a company's ability to restart an activity. Correlatively, rescued companies bear a lower ratio of trade receivables, a worse cash situation and a higher indebtedness than the ones that are directly liquidated. Integration into a corporate group tackled by hypothesis 3 is absolutely crucial in this decision process. Indeed, the coefficient associated to the variable “*being included in a corporate group*” is particularly high. This confirms the idea that as a shareholder, a corporate group has the power to both finance the reorganization on a distressed company and restore the confidence of the judges and other creditors in the capacity of the company to succeed in this process. Individual resilience exemplified by age and size is also a significant factor in determining the probability of being rescued. Another possible explanation of the positive correlation between size and rescue attempt is the impact on employment of the area; indeed, one can easily understand that the commercial court can hesitate closing a business without any attempt to reorganize it, especially when the local or macroeconomic context is depressed which was the case during the period 2007-2010.

To sum up the main result of this second model we may state that commercial judges primarily try to save businesses with the best chance of long-term survival and whose role on labor market is the most important.

4.3 Long term survival vs. subsequent liquidation

The results of the third model that estimates the probability of survival after a petition for bankruptcy show that companies which are able to recover present several significant characteristics that however differ from the ones identified in the first model which discriminates between going concerns and distressed companies. The firms which emerge from a reorganization plan successfully have demonstrated their capacity to stabilize their business, no longer exhibit a steady decline in their turnover and have renewed their inventories of finished products. Beyond its purely operational aspects, the growing weight of these inventories is characteristic of optimistic expectations on the future sales on the part of the management team. This productive recovery combines with a significant improvement in the financial structure mainly visible through the negative correlation between the probability of still being in business

after a reorganization plan and the ratio of receivables. Everything happens as if successful companies do not need to convince customers to buy their products by proposing attractive terms of payment. This situation contributes to the slackening of the constraint of liquidity attested by the positive sign associated to the variable “cash”. As a consequence of this operational and financial recovery, the increase in profitability is strongly and positively associated with the probability of survival after a reorganization plan.

As in the previous cases, the four stated hypotheses are confirmed by this last model. The relationship between market conditions and survival is validated as, once again, the probability of success is negatively correlated to the variable “3 successive decreases in the annual turnover” as well as to the share of receivables in the total assets and to the weight of finished products inventories, whereas the coefficients associated with the two other types of inventories are not significant. Hypothesis 2 is not verified at this stage of the insolvency path since no external financial resource plays a role in differentiating between successful and failing firms once they have implemented a reorganization plan. One may assume that at this stage of the rescuing process the companies with the most severe financial problems have been eliminated during the second stage so they cannot pretend to benefit from a rescue attempt. However, if external financial resources do not make any differences between the two possible cases, profitability appears to play a strong and positive role in determining the probability of survival of previously distressed companies. A possible explanation of the difference between the crucial role of this exogenous variable and the other ones illustrating the financial relationships of distressed firms has to do with the twofold sense of profitability. It is both an indicator of the capability of a company to self-finance its activity and a “residue” to be shared between reinvestment or dividends to the shareholders. This last interpretation probably prevails in this model so that one may consider, just as in the first model that firms making profits are less likely to fail than unprofitable ones. The third hypothesis concerning the role of the relationships with the parent company is never confirmed as most companies remaining in the last sub-set are integrated in corporate groups, independent ones being very rare at this stage of the process. It is then not surprising to observe that no evidence in favor of the robustness of the third hypothesis is brought by the estimation. As a way of testing the capacity of resilience of companies which are victims of financial difficulties, hypothesis 4 introduced the age and the size as differential variables. This last variable is not significant. The smallest companies tend to be immediately liquidated without any rescue attempt mainly because their exit from the market has no important consequences on local employment. Age plays a significant but non prominent role. The positive correlation between age and the probability of survival may be connected to accumulated experience, skills and know-how which can be assimilated to intangible resources. These resources can be mobilized to strengthen the effects of the decisions made to restore competitiveness.

In order to conclude with this final stage we may consider that firms able to mobilize their internal resources in order to renew the goods they produce and to improve their market share have the highest probability of long-term survival.

5 Conclusion

The purpose of this paper was to provide a framework which goes beyond a dichotomist choice between operating and bankrupt firms in order to better understand how companies fail. To do so, we began by proposing an analytical approach compatible with a gradual conception of insolvency. Companies whose financial and economic ratios reflect a real distress have to leave the economic world to file a petition for bankruptcy, entering then in a judicial world

characterized by rules going beyond the pure respect of prior commitments. Along this so-called insolvency path three mile-stones can be noticed. The first one consists in the declaration of insolvency and draws a separation line between going concerns and firms in cessation of payments. The second one appears at the moment the commercial judges have to decide, in accordance with debtors and creditors to liquidate or to rescue the insolvent company. The third one, coming several years after the implementation of the reorganization plan, signals the end of the path as it gives an official recognition either of the definitive failure of the reorganized company or of the favorable outcome of the process, i.e., the firm's survival and renewal with success.

From this progressive framework we are able to draw two types of conclusion. The first one deals with the differences in the profile of the firms from the moment where the difficulties are officially recognized to their effective disappearance, whereas the second one concerns the judgment we can bear about the rationale of the French insolvency law.

Corporate insolvency law can draw a line between healthy firms endowed with sufficient resources in the economic order and companies whose difficulties are so significant that they undermine their ability to meet their commitments and cause the switch to a second order, the legal system. The importance of the definition of failure and the borders between healthy and distressed companies did not escape the legislator. Changes brought to corporate insolvency Law support this assumption. This law determines the rules of exit from the market. It is used as a corporate demography restructuring tool and, therefore, allows an adaptation of the economy. It is positioned at the heart of the Schumpeterian process of creative destruction, and contributes significantly to determine its severity.

Analysis of *Law in the Court* rather than *Law in the Book* shows that the rationality of commercial court is not a strict application of an invariable procedure. The three sequential models we study show that judges have to consider the economic reality of companies to make their decisions. The changes in the signs and level of coefficients associated with the different explanatory variables contrast with the pro-debtor French conception of insolvency law popularized by *Doing Business reports* and the theory of legal origins. Indeed, even if commercial courts are clearly preoccupied by the consequences of firms exit from the market as suggested by the importance of the variable *Size*, measured by the number of employees, it is also clear that the possibilities and the conditions of access to financial resources also motivate the decision to declare insolvency, to reorganize or, in the end, to liquidate a company. The importance of the individual characteristics of the firms appears also through the significance of coefficients associated with the variables. It illustrates the quality of the relationships between the company and its customers. So, far from being mainly, or even only, preoccupied by the survival of the company in order to preserve employment and continued economic activity, French commercial judges appear to be influenced in their decision-making by the firm's resilience as reflected by the usual accounting ratios.

Some limits should however be pointed out. The first one has to do with a bias in the sample. Indeed, despite all the possibilities offered by the law, bankruptcy proceedings almost always end with the liquidation of the company. This creates a distortion in the result we obtain insofar as the observed rates of rescue attempts exceed 76% in the studied population whereas they are about 10% in the total population. This major difference comes from the fact that, due to the sources mobilized, our database only includes firms with 10 employees or more and presents an abnormally high proportion of industrial companies. Another limit comes from the arbitrary cut-off of the procedure three years after the entry. These two drawbacks are however impossible to avoid as no exhaustive database of firms employing fewer than 10 workers exists in France.

Another limit to underline concerns the period we studied. Centering primarily on 2007-2010, our purpose was to focus on the most recent available data. However, the last three years correspond to the most severe economic crisis of the last sixty years making it difficult to generalize our results. In order to limit the idiosyncratic conclusion, we intend to enlarge this research to other periods. We can also consider the possibility of adapting a logistic nested model.

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Appendices

Table 3: Descriptive statistics of the total population in 2007 (143 114 companies with 10 employees and more) (Source: EAE INSEE-LIFI-DIANE)

Industry in 2007 Stage I	1 Cessation of payment		2 Normal activity		Total	
	%	Number	%	Number	%	Number
Food industries	3.9	212	96.1	5,256	100	5,468
Manufacturing industries	8.1	2,271	91.9	25,693	100	27,964
NTIC	5.3	338	94.7	6,080	100	6,418
Hotels and restaurants	3.0	317	97.0	10,133	100	10,450
Construction	6.4	1,517	93.6	22,033	100	23,550
Retailing	4.1	1,601	95.9	37,142	100	38,743
Transport and mail	6.4	669	93.6	9,755	100	10,424
Business services	6.6	528	93.4	7,472	100	8,000
Intellectual services	3.0	306	97.0	9,841	100	10,147
Business administration	3.7	72	96.3	1,878	100	1,950
<i>Size in 2007</i>						
[10-19] employees	5.2	3,354	94.8	61,757	100	65,111
[20-249] employees	5.9	4,330	94.1	68,653	100	72,983
[250 employees and more	2.9	147	97.1	4,873	100	5,020
<i>Group affiliation in 2007</i>						
Independent firms	6.4	6,282	93.6	91,279	100	97,561
Firms belonging to a group	3.4	1,549	96.6	44,004	100	45,553

Table 4: Descriptive statistics in 2007 of 7831 companies which entered bankruptcy proceedings between 2007 and 2010 (Source: EAE INSEE-LIFI-DIANE)

Industry in 2007 Stage II	1 Rescue attempt		2 Immediate liquidation		Total	
	%	Number	%	Number	%	Number
Food industries	87.3	185	12.7	27	100	212
Manufacturing industries	87.0	1,976	13.0	295	100	2,271
NTIC	75.4	255	24.6	83	100	338
Hotels and restaurants	83.3	264	16.7	53	100	317
Construction	73.1	1,109	26.9	408	100	1,517
Retailing	67.8	1,085	32.2	516	100	1,601
Transport and mail	73.5	492	26.5	177	100	669
Business services	65.0	343	35.0	185	100	528
Intellectual services	77.8	238	22.2	68	100	306
Business administration	94.4	68	5.6	4	100	72
<i>Size in 2007</i>						
[10-19] employees	70.4	2,362	29.6	992	100	3,354
[20-249] employees	81.1	3,513	18.9	817	100	4,330
[250 employees and more	95.2	140	4.8	7	100	147
<i>Group affiliation in 2007</i>						
Independent firms	73.1	4,591	26.9	1,691	100	6,282
Firms belonging to a group	91.9	1,424	8.1	125	100	1,549

Table 5: Descriptive statistics in 2007 of 6015 companies having exited bankruptcy proceedings between 2007 and 2010 (Source: EAE INSEE-LIFI-DIANE)

Industry in 2007 Stage III	1 Rescued		2 Liquidation		Total	
	%	Number	%	Number	%	Number
Food industries	57.3	106	42.7	79	100	185
Manufacturing industries	58.7	1,159	41.3	817	100	1,976
NTIC	48.2	123	51.8	132	100	255
Hotels and restaurants	70.8	187	29.2	77	100	264
Construction	49.4	548	50.6	561	100	1,109
Retailing	49.3	535	50.7	550	100	1,085
Transport and mail	56.7	279	43.3	213	100	492
Business services	57.1	196	42.9	147	100	343
Intellectual services	59.7	142	40.3	96	100	238
Business administration	72.1	49	27.9	19	100	68
Total	55.3	3,324	44.7	2,691	100	6,015
<i>Size in 2007</i>						
[10-19] employees	58.3	1,377	41.7	985	100	2,362
[20-249] employees	53.0	1,861	47.0	1,652	100	3,513
[250 employees and more	61.4	86	38.6	54	100	140
Total	55.3	3,324	44.7	2,691	100	6,015
<i>Group affiliation in 2007</i>						
Independent firms	53.5	2,455	46.5	2,136	100	4,591
Firms belonging to a group	61.0	869	39.0	555	100	1,424
Total	55.3	3,324	44.7	2,691	100	6,015

Table 6 - Descriptive statistics of explanatory variables used in models

		N.	Missing values	10 th percentile	25 th percentile	median	75 th percentile	90 th percentile
Size (number of employees)	Cessation of payments	7,831		10	13	22	39	76
	Normal activity	135,283		10	13	21	42	97
	Rescuing	6,015		10	14	24	43	89
	Liquidation	1,816		10	12	18	28	45
	Long term survival	3,324	,	10	14	23	43	91
Age	Subsequent liquidation	2,691	,	11	15	25	43	86
	Cessation of payments	6,876	955	3	6	13	23	37
	Normal activity	125,973	9,310	4	9	17	27	41
	Rescuing	5,528	487	3	7	14	24	39
	Liquidation	1,348	468	2	5	10	19	32
Long term financial resources	Long term survival	3,141	183	3	7	15	25	41
	Subsequent liquidation	2,387	304	3	6	13	22	38
	Cessation of payments	4,747	3,084	-0.436	-0.013	0.156	0.311	0.462
	Normal activity	113,659	21,624	0.090	0.221	0.373	0.525	0.662
	Rescuing	3,981	2,034	-0.421	-0.013	0.158	0.315	0.462
Receivables	Liquidation	766	1,050	-0.549	-0.018	0.138	0.284	0.460
	Long term survival	2,682	642	-0.381	0.002	0.172	0.332	0.484
	Subsequent liquidation	1,299	1,392	-0.478	-0.045	0.135	0.278	0.425
	Cessation of payments	4,747	3,084	0.162	0.315	0.504	0.693	0.824
	Normal activity	113,659	21,624	0.082	0.228	0.421	0.609	0.772
Tax payable ratio	Rescuing	3,981	2,034	0.160	0.309	0.492	0.679	0.812
	Liquidation	766	1,050	0.181	0.360	0.570	0.763	0.895
	Long term survival	2,682	642	0.144	0.297	0.479	0.655	0.795
	Subsequent liquidation	1,299	1,392	0.188	0.338	0.523	0.713	0.840
	Cessation of payments	3,981	2,034	0.055	0.107	0.197	0.338	0.547
Profitability	Normal activity	766	1,050	0.000	0.102	0.235	0.402	0.630
	Rescuing	4,747	3,084	0.051	0.106	0.202	0.350	0.568
	Liquidation	113,659	21,624	0.045	0.081	0.140	0.223	0.332
	Long term survival	2,682	642	0.055	0.104	0.190	0.327	0.536
	Subsequent liquidation	1,299	1,392	0.055	0.116	0.208	0.365	0.565
Financial debt ratio	Cessation of payments	4,747	3,084	-0.257	-0.090	0.020	0.098	0.197
	Normal activity	113,659	21,624	-0.038	0.031	0.097	0.182	0.294
	Rescuing	3,981	2,034	-0.248	-0.089	0.019	0.095	0.188
	Liquidation	766	1,050	-0.292	-0.092	0.029	0.124	0.263
	Long term survival	2,682	642	-0.211	-0.064	0.027	0.103	0.194
Cash flow ratio	Subsequent liquidation	1,299	1,392	-0.327	-0.133	-0.006	0.078	0.172
	Cessation of payments	3,981	2,034	0.009	0.061	0.179	0.345	0.572
	Normal activity	766	1,050	0.000	0.021	0.129	0.303	0.537
	Rescuing	4,747	3,084	0.006	0.055	0.172	0.340	0.570
	Liquidation	113,659	21,624	0.000	0.026	0.112	0.257	0.442
Raw materials inventories ratio	Long term survival	2,682	642	0.012	0.065	0.178	0.339	0.572
	Subsequent liquidation	1,299	1,392	0.006	0.052	0.183	0.357	0.571
	Cessation of payments	4,747	3,084	-0.670	-0.504	-0.329	-0.150	0.002
	Normal activity	113,659	21,624	-0.514	-0.344	-0.156	0.027	0.235
	Rescuing	3,981	2,034	-0.668	-0.504	-0.334	-0.162	-0.017
Outstanding inventories ratio	Liquidation	766	1,050	-0.692	-0.499	-0.296	-0.070	0.092
	Long term survival	2,682	642	-0.653	-0.484	-0.324	-0.153	-0.006
	Subsequent liquidation	1,299	1,392	-0.710	-0.545	-0.360	-0.186	-0.042
	Cessation of payments	4,747	3,084	0.000	0.000	0.020	0.088	0.176
	Normal activity	113,659	21,624	0.000	0.000	0.002	0.035	0.108
Finished products inventories ratio	Rescuing	3,981	2,034	0.000	0.000	0.025	0.096	0.181
	Liquidation	766	1,050	0.000	0.000	0.000	0.045	0.134
	Long term survival	2,682	642	0.000	0.000	0.027	0.096	0.179
	Subsequent liquidation	1,299	1,392	0.000	0.000	0.022	0.094	0.186
	Cessation of payments	4,747	3,084	0.000	0.000	0.000	0.044	0.130
Finished products inventories ratio	Normal activity	113,659	21,624	0.000	0.000	0.000	0.006	0.066
	Rescuing	3,981	2,034	0.000	0.000	0.000	0.048	0.134
	Liquidation	766	1,050	0.000	0.000	0.000	0.022	0.102
	Long term survival	2,682	642	0.000	0.000	0.000	0.049	0.133
	Subsequent liquidation	1,299	1,392	0.000	0.000	0.000	0.043	0.136
Finished products inventories ratio	Cessation of payments	4,747	3,084	0.000	0.000	0.000	0.000	0.087
	Normal activity	113,659	21,624	0.000	0.000	0.000	0.000	0.018
	Rescuing	3,981	2,034	0.000	0.000	0.000	0.000	0.096
	Liquidation	766	1,050	0.000	0.000	0.000	0.000	0.000
	Long term survival	2,682	642	0.000	0.000	0.000	0.000	0.106
Subsequent liquidation	1,299	1,392	0.000	0.000	0.000	0.000	0.076	

Tableau 7: Logit estimation of the probability of entering bankruptcy proceedings

Variables	First stage model	Second stage model	Third stage model
Size (number of employees)	-0.001*** (0.000)	0.01** (0.004)	0.001 (0.000)
Age	-0.01*** (0.001)	0.02*** (0.005)	0.01*** (0.003)
Group affiliation	-0.58*** (0.046)	0.39** (0.166)	-0.01 (0.095)
Turnover decrease	0.85*** (0.096)	0.54* (0.316)	-0.32* (0.164)
Long term financial resources	-2.29*** (0.117)	0.15 (0.153)	0.00 (0.138)
Receivables	0.19 (0.114)	-0.48* (0.273)	-0.79*** (0.221)
Financial debt ratio	2.45*** (0.181)	0.09 (0.239)	0.03 (0.229)
Profitability	-2.64*** (0.151)	-0.23 (0.233)	1.42*** (0.223)
Tax payable ratio	0.86*** (0.114)	0.53** (0.249)	0.16 (0.182)
Raw materials' inventories ratio	2.19*** (0.295)	1.36* (0.819)	-0.10 (0.554)
Outstanding inventories ratio	1.64*** (0.286)	2.11** (0.846)	0.53 (0.624)
Finished products inventories ratio	3.79*** (0.492)	1.25 (1.285)	1.54** (0.779)
Cash flow ratio	-0.98*** (0.097)	-0.62*** (0.208)	0.32* (0.171)
Sectoral dummies	yes	yes	yes
Regional dummies	yes	yes	yes
Constant	-2.80*** (0.115)	0.60** (0.267)	0.79*** (0.212)
Observations	105,945	4,250	3,551
Pseudo R-squared	0.16	0.09	0.03
Log likelihood	-13606.67	-1633.25	-2157.14

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.10