Failure patterns amongst small firms and their financial symptoms : A test of hypotheses

Introduction

Financial indicators have been widely used in the business failure literature in order to predict the risk of failure[1] of firms (Beaver, 1966; Altman, 1968; Barnes, 1987; Aziz et al., 1988). The studies on business failure prediction are based on the original work of Beaver (1966) and Altman (1968). In contrast, financial ratios have been less commonly used in a more preventive perspective to failure (Van Wymeersch and Wolfs, 1996; Van Caillie, 2000; Balcaen and Ooghe, 2006). Nevertheless, in a preventive perspective to small business failure, it is important to better understand how financial symptoms combine over time (Ooghe and Van Wymeersch, 1986) and to identify if relationships can be traced between the fundamental causes of failure and specific financial indicators.

An interesting starting point for this last consideration would be the work of Crutzen (2009) and Crutzen and Van Caillie (2009). Indeed, based on unique information about the failure origins of a sample of 203 small Belgian distressed firms[2], this research stresses five major explanatory failure patterns amongst small firms (EBFPs). These patterns are presented in Table 1 :

EBFP 1	Shocked firms	
EBFP 2	Firms serving other interests	
EBFP 3	Apathetic firms	
EBFP 4	Firms that fail because of a punctual managerial error	
EBFP 5	Badly-managed firms	5a - Firms with deficiencies in strategic management
		5b - Totally badly-managed firms
		5c - Firms with deficiencies in business administration

Table 1 : Five major EBFPs amongst small firms (Crutzen, 2009)

Referring to these original EBFPs, this paper tends to integrate the organizational and financial approaches of small business failure. This paper aims at determining if these EBFPs can be associated with some specific financial indicators and, if so, if small distressed firms can be associated to one particular EBFP on the basis of the financial information published in the annual accounts. If each EBFP leads to some specific financial symptoms, then it will be possible to get a proxy information about the fundamental problems inducing failure without having any access to internal information, this identification being considered as a crucial step in the elaboration of any recovery or takeover plan (Argenti, 1976; Gaskill et al., 1993)[3].

Therefore, the objective of this paper is not to help to detect distressed firms as early as possible (as in predictive studies) but is to help key actors to easily identify, on the basis of external financial information, from which patterns distressed firms are coming from and in particular, to determine the fundamental causes of their failure in order to

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1 Bankruptcy mainly
2 Firms investigated by the Court of Commerce of Liège in the framework of a Commercial Inquiry, a Legal Reorganization or a Bankruptcy
3 Already in 1976, Argenti stated that "*only corrective actions that would solve the fundamental causes of the difficulties would really lead to a lasting recovery of the firm*".

implement the possible adequate corrective actions.

In order to reach this objective, the present paper is based on a deductive reasoning (Thiétart, 2003) : it tests a series of hypotheses which relates to the various patterns. These hypotheses are elaborated on the basis of the description of the patterns identified by Crutzen (2009) and on the basis of three underlying (financial) models : Beaver's cash flow model (1966), Ooghe and Van Wymeersch's financial failure path (1986) and Laitinen's financial failure processes (1991).

The present study is based on the following basic assumptions.

Firstly, all failing firms do not behave the same way in terms of financial ratios once they enter the second step of the failure process, i.e. the distress phase. Different financial failure processes may thus be distinguished such as an acute or a chronic financial failure process (Laitinen, 1991). Nevertheless, in fine, the financial symptoms themselves seem to be relatively similar from one distressed firm to another (Ooghe and Van Wymeersch, 1986; Mone et al., 1998). It is rather the first symptoms (or early warning signals) and the speed at which the financial symptoms deteriorate that vary from one firm to another (D'Aveni, 1989a; Laitinen, 1991).

Secondly, the choice of the five basic financial dimensions and of the ratios under consideration in the present study is made on a solid theoretical basis (Barnes, 1987; Karels and Prakash, 1987) : the models of Beaver (1966), of Ooghe and Van Wymeersch (1986, 2006) and of Laitinen (1991) are considered as a basis for the selection of the financial ratios. Actually, these researchers selected a limited amounts of financial ratios on the basis of a theoretical model as well as on the basis of an extensive review of pertinent ratios used in the previous literature on business failure.

Thirdly, all distressed firms from the sample are not at the same stage of the failure process when they are considered : some firms only show several failure symptoms (at a Commercial Inquiry) whereas other ones are already bankrupt. It is thus very difficult to compare the evolution of their financial situation in the year(s) preceding this moment. Indeed, it is reasonable to assume that the financial ratios generally deteriorate more rapidly in the years preceding the bankruptcy of the firm than in the years preceding a Commercial Inquiry (Marco, 1989).

Considering this point, the coherence in the sequential measurement of the financial ratios of the sampled firms is defined by the Signaling Approach (Spence, 1973), which is integrated into the framework of the Agency Theory (Jensen and Meckling, 1976; Fama, 1980). According to these approaches, the managers, who are within the firm, dispose of a better information about the firm than outsiders do. Therefore, signals are sent outside (with or without the approval of the management) in order to inform the external world about the firm's situation : official communications, annual accounts, legal signals such as protests, etc. (D'Aveni, 1989).

With reference to these approaches, the present analysis includes, for all kinds of sampled firms[4], the financial ratios that relate to the (seven) years before the **first external signals** are detected and considered as relevant and sufficiently intense by the Court, so that it regards each firm as a (detected) distressed firm[5]. Concretely, for each case, we identified the year in which, for the first time, failure signals emitted by the firm were so intense that the Court considered the

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4   Distressed firms convoked to a Commercial Inquiry, engaged into a Legal Reorganization or into a Bankruptcy procedure.
5   Indeed, in some cases, a file was open beforehand by the Court on the basis of the detection of relevant signals. Some firms were thus considered as "detected distressed firms" some months or years before a Commercial Inquiry was organized or before entering a Legal Reorganization or a Bankruptcy procedure.

firm as in distress (N). Then, we collected, for each case, relevant financial information for the seven years before this moment. Finally, we tried to identify relationships between the EBFP to which the firm was related and (the evolution of) its financial ratios.

Fourthly, as N is determined on the basis of the system of the Court for detecting and analyzing external failure signals, this latter is considered as meaningful[6] in the present study.

Fifthly, the macroeconomic environment has an homogeneous impact on the whole sample of small firms[7] because all the firms are located in the same geographical area (the juridical area of Liège) and because all of them are small firms. Thus, we may assume that they do not exert any dominant influence on their market (or on the environment) (Delacroix and Swaminathan, 1991; Hall, 1994).

The paper is organized as follows. The first section presents the conceptual framework of the current study. The second section exposes the hypotheses that are tested in this paper. The methodology used to test the hypotheses is presented in the third section : the sample, the variables and the data analysis methods are clarified. Then, the results of the empirical analysis are outlined. Finally, the fifth section discusses these empirical results and summarizes the main findings of the study.

1. Conceptual framework

The current study is based on a series of hypotheses which have been determined on the basis of three previous research : Beaver's cash flow model (1966), Ooghe and Van Wymeersch's financial failure path (1986) and Laitinen's financial failure processes (1991).
An overview of these models is proposed below.
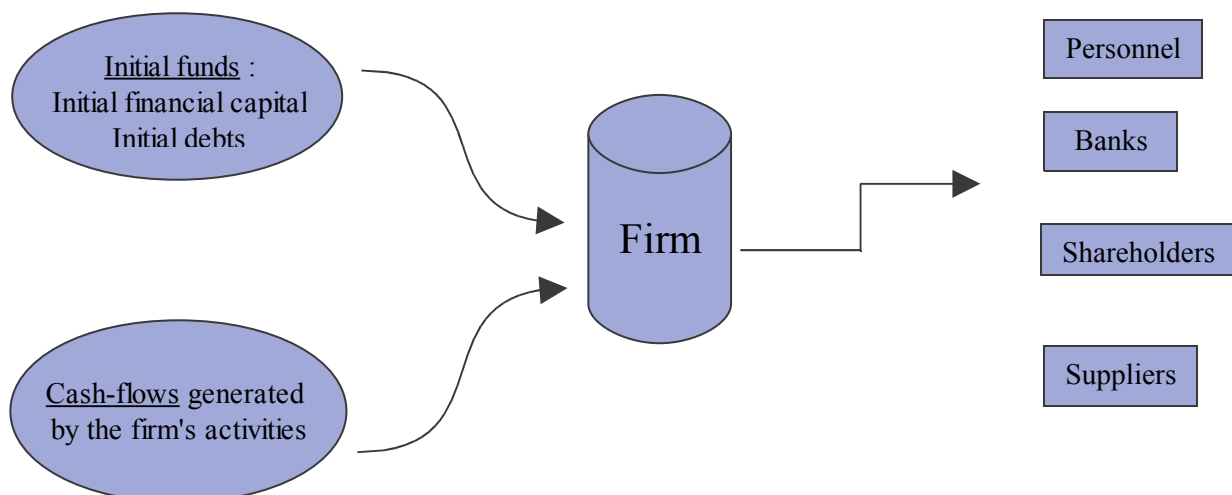
1.1. Beaver's Cash Flow Model (1966)

Figure 1 : The Cash Flow Model (Beaver, 1966)

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6   This means that we assume that this detection system is based on a clear and logical method which makes sense. Indeed, we cannot assume this system is totally efficient (i.e. detection of ALL distressed firms).
7   Firms face similar market conditions (Hall, 1994)

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In this model (Figure 1), the firm is viewed as a reservoir of liquid assets, which is supplied by inflows and outflows. This reservoir serves as a cushion, or as a buffer, against variations in the flows. The solvency of the firm can be defined in terms of the probability that the reservoir will be exhausted, at which point the firm will be unable to pay its obligations as they mature. Considering this view of the firm:

- The larger the (initial) reservoir, the smaller the probability of failure.
- The larger the (net liquid-asset) inflows from operations (i.e. cash flow), the smaller the probability of failure.
- The larger the amount of debt held, the greater the probability of failure.
- The larger the expenditures for operations (i.e. outflows from operations), the greater the probability of failure.

With reference to this model, it is reasonable to assume that all distressed firms have some problems regarding this cash flow reservoir. Nevertheless, it is obvious that differences exist between distressed firms : some of them have had a too small reservoir since their creation, other ones suffer from insufficient inflows or from disproportionate outflows, etc. We may thus imagine that the 203 distressed firms of the sample may have specific problems in function of the fundamental reasons for their failure (in function of their EBFP).

1.2. Ooghe and Van Wymeersch's financial failure path (1986)
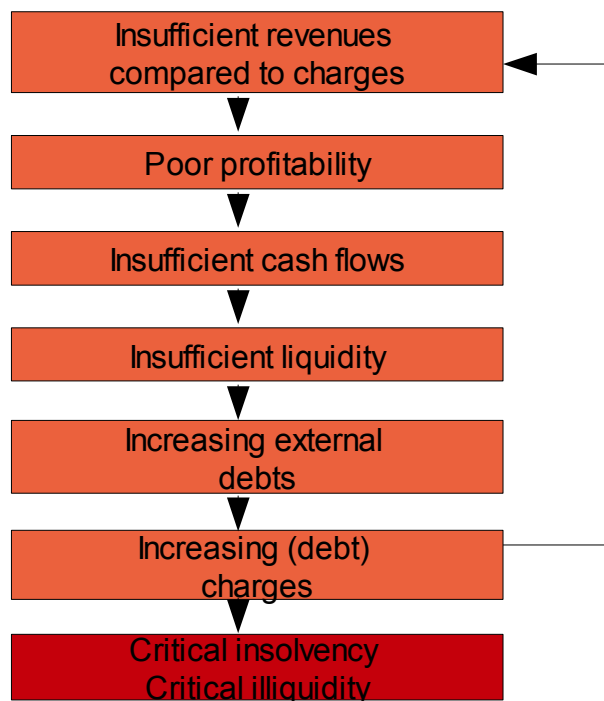

Figure 2 : The Financial Failure Path (Ooghe and Van Wymeersch 1986)

Ooghe and Van Wymeersch (1986) argue that the sequence of financial symptoms remains quite similar from one distressed firm to another and they present one (general) financial failure path.

According to their model (Figure 2), the financial downward spiral starts with an insufficient amount of sales compared to the amount of expenses the firm has to support. This leads to a lack or to a decrease in the profitability of the firm.

The insufficient or decreasing profitability of the firm leads to a lack of cash flows. This lack of cash flows, eventually combined with excessive investments, conducts to a lack of liquidity. Then, as the firm needs cash, the leaders of the firm are obliged to look for external financing. Indeed, as the situation of the firm has deteriorated and as the partners begin to have some doubt about it, it is difficult to attract new investors in order to increase the equity of the firm. The leaders are thus forced to increase the level of external debts (banks, public institutions, etc.) and, as a result, the firm's solvency decreases. Finally, the increase in the level of external debts of the firm finally leads to an increase in its financial expenses.

The increase in the financial expenses of the firm, combined with the increasing deterioration of its organizational situation, leads to an additional decrease in the firm's profitability. Subsequently, there is a more substantial lack of cash flows and more significant liquidity problems. This is why the level of external debts increases again and the financial expenses too… etc.

1.3. Laitinen's financial failure processes (1991)

Laitinen identifies three alternative types of financial failure processes.

Firstly, the *chronic failure process* refers to firms in which almost all financial ratios are poor already in the fourth year before bankruptcy.

Secondly, the *revenue financing failure process* relates to firms whose indebtedness and static liquidity are on an average level in every year before bankruptcy. However, the sufficiency of revenue financing is rather low because of a poor profitability and of a slow accumulation of revenues.

Thirdly, the *acute failure process* concerns firms where almost all the financial ratios dramatically deteriorate in the first year before bankruptcy.

1.4. A coherent conceptual framework

The three models presented before are coherent and they are even complementary for a global understanding of financial distress. Indeed,

- At first, the model of Beaver (1966) perceives the firm as a liquidity reservoir and it stresses how financial distress can originate from distinctive problems with this reservoir. This model concentrates thus on the working of the liquidity reservoir of the firm and it highlights its potential deficiencies.
- Then, the model of Ooghe and Van Wymeersch (1986) shows how financial symptoms deteriorate (as a financial failure process) once the firm is in distress. This model concentrates on the general (financial) steps through which all distressed firms pass through until their potential bankruptcy.
- Finally, the model of Laitinen (1991) focuses on how the deterioration of the financial symptoms of firms can differ from one firm to another. This model identifies several typical financial failure paths amongst distressed firms.

2. Hypotheses

Based on the conceptual framework presented in the Introduction and in Section 1, this section presents the hypotheses that are tested in the present study. It is divided into two sub-sections :

- Section 2.1. presents two general hypotheses which concern all distressed firms.

- Section 2.2. elaborates a series of hypotheses which are specific to each pattern, in order to test if relationships can be traced between the typical fundamental (organizational) problems and financial symptoms.

2.1. General hypotheses[8]

Firstly, as the sample only consists of distressed[9] firms, by definition, all are engaged into a financial downward spiral (Ooghe and Van Wymeersch, 1986) and all of them are thus confronted to problems regarding Beaver's cash flow model (1966), i.e. problems of original size, problems of inflows or problems of outflows. As Ooghe and Van Wymeersch state (1986), it is reasonable to assume that, globally, their financial ratios deteriorate more and more when approaching the year N.

H1 : Globally, when evolving towards N, the financial ratios of the sampled firms deteriorate more and more.

Secondly, as the sample of firms consists of firms considered as distressed firms by the Court of Commerce of Liège, we may assume that, globally, the sampled firms have liquidity and solvency problems in N. Indeed, as Ooghe and Van Wymeersch remember (1996), the criteria used by the Court to detect distressed firms are based on these two financial dimensions.

H2 : Globally, all the sampled firms have a weak solvency and a weak liquidity in N.

2.2. Specific hypotheses

Specific hypotheses are constructed for each pattern in order to test if relationships can be traced between the fundamental (organizational) problems and financial symptoms. All these hypotheses are elaborated on the basis of a combination of the description of the EBFPs presented in the Introduction (Crutzen, 2009) with the information, either expressed or latent, contained in the models of Beaver (1966), Ooghe and Van Wymeersch (1986) and Laitinen (1991).
[10]

2.2.1. *Shocked firms (EBFP 1)*

With reference to Crutzen (2009), this pattern refers to small firms that fail after one or several shocks such as the

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8   The general hypotheses are directly deducted from the models presented below.
9   Firms that are engaged into a failure process and whose (organizational) situation is so much deteriorated that they show (external) signs of failure (financial failure symptoms mainly).
10 In the context of this study, the hypotheses are not necessarily synchronized : they should be considered separately.

bankruptcy of an important customer or the firm's takeover. These shocks are punctual events in the firm's life and they provoke its entry into a failure process because the entrepreneurs state that their firm had no particular problems before this shock.

Considering this description, we may assume that firms belonging to this pattern are associated with non problematic financial indicators (compared to other firms) before the occurrence of the shock and that their financial situation (added value, profitability, solvency and liquidity) suddenly deteriorates after this event. By definition, we may thus assume that firms belonging to this pattern tend to follow an acute financial failure process (Laitinen, 1991) : problems in their liquidity reservoir appear suddenly (Beaver, 1966) and the deterioration of their financial symptoms (Ooghe and Van Wymeersch) is quite rapid.

H1a : Shocked firms are associated with non problematic[11] ratios before the occurrence of the shock.

H1b : Shocked firms are associated with a sudden deterioration of their financial ratios after the occurrence of the shock.

2.2.2. *Firms serving other interests (EBFP 2)*

This pattern relates to small firms whose operations mainly serve other interests than their own ones. In these firms, the (personal or professional) objectives of the entrepreneurs are, consciously or unconsciously, not aligned with the corporate goals. The predominance of the entrepreneur's personal interests over the firm's ones (such as a disproportionate amount of shareholders' receivables) and fraudulent activities are strongly associated to EBFP 2.

Regarding this definition, we may assume that these firms are often associated with missing data. This situation can notably be explained by the following two elements. Firstly, their leaders may try to hide their fraudulent activities or abnormal practices, so that, even if they have made up financial statements, they do not publish them (or hand them over to outsiders for evaluation). Secondly, the (expert)accountant who produces the annual accounts and who has to validate them may refuse to publish them if he notes some malpractices.
In addition, we may assume that these firms are associated with a weak liquidity for a longer time than other sampled firms. Indeed, the liquidity problems of firms belonging to other EBFPs are generally the consequences of other fundamental problems and of a progressive deterioration of their (organizational and financial) situation (Ooghe and Van Wymeersch, 1986). In contrast, Crutzen and Van Caillie (2009) stress that, in most of the firms belonging to EBFP 2, the main fundamental problem is that the entrepreneurs withdraw the cash for other uses than those required by the activities of the firms.

H2a : Firms belonging to EBFP 2 are often associated with missing data.

H2b : Firms belonging to EBFP 2 are associated with a weak liquidity for a longer time than other sampled firms.

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11 As the database only consists of distressed firms, it is reasonable to assume that, globally, this pattern should be associated with <u>less poor</u> ratios (than other firms) before the occurrence of the shock.

2.2.3. Apathetic firms (EBFP 3)

This pattern concerns small firms that become progressively misaligned with their environment because their leaders lack the ability to anticipate events and to adapt to (progressive) changes. The main fundamental reasons for their progressive misalignment with their external environment is the lack of dynamism and the loss of motivation of their leaders.

Referring to this description, we may assume that these firms tend to follow a chronic financial failure process (Laitinen, 1991) : their (financial) situation deteriorates progressively over years.

At first, we may assume that these (older) firms tend to have an important structure compared to their level of activities[12]. As these firms become progressively misaligned with their environment, they are thus globally associated with a weak and decreasing level of activities compared to their asset structure.

In addition, we may assume that these firms, whose structure, strategy and management (methods) have not been progressively adapted to the evolution of their environment, have had a poor added value and profitability since a longer time than other firms. Indeed, the structure of these firms generates expenses (fixed costs, personnel costs, etc.) that are too important compared to their (weak and decreasing) level of activities. In particular, this leads to disproportionate personnel costs compared to added value, to a poor return on investment and to poor cash flows ratios. Nevertheless, as their financial failure process is a chronic one, we may expect that, when approaching N[13], these ratios continue to decrease but less rapidly than the ratios of firms belonging to other EBFPs.

H3a : Firms belonging to EBFP 3 are associated with a weak (and decreasing) level of activities compared to other firms in the years preceding N.

H3b: Firms belonging to this EBFP are associated with a weak (and decreasing) added value and profitability for a longer time than other firms but, globally, in the years close to N, this decrease is more progressive than in other firms'.

2.2.4. Firms that fail after a punctual managerial error (EBFP 4)

The fourth pattern identifed by Crutzen (2009) is related to a punctual (strategic) managerial error, which is linked to the (in)ability of the entrepreneur to correctly analyze the firm's environment, to anticipate changes and to adapt the firm to it. It concerns firms that fail because they are founded on a non-viable business plan or because a managerial decision that does not have the expected consequences (such as a missed strategic reorientation or failed big investment) is made.

Considering the above-mentioned description, we may assume that, once their punctual strategic managerial error is made, these firms are confronted to a sudden decrease in their level of activities compared to their assets (including the investments related to this decision). Indeed, the implementation of this decision generally induces investments (i.e. an increase in the assets of the firm) that are not followed by the expected increase in the volume of activities.

Furthermore, once the managerial error is made, all other financial indicators are very poor compared to those of other

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12 Over-sized firms
13 In the years directly preceding N

firms (except EBFP 5a and 5b)[14]. Indeed, the implementation of this decision results in a firm with a totally non-viable strategic position on its market. For example, there is no (more) demand for the firm's products.

H4a : Firms belonging to EBFP 4 are associated with a (sudden) weak level of activities compared to their structure, consecutive to an inadequate managerial decision.

H4b : Firms belonging to EBFP 4 are associated with very poor financial indicators on all the dimensions, consecutive to an inadequate managerial decision.

2.2.5. *Badly-managed firms (EBFP 5)*

This pattern includes small firms whose entrepreneurs lack the required managerial competences to override the first stages of their life cycle (creation and growth phases).
Three sub-patterns are distinguished by Crutzen (2009) :

- EBFP 5a refers to firms with deficiencies in strategic management.
- EBFP 5b concerns firms which are totally badly-managed because their strategic management as well as their business administration is problematic.
- EBFP 5c relates to firms with deficiencies in business administration.

Considering the descriptions proposed by Crutzen (2009) for these sub-patterns, we make the assumption that firms belonging to EBFP 5c, i.e. firms which have real potentialities on their market but which are confronted to problems of internal management, show specific financial indicators compared to firms belonging to EBFP 5a or 5b, i.e. firms which do not have any real potentialities on their market because of deficiencies in strategic management.

- EBFP 5a and EBFP 5b

These sub-patterns refer to firms in which there is an inadequate internal management of external factors : the entrepreneur lacks the ability to analyze correctly the firm's environment, to anticipate adequately changes in it and to adapt to them. Under these circumstances, in the first stages of their life cycle, the real potentialities of these firms on their market are over-estimated or even inexistent[15].

Considering this description, we may assume that these firms are often associated with missing data. This assumption can notably be explained by the following elements.

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14 Indeed, this failure pattern can be associated with EBFP 5a and 5b because all relate to strategic managerial problems which lead to a lack of demand for the firm's products. The two main differences between EBFP 4 and EBFP 5a and 5b are :
- EBFP 4 relates to punctual strategic errors (such as a non viable business plan or a missed strategic reorientation) that make the firm completely non viable, even if the entrepreneurs/leaders are competent. EBFP 5a and 5b rather concern firms lead by entrepreneurs with recurrent strategic managerial deficiencies. For example, their firm starts on a wrong basis (an inadequate business plan) and they are unable to implement the needed strategic changes.
- EBFP 4 does not refer to particular stages of the firm's life cycle : it refers to pure punctual strategic error. EBFP 5a and 5b only refer to strategic deficiencies in the first phases (creation or growth) of a firm's life.
15 Regarding Beaver's model (1966), these firms do not succeed in generating sufficient inflows.

Firstly, as firms belonging to these two (sub)patterns have no (or few) potentialities on their market in the first stages of their life cycle, we may assume that a large part of them are very young when they become distressed. It is then logical that most of them have never published any financial accounts before N[16], when they are detected as distressed firms by the Court.

Secondly, their leaders may try to hide the poor beginning of their firm by voluntarily delaying the publication of their financial accounts.

Thirdly, some negligent or non-motivated entrepreneurs may forget (or even not be aware of) the Belgian law that makes it compulsory for all incorporated firms to publish their financial statements[17]. Under these circumstances, they may, for example, not provide their accountant with the required documents to produce financial accounts.

With reference to the definitions proposed for these two sub-patterns, we may also assume that, compared to other distressed firms, when financial data are available, these firms are associated with very poor ratios in the years preceding N. As we assume that these firms have few, or even no, potentialities on their market, we may assume that their level of activities, their added value, their profitability, their solvency and their liquidity are globally very poor since N-2.

H5a : *Firms belonging to EBFP 5a and EBFP 5b are often associated with missing data.*

H5b: *Firms belonging to EBFP 5a and EBFP 5b are associated with very poor financial indicators (on the five dimensions) since N-2.*

- EBFP 5c

This sub-pattern relates to firms with deficiencies in business administration. In these firms, the strategic management is not problematic : they have real potentialities on their markets (adequate level of activities, real demand for their products or services, etc.). The factors that fundamentally explain their failure are a poor ability to control the firm (and eventually its growth), a problematic financial management (such as an inadequate cost pricing) or a poor accounting management in the first stages of their life cycle. In the 21 sampled firms out of the 35 that belong to this pattern, these problems have been present since the creation of the firm whereas, in the 14 other firms, they arise with its growth.

Considering the description of this failure sub-pattern, we may thus assume that these firms are associated with a disproportionate level of activities (net sales) compared to their structure[18]. Indeed :
- As mentioned above, in 14 of the sampled firms, the entrepreneur has it difficult to control the firm's growth :

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16 Indeed, in Belgium, firms have to close their financial statements in the six months following the end of their reporting period. The financial accounts have to be deposited and, then, published at the Belgian National Bank one month after this closing (Moniteur Belge, 1999, Loi contenant le Code des sociétés, art. 92-98)

17 The Belgian law distinguishes between two schemes in order to present the financial accounts : a complete and a abbreviated scheme (Moniteur belge, 1975 - Loi du 17 juillet 1975 relative à la comptabilité des entreprises). (Small) firms that do not exceed more than one of the following limits may publish their accounts according to an abbreviated scheme : 50 workers, net sales = 7.3 million Euros, total balance sheet = 3.6 million Euros. Nevertheless, firms employing more than 100 workers have necessarily to present their financial accounts according to a complete scheme.

18 These firms may nevertheless be growing

the net sales rise but he does not succeed in adapting and in adequately managing the firm's structure according to this new level of activities.

- Furthermore, in a lot of start-ups belonging to this pattern, the entrepreneur fights for revenues (net sales) while he does not have the adequate resources and resources' deployment (small initial financial capital, lack of cash to finance the activities, etc.).

In addition, as almost one half of these firms are confronted to growth-related problems, we may assume that this pattern is much more associated with financial indicators referring to the firm's growth than other patterns. We may thus hypothesize that, in the years preceding N, firms belonging to EBFP 5c are associated with a higher rate of growth in total assets than other firms.

H5c : Firms belonging to EBFP 5c are associated with a high level of activities compared to their structure in the years preceding N.

H5d : Firms belonging to EBFP 5c are associated with a higher rate of growth in total assets than other firms in the years preceding N.

3. Methodology

3.1. Sample

The sample of firms studied in the present research is similar to the one used by Crutzen (2009) : it is composed of 203[19] incorporated small distressed firms under the investigation of the Court of Commerce of Liège for a Commercial Inquiry, a Legal Reorganization or a Bankruptcy.

3.2. Variables

The data included in the present study are :

- Some intrinsic characteristics of the firm : its name, its official number, its age in N, the number of workers it employed in N, its net sales as well as its total balance sheet in N.
- The year in which the **first external signals** were detected by the Court and considered as relevant and sufficiently intense by this entity, so that it regards each firm as a distressed firm (N).
- The EBFP with which each sampled firm was associated by Crutzen (2009).
- Ten[20] financial ratios which were chosen on the basis of the work of Beaver (1966), of Ooghe and Van Wymeersch (1986, 2006) and of Laitinen (1991). With reference to these studies, five main (financial) dimensions are taken into consideration. From the most symptomatic to the most fundamental ones, the liquidity, the solvency, the profitability and the added value dimensions are analyzed (Ooghe and Van Wymeersch, 1986, 2006). A fifth dimension

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19 Indeed the taxonomy identified by Crutzen (2009) and Crutzen and Van Caillie (2009) does not include 5 (emerging) innovative firms regarding their very specific behavior (in terms of reasons for failure).

20 A supplementary ratio (Working Capital Requirements to Net Assets) was tested. That is why it appears in our graphs (see Appendix 3) but, as it did not lead to any significant result, this ratio was drawn from the definitive analysis.

referring to the firm's activities (or firm's operations) is also considered in the present study. This last dimension includes financial information which refers to the firm's growth and to its revenue accumulation (Laitinen, 1991). Ratios reflecting these five dimensions were selected amongst the ratios used in these three preceding studies.

Table 2 lists these ten ratios and Appendix 1 details how they are calculated.

Dimension	Ratio	Label	Previous researchers		
			Beaver (1966)	Ooghe & VW (1986, 2006)	Laitinen (1991)
Liquidity	Current ratio	LL	X		X
	Quick ratio	LS		X	
Solvency	Equity ratio	S	X	X	X
Profitability	Cash Flow from Operations[21] /Total Debt ratio	CF/D	X	X	
	Cash Flow from Operations /Total Assets ratio	CF/A		X	
	Return on Investment ratio	ROI	X	X	X
Added Value	Personnel Costs/Added Value ratio	FP/V		X	
	Added Results/Added Value ratio	RA/V		X	
Firm's operations	Net Sales/Total Assets ratio	CA/A	X		X
	Rate of Growth in Total Assets ratio	AC			X

<u>Table 2</u> : List of ratios

When data were available, these ratios were calculated[22], for each sampled firm, over the seven years preceding its first detection by the Court (from N-7 to N)[23] in order to identify, as soon as possible, potential differences in financial behaviors between firms belonging to the distinctive EBFPs.

After an examination of the database[24], it comes out that, as Laitinen already mentioned (1991), the distributions of the

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21 The notion of Cash Flow from Operations refers to the amount of cash generated by the firm's activities. That is why we place it in the profitability dimension, but close to the liquidity dimension. It is worth remembering that the structure of the financial accounts (balance sheet and income statement) can differ from one country to another one (Stickney et al., 2007). In Belgium, we refer to financial reporting standards that are sometimes different from the ones used in other countries. This leads to "false friends" or semantic differences in the definition of some terms. The term Cash Flow from Operations considered in the present study has been chosen and defined on the basis of the work of Ooghe and Van Wymeersch (1986, 1996, 2006). Indeed, these Belgian researchers carried out studies on financial analysis and, in particular, on business failures in the same (legal) context as we do and they highlight the importance of ratios relating the Cash Flow from Operations in their study of business failures. The Cash Flow from Operations is then calculated as follows : Receipts from Operations – Expenditures for Operations (or Operating profit + unpaid expenses). This definition of the (Operating) Cash Flow is different from the one used by Laitinen (1994) because it does not include any information from the balance sheet, such as accruals or deferrals, which can notably be manipulated or "adjusted" (via creative accounting) in order to improve the externally-visible financial situation of failing firms (Ooghe and Van Wymeersch, 1986).
22 The database was then checked in order to verify if there were no errors or missing data.
23 This time period was determined with reference to the results of the studies of Van Wymeersch and Wolf's (1996) and of Van Caillie and Dighaye (2002) as well as according to the availability of the data
24 Indeed, after a Shapiro Wilks' W test of normality (carried out for a series of ratios), it comes out that the W statistic

ratios generally do not statistically conform to the normality at normal risk levels. Under these circumstances, it is reasonable to assume that the application of classical parametric statistical techniques to the available data would not lead to reliable results and that a nonparametric statistical method is much more appropriate to treat the data.

In order to allow the use of nonparametric statistical techniques, all the (quasi) continuous data composing the database were transformed into discrete data (nominal or ordinal data) thanks to a grouping in classes (Bouroche and Saporta, 2005).

Firstly, concerning the intrinsic characteristics of the sampled firms, the modalities of the (quasi) continuous variables, such as firm's age and size (personnel, net sales and total balance sheet), were grouped into a determined amount of classes (Bouroche and Saporta, 2005). The various classes were chosen by considering the lessons from important Belgian research on small business (failure) (Donckels et al., 1993; Unizo, 2007; Graydon, 2009).

Secondly, all the distinctive values of the ratios were transformed into deciles (discrete and ordinal data). Under these conditions, if the current ratio of a firm belongs to the upper decile (10), this means that this firm has a very good liquidity compared to most firms from the sample. However, it is worth remembering that the sample consists only of distressed firms. Thus, a value of 10 does not necessarily means that the liquidity of this firm is good but rather that it is better than the liquidity of other firms of the sample.

In order to conclude the presentation of the sample and of the variables included in the present study, Table 3 presents descriptive statistics (valid N, mean, minimum, maximum, variance and standard deviation) about the sampled firms by (sub)EBFP in function of their age and size (personnel, turnover (CA) and total assets (AT)), when they are detected by the Court (in N).

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is generally significant and that, then, the hypothesis that the respective distribution is normal should be rejected.

EBFPs	Variables	Valid N	Mean	Sum	Minimum	Maximum	Variance	Std.Dev.
EBFP 1 (41 firms)	Age (N)	39	11,6923	456,000	1,00000	27,000	51,2	7,1567
	Pers (N)	39	3,7179	145,000	0,00000	17,000	12,4	3,5240
	CA (N)	10	509,7000	5097,000	63,00000	1320,000	252912,9	502,9045
	AT (N)	20	414,1000	8282,000	19,00000	2893,000	460246,5	678,4147
EBFP 2 (20 firms)	Age (N)	20	8,350	167,000	1,0000	24,000	40	6,352
	Pers (N)	14	9,857	138,000	0,0000	40,000	159	12,618
	CA (N)	7	1042,857	7300,000	174,0000	2909,000	1333319	1154,695
	AT (N)	8	888,875	7111,000	127,0000	2460,000	642620	801,636
EBFP 3 (15 firms)	Age (N)	15	22,600	339,00	9,00000	37,00	67	8,166
	Pers (N)	13	8,923	116,00	0,00000	48,00	153	12,366
	CA (N)	3	971,667	2915,00	61,00000	2238,00	1279706	1131,241
	AT (N)	7	4001,857	28013,00	64,00000	24851,00	84715314	9204,092
EBFP 4 (36 firms)	Age (N)	36	6,9167	249,000	1,00000	29,000	48,5	6,9627
	Pers (N)	34	5,5588	189,000	0,00000	41,000	66,6	8,1620
	CA (N)	10	831,4000	8314,000	88,00000	3165,000	992059,8	996,0220
	AT (N)	17	531,1765	9030,000	21,00000	2883,000	651745,2	807,3073
EBFP 5a (28 firms)	Age (N)	28	4,1786	117,000	1,00000	12,000	10,82	3,2892
	Pers (N)	26	3,4231	89,000	0,00000	12,000	9,05	3,0090
	CA (N)	3	238,3333	715,000	40,00000	601,000	98934,33	314,5383
	AT (N)	14	189,8571	2658,000	22,00000	460,000	18256,90	135,1181
EBFP 5b (26 firms)	Age (N)	25	2,7200	68,000	0,0000	9,0000	4,88	2,2083
	Pers (N)	24	6,2500	150,000	0,0000	18,0000	28,80	5,3670
	CA (N)	3	421,6667	1265,000	189,0000	601,0000	44569,33	211,1145
	AT (N)	10	351,4000	3514,000	11,0000	686,0000	51770,93	227,5323
EBFP 5c (37 firms)	Age (N)	37	7,351	272,00	1,00000	22,000	31	5,609
	Pers (N)	34	7,824	266,00	0,00000	37,000	71	8,412
	CA (N)	10	2431,200	24312,00	34,00000	9984,000	10442637	3231,507
	AT (N)	20	898,100	17962,00	23,00000	3538,000	1273775	1128,616

Table 3 : Descriptive statistics of the sample by EBFP

In addition, as the variable "Firm's Age" appears to be a significant characteristic in explaining the origins of business failure (Thornhill and Amit, 2003), Table 4 details the age of the sampled firms in N, by EBFP.

	Missing Data	<= 3 years	<= 5 years	<= 10 years	<= 15 years	> 15 years	Row
EBFP 1	2	6	2	12	9	10	41
	0,99%	2,96%	0,99%	5,91%	4,43%	4,93%	20,20%
EBFP 2	0	3	6	4	4	3	20

	0,00%	1,48%	2,96%	1,97%	1,97%	1,48%	9,85%
EBFP 3	0	0	0	1	2	12	15
	0,00%	0,00%	0,00%	0,49%	0,99%	5,91%	7,39%
EBFP 4	0	17	6	4	6	3	36
	0,00%	8,37%	2,96%	1,97%	2,96%	1,48%	17,73%
EBFP 5a	0	18	1	7	2	0	28
	0,00%	8,87%	0,49%	3,45%	0,99%	0,00%	13,79%
EBFP 5b	1	20	3	2	0	0	26
	0,49%	9,85%	1,48%	0,99%	0,00%	0,00%	12,81%
EBFP 5c	0	13	4	10	6	4	37
	0,00%	6,40%	1,97%	4,93%	2,96%	1,97%	18,23%
All Grps	3	77	22	40	29	32	203
	1,48%	37,93%	10,84%	19,70%	14,29%	15,76%	

Table 4 : Age of the sampled firms by EBFP

3.3. Data analysis

The hypotheses were tested through a correspondence analysis[25] (Benzécri, 1973; Lebart et al., 1977; Lebart et al., 1984; Greenacre, 1984; Bouroche and Saporta, 2005). Indeed, this non-parametric multivariate data analysis technique allows to highlight the proximities between the modalities of discrete variables considered as active (i.e. the ten financial ratios) and the modalities of a discrete variable considered as passive (i.e. the EBFPs). This statistical analysis associates each EBFP with the modalities of the financial ratios (calculated from N-7 to N) which explain it the best. This analysis permits thus to see which modalities (deciles) of the ratios are much more commonly linked with the various failure patterns.

The results of the correspondence analysis were completed and validated by the analysis of 2D graphs (or Box Plots) representing how the raw values of the ratios are distributed for each EBFP. These graphs represent the main characteristics (median, for example) of the raw values of the various financial ratios and they place a box around the midpoint (i.e. median) which represents a selected range (i.e., from 25 to 75 % of the cases) and whiskers outside of the box which also represent a selected range (i.e. non outliers range)[26]. The analysis of this graph provides interesting information about the real distribution of each ratio and about the magnitude of the degradation of each ratio (for each EBFP) year after year.

4. Results

As explained in the Methodology section, two complementary statistical analyses were carried out in order to identify potential relationships between the EBFPs and specific financial indicators in the years preceding N.
Appendix 2 presents the variables (and their labels) which are included in the statistical analyses.

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25 The statistical analysis was achieved with the help of the software Statistica (Version 7, 1984-2005)
26 The minimum and maximum values taken by the ratio without including the outliers

Firstly, Appendix 3 presents the results of the correspondence analysis, with a focus on the EBFPs and their related ratios. Considering the high number of variables and modalities, four correspondence analysis were carried out in function of the various financial dimensions investigated in the present study :

- A correspondence analysis including the ratios relating to the firm's operations (Figure 1)
- A correspondence analysis referring to the added value ratios (Figure 2)
- A correspondence analysis including the profitability ratios (Figure 3)
- A correspondence analysis including the liquidity and solvency ratios (Figure 4)

were successively carried out.

These 2D figures show which modalities of the ratios (active variables) are much more associated to each EBFP (passive variable).

Secondly, Appendix 4 presents the Box Plots for each ratio in function of the distinctive EBFPs.

The results of these two statistical analyses were used in parallel in order to test the hypotheses presented in Section 2.

4.1. General findings

4.1.1. General observations

Firstly, the correspondence analyses associate very few modalities of the 10 ratios to specific EBFP before N-3. Indeed, Appendix 3 shows that only two financial ratios, which relate to firms' structure (Net Sales/Total Assets and Rate of Growth in Total Assets ratios) are associated to EBFP 3 already 5 years before N. Apart from these exceptional (and, nevertheless, meaningful) observations, the financial behavior of the sampled firms can thus not be associated with one particular failure pattern before N-3 and there is thus no significant difference in terms of financial indicators between the EBFPs before N-3. This observation can partially be explained by the fact that, as Table 4 shows, lots of the sampled firms are young in N : 77 firms are three years old or less when they are firstly detected by the Court. It is thus impossible to get information before N-3 for these firms as they were still not created at that time.

This first general observation is consistent with the results of the studies carried out by Laitinen (1991) and by Van Wymeersch and Wolfs (1996). Indeed, while they firstly consider a longer time period[27], these researchers finally interpret (financial) data relating to the four or five years before bankruptcy (or legal reorganization).

Considering this observation, the following part of the current study focuses thus mainly on a more relevant time period : it analyzes the 10 ratios between N-4 and N[28].

Secondly, the first dimension highlighted by the correspondence analyses is the time dimension. An analysis of the variables which are the most correlated to Dimension 1 and an examination of the column coordinates of the different modalities of the variables (on Dimension 1) lead to this observation. Therefore, some EBFPs, which are located on the right side of the graphs, are associated to financial indicators earlier (in N-5, N-4 or N-3) than other ones. The failure patterns that are the earliest associated with financial indicators are EBFP 3 and EBFP 1. These patterns could thus be identified with reference to some financial symptoms before N. In contrast, firms belonging to EBFP 5a or 5b are much

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27 For example, Laitinen (1991) considers the 6 years before bankruptcy in his study.
28 That's why the Box Plots were only drawn from N-4 to N.

hardly related to particular financial ratios until N. It would therefore be difficult to detect them and to identify the fundamental reasons for their failure (i.e. their EBFP) on the basis of financial information only.

Thirdly, the correspondence analysis confirms that there is a significant relationship between the age, the size of the firms (in N) and the EBFPs. For example, EBFP 5a and 5b mainly refer to very young firms, i.e. firms younger than 3 years, and to very small firms, i.e. firms without workers or with less than 5 workers and firms with a small amount of total assets and net sales.

4.1.2. Validation of the general hypotheses

H1: Globally, when evolving from N-7 to N, the financial ratios of the sampled firms deteriorate more and more	Validated
H2: Globally, the solvency and the liquidity of the sampled firms are weak in N	Partially validated

Firstly, H1 is validated because, when looking at the global evolution of the (raw) values of all the ratios for all the EBFPs from N-7 to N (see Appendix 4), it comes clearly out that the financial situation[29] of the sampled firms deteriorates when they evolve towards N.

Secondly, H2 is partially validated. Actually, Figure 3 shows that the solvency (S_N) of the sample is weak in N. Indeed, the mean value of the equity ratio is around zero for all the EBFPs and there are a lot of negative values[30]. This means that lots of sampled firms are totally dependent on external debts.

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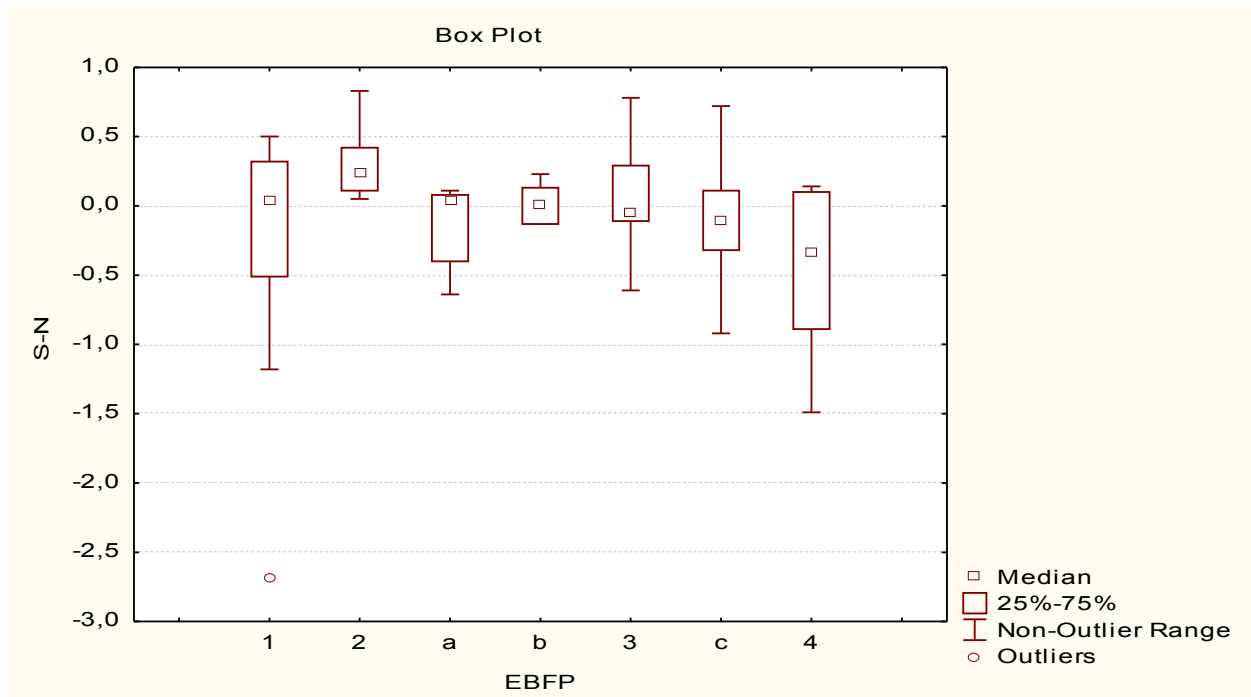
29 On the five dimensions under consideration.
30 If the total net assets (Total assets – Provisions - Total Debts) are reduced to an amount that is inferior to half of the amount of the capital (shareholders' shares), the Belgian legislation estimates the firm has solvency problems (Moniteur Belge, 2009 - Loi sur la continuité des entreprises, art. 23).

Figure 3 : Solvency of the sampled firms in N, by EBFP

Nevertheless, when looking at the liquidity position of firms in N (Figure 4), it comes out that all firms do not show weak liquidity ratios at this time.
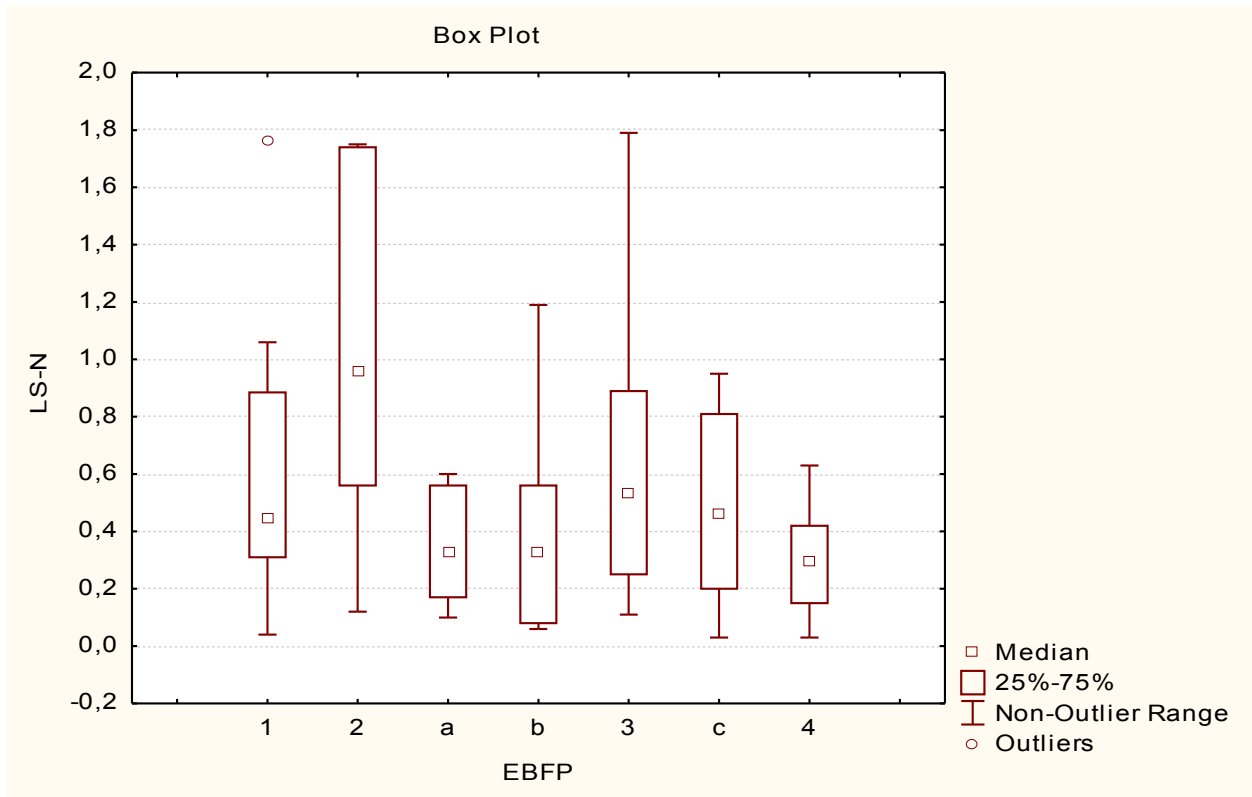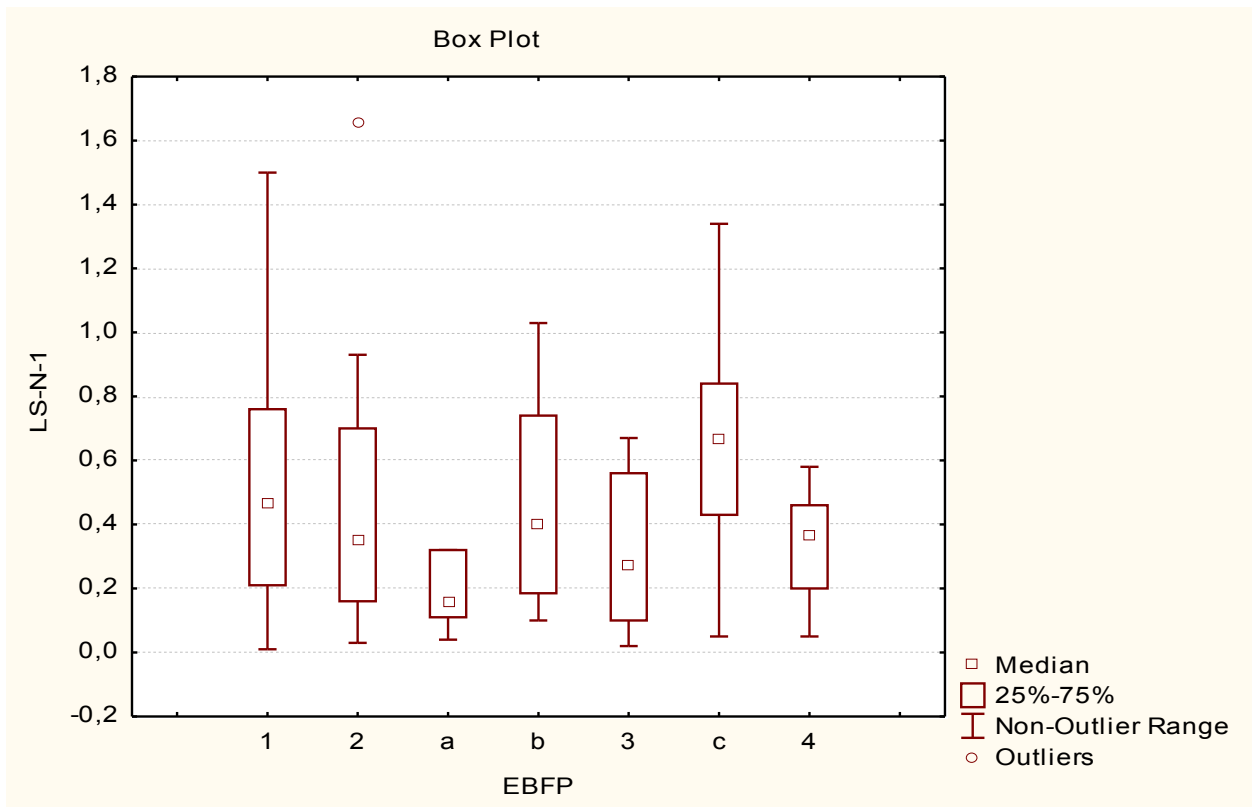

Figure 4 : Quick ratio in N, by EBFP

Figure 5 :Quick ratio in N-1, by EBFP

Even if some firms, such as those belonging to EBFP 5a, 5b or 4, have a weak[31] quick ratio in N, the ratio of firms belonging to EBFPs 1, 2 and 3 is not that weak. For example, the median value of the quick ratio for firms belonging to EBFP 2 is close to 1 in N. More surprisingly, a comparison between Figure 4 and Figure 5 shows that the liquidity of some distressed firms (EBFPs 2 or 3) even improves in N (compared to N-1). This observation can be partially explained by the fact that, after a first contact with the Court in N, it is reasonable to assume that :

- Corrective or palliative[32] actions are (directly) taken in order to recover in the short or in the long term.
- Creative accounting is sometimes used in order to make the information provided by the financial statements more favorable to the firm and, thus, in order to avoid more serious problems such as the legal reorganization or the bankruptcy[33].

H2 can thus only be partially validated.

4.2. Specific hypotheses

H1a: Shocked firms are associated with non problematic ratios before the occurrence of the shock.	Not validated
H1b: Shocked firms are associated with a sudden deterioration of their financial ratios after the occurrence of the shock.	Not validated
H2a: Firms belonging to EBFP 2 are often associated with missing data.	Validated
H2b: Firms belonging to EBFP 2 are associated with a weak liquidity for a longer time than other sampled firms.	Validated
H3a: Firms belonging to EBFP 3 are associated with a weak (and decreasing) level of activities compared to other firms in the years preceding N.	Validated
H3b: Firms belonging to this EBFP are associated with a weak (and decreasing) added value and profitability for a longer time than other firms but, globally, in the years close to N, this decrease is more progressive than in other firms'.	Validated
H4a: Firms belonging to EBFP 4 are associated with a (sudden) weak level of activities compared to their structure, consecutive to an inadequate managerial decision.	Partially validated
H4b: Firms belonging to EBFP 4 are associated with very poor financial indicators[34] on all the dimensions, consecutive to an inadequate managerial decision.	Validated
H5a: *Firms belonging to EBFP 5a and EBFP 5b are often associated with missing data.*	Validated

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31 The median value is smaller than 0.3

32 Only long-term corrective actions, which remedy the fundamental problems (causes) of the failure, may lead to a durable recovery. Indeed, short-term palliative actions, which only solve some symptomatic problems, may only lead to a short-term improvement of the firm's situation.

33 In this sense, it would be very interesting to analyze, for example, the evolution of shareholder's receivables.

34 Similar to those of EBFP 5a and 5b. Indeed, this failure pattern can be associated with EBFP 5a and 5b because all relate to strategic managerial problems which lead to a lack of demand for the firm's products. The two main differences between EBFP 4 and EBFP 5a and 5b are :

- EBFP 4 relates to punctual strategic errors (such as a non viable business plan or a missed strategic reorientation) that make the firm completely non viable, even if the entrepreneurs/leaders are competent. EBFP 5a and 5b rather concern firms lead by entrepreneurs with recurrent strategic managerial deficiencies. For example, their firm starts on wrong basis (an inadequate business plan) and they are unable to implement the needed strategic changes.
- EBFP 4 does not refer to particular stages of the firm's life cycle : it refers to pure punctual strategic error. EBFP 5a and 5b refer to strategic deficiencies in the first phases (creation or growth) of a firm's life.

H5b: Firms belonging to EBFP 5a and EBFP 5b are associated with very poor financial indicators on the five dimensions since N-2.	Validated
H5c: Firms belonging to EBFP 5c are associated with a high level of activities compared to their structure in the years preceding N.	Not validated
H5d: Firms belonging to EBFP 5c are associated with a higher rate of growth in total assets than other firms in the years preceding N.	Partially validated

4.2.1. *Shocked firms*

Regarding H1a, the correspondence analysis does not clearly associate specific financial symptoms with this pattern before N-2. Considering the shock could occur in N, N-1, N-2 or even in a previous year, the information provided by this statistical analysis is thus not relevant to validate H1a. An analysis of the box plots detailing the main characteristics of the 10 ratios for these firms (see Appendix 4) leads to the following observation. This pattern is composed of firms with very heterogeneous financial behaviors on the various financial dimensions considered. Indeed, since N-4, EBFP 1 consists of small firms which have a financial situation that ranges from very poor to satisfactory (on the various dimensions considered). Thus, the first hypothesis can not be validated : all firms belonging to EBFP 1 do not necessarily have a non-problematic financial situation before the occurrence of the shock, which the entrepreneurs present as the main fundamental reason for the failure of their firm.

Considering this first observation, it is necessary to relativize the importance to give to this EBFP and to be careful with the description proposed for it. In fact, the results of the present analysis reinforce what Argenti (1976) or Ooghe and Waeyaert (2004) state : some unfavorable conditions are generally developing within these firms before the occurrence of the shock. Thus, in some cases, the shock is only an event that amplifies the firm's failure but it does not explain its fundamental origins. Two main situations may be distinguished. The firm performed without any important problem until this event but it was vulnerable (because of its dependence towards one particular partner, for example) or the firm has never performed well but the entrepreneur externalizes (consciously or unconsciously) the reasons for the failure of his firm. Nevertheless, we consider that, in some particular cases (such as in the case of a sudden accidental factor), a failure pattern relating to shocked firm is meaningful[35].

Referring now to H1b, the two complementary analyses carried out in the current study do not allow to identify a significant sudden decrease in the global financial situation of these firms. This hypothesis can thus not be validated on the basis of the present study.
Two explanations can nevertheless be given for this observation.

- Firstly, as mentioned above, in some cases, the shock is only used as an excuse by the entrepreneur for hiding other more fundamental problems and, in particular, his own previous mistakes. In these cases, the firm is already engaged into a failure process before the occurrence of the shock. This latter amplifies the failure but it does not originate it. So, the entrepreneur exaggerates the impact of the shock on his firm's failure, so that this event does not have a so disruptive impact on the firm's financial situation as he argues.
- Secondly, the year in which the shock occurred can be N, N-1, N-2 or even a previous year[36]. As the ratios are

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35 This is why this pattern will not be deleted from the taxonomy presented in this research.
36 We do not have this information

analyzed globally, it is thus practically impossible to identify a (global) sudden deterioration.

4.2.2. *Firms serving other interests*

Firstly, H2a is validated by the results of the correspondence analysis (see Appendix 3). Indeed, this pattern is often associated with missing information on the dimensions considered in this study.[37]

Secondly, the correspondence analysis associates this EBFP with a poor quick ratio since N-2. The box plots show that firms belonging to this pattern have a poor liquidity since N-4. In fact, Figures 6 to 10 show that the median value of the quick ratio for these firms is weaker than for other firms until N-1. This means that these firms are confronted to recurrent liquidity problems compared to other firms (whose liquidity deteriorates progressively until N as a consequence of other fundamental problems).
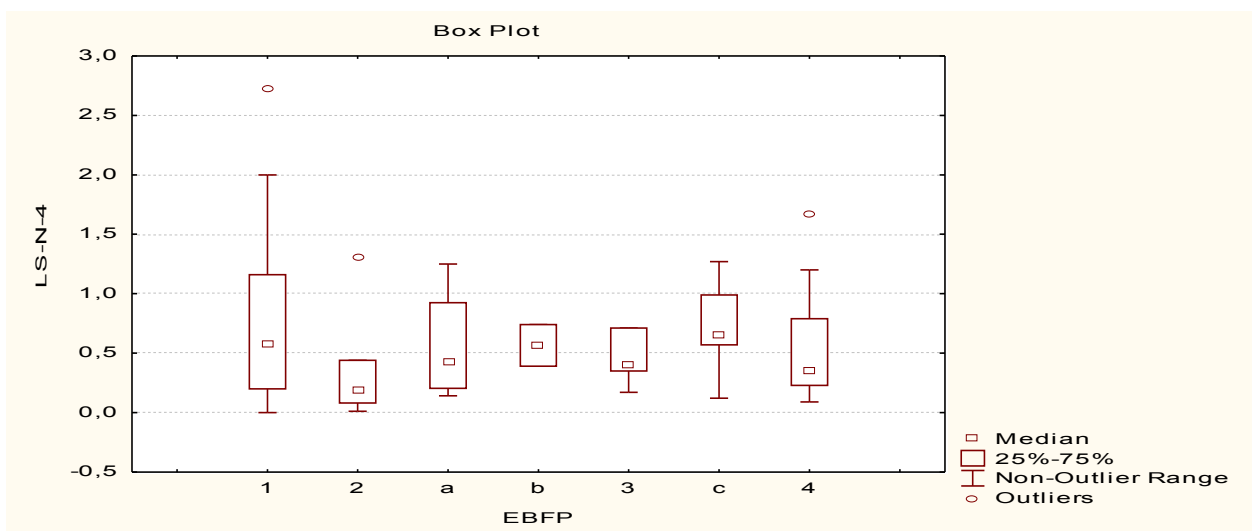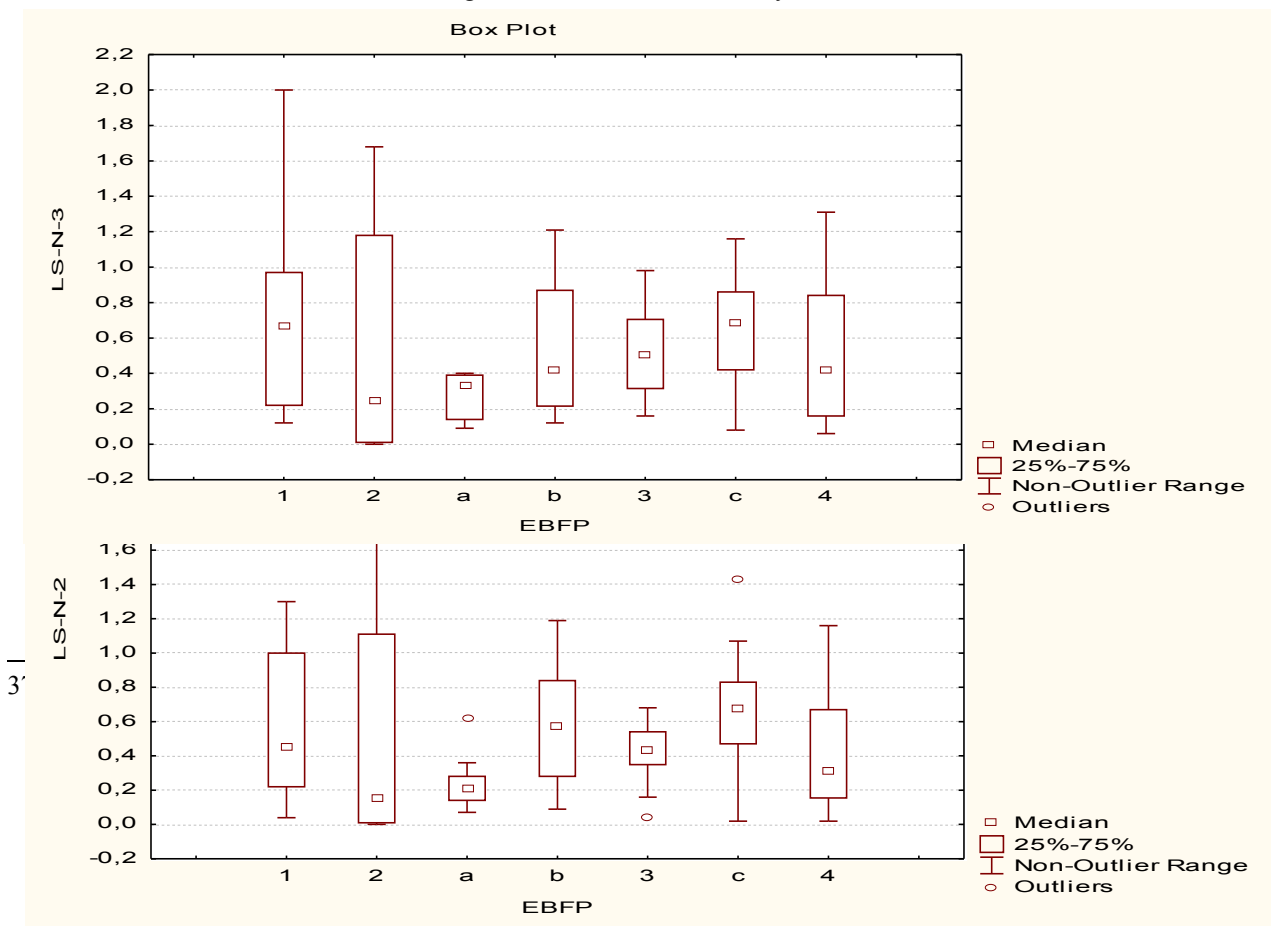

Figure 6 : Quick ratio in N-4, by EBFP

Figure 7 : Quick ratio in N-3, by EBFP

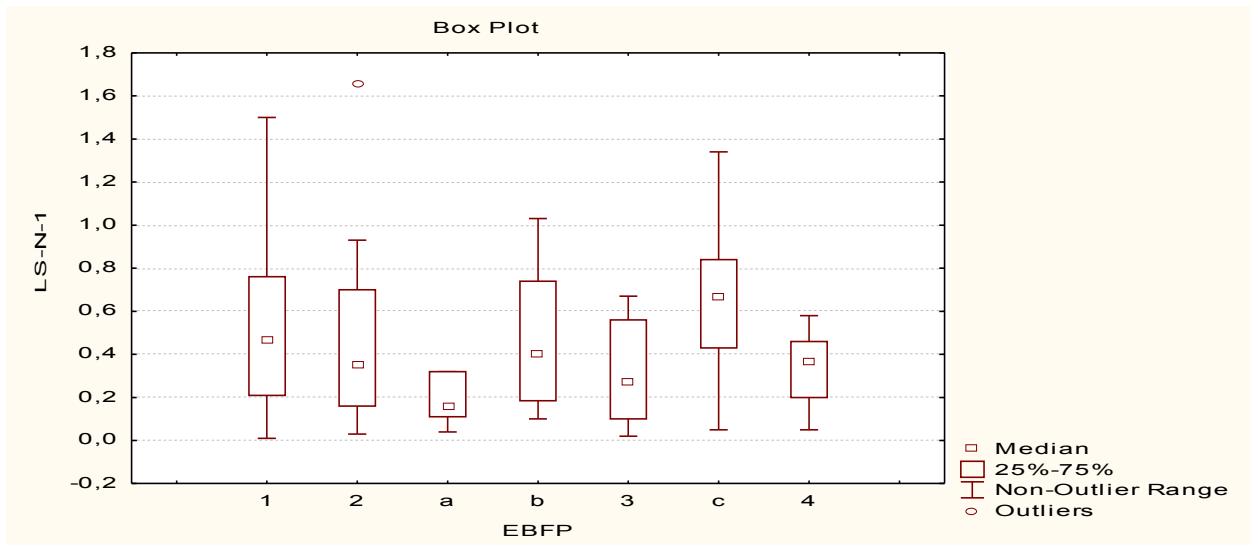Figure 8 : Quick ratio in N-2, by EBFP:

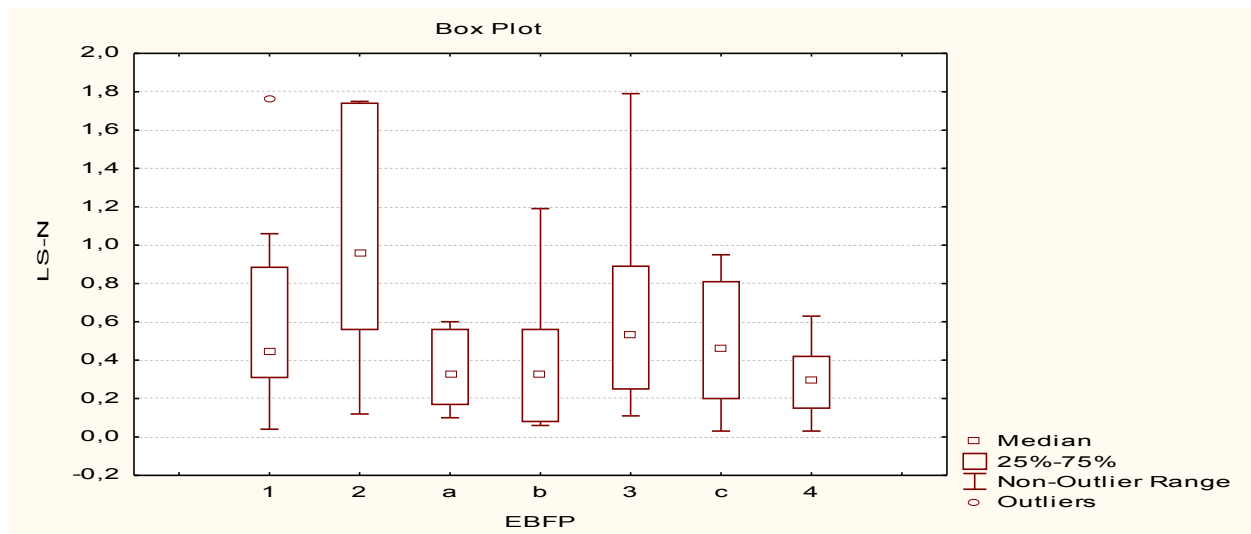

Figure 9 : Quick ratio in N-1, by EBFP

Figure 10 : Quick ratio in N, by EBFP

Another relevant observation comes from the examination of the box plots : the liquidity of "firms serving other interests" significantly improves in N. We may thus assume that, once they have been contacted by the Court, the entrepreneurs of these firms often take actions in order to reduce the potential negative consequences of their malpractices or even in order to hide them. For example, they reimburse (a part of) the money they withdrew from the firm (via the account dedicated to shareholders' receivables for example) or they use creative accounting in order to make the information provided by the financial statements more favorable to the firm and, thus, in order to avoid more serious problems such as the bankruptcy.

4.2.3. Apathetic firms

The correspondence analysis clearly associates "apathetic firms" (EBFP 3) with a poor level of activities compared to the (assets) structure of the firm. Since N-5, the net sales to total assets ratio associated with this EBFP is very poor (decile = 1) compared to other firms.

As, since N-5, this ratio equals to 1 and as the financial situation of all the firms from the sample deteriorates when evolving until N, we may thus hypothesize that, from N-5 to N, the level of activities of these firms progressively deteriorates compared to their structure, which remains relatively stable. Indeed, the correspondence analysis and the box plots dedicated to the measure of the growth in the firms' assets show that, globally, the asset structure of these firms remains stable from N-5 until N. H3a is thus validated by the statistical analysis.

Furthermore, since N-3, the correspondence analysis associates apathetic firms with a high level of personnel costs compared to the added value generated by the firm's activities. This confirms that compared to firms belonging to other EBFPs, these firms have a (too) high structure (fixed costs, personnel costs, etc.) compared to the level of their activities and, in particular, compared to the added value they generate.

Finally, the correspondence analysis associates this EBFP with intermediate values (decile = 4) for the operating cash flow ratios in N-2 and with higher value for these ratios in N. In addition, the box plots show that, globally, these firms have poor cash flow ratios from N-4 until N-2 compared to other sampled firms but that, globally, in N-1 and in N, their situation has become similar or even better than the one of other firms.

H3b is thus validated too. Indeed, the statistical analysis shows that :
- Apathetic firms are confronted to added value and profitability (cash flow) problems earlier than other firms (since N-4).
- Their added value and their profitability decrease when approaching N.
- But, this decline is more progressive than in other firms.

4.2.4. *Firms that fail because of a punctual (strategic) managerial error*

Considering the firm's operation dimension (and H4a), the correspondence analysis associates very little information with this fourth EBFP : this latter is close to EBFP 5a and 5b, which are strongly related to missing data. This situation can notably be explained by the fact that most of the firms belonging to this pattern (29 out of the 36 firms) are small firms that were launched on the basis of a totally non viable business plan, i.e. an enormous initial (punctual) strategic error. Therefore, it is logical to observe that their global financial situation is relatively similar to the one of firms belonging to EBFP 5a and 5b. They are associated with a lot of missing data because they have never risen up and they are thus very young in N. Their level of activities is very weak compared to their structure since their creation (in N-2 or even in N-1[38]). Etc.

Considering H4a, the box plots show that there is a global decline in the net sales to total assets ratio of these firms in N-2 and in N-1. In most of the cases, the strategic managerial error would thus be implemented in N-2 or in N-1. This global decrease in firms' level of activities compared to their asset structure in N-2 and in N-1 can actually be explained

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38Indeed, most of these firms are younger than 3 years old in N (see Table 4)

by the fact that most of these firms were created on the basis of a non viable business plan in N-2 or in N-1[39]. As these firms are totally non-viable and have no potential on their market, their arrival in the sample provokes thus a global decrease in the global level of activities of these firms.

Nevertheless, it is worth noticing that the current statistical analysis does not provide any clear information about firms that fail after a punctual strategic error which differs from a non viable business plan (such as a missed strategic reorientation). Actually, these firms consist in less than one fifth of the firms belonging to EBFP 4 (7 out of 36) and we suppose that this is why no significant specific financial indicator comes out of the present study. Under these circumstances, we consider thus that, to date, H4a can only be partially validated. Indeed, a further investigation of the EBFP4 and of its potential relationships with financial indicators is necessary if we want to understand it completely.

Referring now to H4b, the correspondence analysis associates this pattern, either with EBFP 5a and 5b (on the firm's operation dimension), or with poor deciles on the other financial dimensions in N-1 and in N. For example, it is associated with a very poor added result compared to added value in N-1. This means that these firms do not generate, or even destroy[40], value in N-1. The box plots show that, globally, these firms are associated with very poor financial indicators on the various dimensions (added value, profitability and liquidity mainly) since N-4, and, more particularly, since N-2 and N-1. H4b can thus be validated.

4.2.5. *Badly-managed firms*

Firstly, H5a is validated because the correspondence analysis almost systematically associates EBFP 5a and 5b with missing data (on the five financial dimensions).

Secondly, when the correspondence analysis associates data with these two sub-patterns, these financial indicators relate to N-1 or N (because most of these firms are very young in N) and they are very poor. For example, it associates these patterns with a very poor return on assets, with a poor operating cash flow to total debts and with a poor operating cash flow to total assets in N (decile = 1). The box plots confirm these observations. Furthermore, Appendix 4 shows that, similarly to EBFP 4, a large part of the firms belonging to these sub-patterns destroy value since N-2[41]. H5b can thus be validated.

Thirdly, the correspondence analysis and the box plots do not permit to validate H5c. Globally, EBFP 5c is thus not significantly related to under-sized firms, i.e. firms with a particularly high level of activities compared to their structure.
One potential explanation for the non-validation of this hypothesis is that this sub-pattern gathers together a high diversity of firms, with various business administration problems and with heterogeneous financial behaviors. For example :
- Some of these firms only lack the needed cash to finance their activities. They have too high working capital requirements compared to the available resources : these firms are profitable but their activities can not be adequately financed (problems in the management of the working capital requirements).

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39 Indeed the correspondence analysis strongly associated EBFP 4 with young firms in N.
40 Indeed the box plot shows that, in most of these firms, the added result to added value ratio is under zero in N-1.
41 Indeed the box plot shows that, in most of these firms, the added result to added value ratio is under zero in N-1.

- Some other firms are confronted to problems of internal organization (such as a too high pressure/stress or inefficient ways of working). This situation may have different consequences such as too high operational expenses[42] compared to revenues or increasing delays in delivery, a decreasing quality of the product or service and, then, customers' dissatisfaction (and their potential loss).
- In other firms, the entrepreneurs have poor accounting skills and they have inadequately determined their sales prices : they sell their product at an inadequate (too low or too high) price. In this case, the firm is unprofitable while its potentialities on the market are high. Etc.
- Furthermore, some firms have had problems since their creation while other ones develop well in a first time and enter the failure process later (in the growing phase).

These examples illustrate the fact that this pattern is composed of firms with different business administration problems which can lead to a variety of financial problems. Relationships between firms belonging to EBFP 5c and specific financial symptoms would probably only be traced after a further segmentation of this pattern into several, even more homogeneous, sub-patterns.

Finally, H5d is partially validated because the correspondence analysis associates this failure pattern with a higher rate of growth in total assets than other firms in N-3 and N-2. In contrast, this statistical analysis associates EBFP 5c with a small (or even with a negative) rate of growth in total assets in N-1. This means that, once they become aware of their uncontrolled growth, the entrepreneurs made corrective actions, already in N-1. The box plots confirm this observation. Indeed, Appendix 4 shows that the median value for this ratio (i.e. the rate of growth in total assets) for EBFP 5c is significantly higher than for other EBFPs. Furthermore, this ratio remains globally positive for these firms in N-3 and in N-2 while it is globally negative for other ones. This means that, globally, while other firms tend to decrease their asset size, firms belonging to EBFP 4 are still growing in N-3 and in N-2.

Table 5 briefly summarizes the relationships identified between the EBFPs and financial indicators.

EBFP	Relationships with financial ratios identified by the statistical analysis
1	Not necessarily an acute (sudden) financial failure process (Non-validation of the hypotheses).
2	Lots of missing data – Poor quick ratio in N-2 and N-1 and dramatic improvement in N.
3	Poor and decreasing net sales to total assets ratio since N-5 – Weak added value and weak profitability that decrease more slowly than in other firms since N-2.
4	Global decrease in the net sales to total assets ratio in N-2 and in N-1 – Poor ratios on all dimensions (closed to EBFP 5a and 5b).
5a-5b	Lots of missing data - Poor ratios on all dimensions since N-2.
5c	High rate of growth in total assets in N-3 and in N-2 compared to other firms.

Table 5 : Relationships identified between the EBFPs and financial indicators

5. Discussion

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42 Too much personnel, too much activities to support the production, etc.

The present statistical analysis confirms that different financial failure processes may be distinguished among a sample of distressed firms (Laitinen, 1991). Indeed, it shows that some financial failure processes are much more progressive than other ones. For example, consistent with the study of Ooghe and De Prijcker (2008), this study shows that firms belonging to EBFP 3 tend to follow a more progressive (chronic) financial failure process, which is characterized by a progressive deterioration of their financial indicators.

In addition, this study shows that some specific financial indicators can (sometimes) be roughly associated with the explanatory business failure patterns identified by Crutzen (2009). For example, EBFPs 2, 5a and 5b are associated with a lot of missing data and EBFP 3 is related to a progressive decrease in the firm's level of activities compared to its asset structure.

Nevertheless, it is obvious that, on the basis of the current study, strong and exclusive relationships between each EBFP and specific financial symptoms can not be traced. Indeed, the correspondence analysis does not highlight really strong relationships between the EBFPs and specific financial ratios : the most obvious associations proposed are relationships between the EBFPs and missing data. Under these conditions, in a preventive perspective to failure and on the basis of the results of the current study, the early detection of the EBPFs is thus not possible on the basis of specific (traditional) financial indicators.

Several potential reasons for the non-validation of some hypotheses and for the lack of strong relationships between the EBFPs and financial indicators are presented below.

Firstly, as mentioned before, there are a **lot of missing data in the database**. Under these circumstances, it is then impossible to relate EBFPs with specific financial information.

Actually, most of the sampled firms are very young when they are detected by the Court of Commerce of Liège, and, eventually, when they disappear via a bankruptcy or a voluntary liquidation. Some of them have thus never published any financial accounts in N (or even at the moment of their disappearance). Furthermore, an examination of the database confirms the observation made by Ohlson (1980) and Lawrence (1983) : as firms go along the last phases of the failure process[43], the entrepreneurs of distressed firms tend to delay (or even to default) the deposit and, thus, the publication of their financial accounts at the Belgian National Bank. Indeed, when financial symptoms become more and more significant, the leaders try to hide the poor situation of their firm.

Secondly, as already explained by Crutzen (2009) and Crutzen and Van Caillie (2009), even if each of the studied firms can predominantly be tied up to a particular EBFP, one sole pattern rarely explains completely the firm's deteriorated situation when it is detected by the Court (N). **The business failure process is generally characterized by a sequence of unfavorable circumstances over time and** it is rather the accumulation (or the sequence) of these unfavorable factors that leads to the detection of the firm by the Court. So, a firm is often weakened by some unfavorable conditions, which can be related to one of the five EBFP, and, then, one or several "aggravating factors"[44] bring it to its knees (Argenti, 1976; Sheppard, 1994). Nevertheless, the current study focuses on the identification of several typical explanatory failure patterns and not of failure paths, which would depict this sequence of events. Therefore, when trying

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43 When significant financial symptoms appear, when approaching N

44 "Aggravating factors" are events which do not fundamentally cause the failure of a firm but which aggravate the deterioration of its situation because it is too weak to survive the blow.

to relate the various EBFPs with specific financial indicators, it does not consider aggravating factors whereas they certainly have an impact on the financial symptoms that are shown by the firms when they become distressed.

Thirdly, the **data analyzed do not always necessarily represent the true conditions**.

On the one hand, it is difficult to make sure that the available information is reliable because financial data can be manipulated (via creative accounting) in order to hide some unfavorable information such as a poor financial situation or malpractices.

On the other hand, the failure patterns are determined on the basis of the "perceived" fundamental problems explaining the entry of the firm in a failure process. Even if we have tried to limit as much as possible the bias related to the perceptions of the leaders (subjectivity), notably through triangulation methods (Yin, 1988), the data are primarily based on the stories told ex post by the leaders of these distressed firms to a judge or an administrator from the Court. They may have a natural tendency to externalize the problems or they may lack hindsight regarding the situation of their firm (Bruno et al., 1987).

Fourthly, s**ome EBFPs** (EBFPs 1, 4 and 5c) **have to be put into perspective or to be refined** in order to be able to identify some relationships between organizational and financial information.

Finally, when we consider ex post the whole research process, it is clear that some of the **basic assumptions on which this paper is founded could be refined**. Especially, this study is based on the assumption that the detection system used by the Court is meaningful and, thus, the key variable N, i.e. the year at which the sampled firms are considered, for the first time, as distressed firms by the Court, is determined on the basis of this system. But, this system does not allow to detect firms which are all in the same stage of the failure process in N (Bayard and Lonhienne, 2003). Indeed, when they are detected by this system, some firms only face punctual financial problems (such a a short liquidity crisis), which can be solved, while other ones have a financial situation that is very close to the legal criteria for bankruptcy (critical illiquidity and insolvency). Under these circumstances, comparing the sampled firms, using N as a common denominator for choosing the sequential measurement of the ratios, can lead to biases in the results.

Conclusion

The present study confirms that there is a strong relationship between the EBFPs and the intrinsic characteristics of firms because the correspondence analysis strongly associates the various patterns with the age, the size (net sales and total assets) of firms in N.

Simultaneously, the current research confirms that, as demonstrated by Laitinen (1991), all the firms do not behave the same in terms of financial indicators once they enter and evolve in the distress phase of the failure process. Different financial failure processes may thus be distinguished among small distressed firms. Actually, the statistical analysis corroborates that it is rather the first symptoms (or early warning signals, such as a very high or very weak net sales to total assets ratio) and the speed at which the financial symptoms deteriorate that vary from one firm to another (D'Aveni, 1989a; Laitinen, 1991). The present study shows for example that the deterioration of the firms' financial situation can be more or less progressive, notably in function of the EBFP to which they belong. In a preventive

perspective to failure, this implies that the failure can be detected[45] much earlier for some firms (such as EBFP 3) than for other ones (such as EBFP 5).

Furthermore, this study stresses that specific financial indicators can be roughly associated with some of the explanatory business failure patterns identified by Crutzen (2009) and Crutzen and Van Caillie (2009). Nevertheless, it is obvious that, on the basis of the current study, strong and exclusive relationships between each EBFP and specific financial symptoms can not be traced. Indeed, the correspondence analysis does not highlight really strong relationships between the EBFPs and specific financial ratios : the most obvious associations proposed are relationships between the EBFPs and missing data.

Under these conditions, while previous researchers demonstrate that financial ratios are useful to measure failure risks in a predictive perspective, the current study leads to the conclusion that, in a preventive perspective to failure, the early detection of the EBPFs is not possible on the basis of a series of (traditional) financial indicators. Several potential reasons for these observations have been presented in the fifth section, dedicated to a discussion of the results.

Even if it provides some interesting insights about relationships between organizational and financial failure factors, the present study raises new issues and it provides thus suggestions for future studies about this phenomenon.

Firstly, some EBFPs have to be further investigated in the future.

- EBFP 1 ("shocked firms") has to be put into perspective because the present study stresses again that shocks are often an excuse taken by the entrepreneurs in order to free themselves of guilt.
- Furthermore, EBFP 4 ("firms that fail after a punctual strategic error") has to be refined in a future research.
- Finally, EBFP 5c ("firms with deficiencies in business administration") has to be much more detailed because the current study shows that this sub-pattern is composed of firms with different business administration problems, which can lead to a variety of financial problems. Under these conditions, clear relationships between firms belonging to this pattern and specific financial symptoms would probably only be traced after a further segmentation of this sub-pattern into several, more homogeneous groups of firms.

Secondly, as the current study does not provide any strong relationship between each EBFP and specific financial symptoms, a larger research, based on a larger sample of firms, would perhaps lead to more significant results.

Thirdly, in the future, it would be interesting to concentrate on the identification of various failure paths (or failure trajectories), which would describe the sequence of events from the origins of the failure until N, rather than on failure patterns, which only focus on explanatory factors. As lots of researchers argue (Argenti, 1976; Newton, 1985), it is reasonable to assume that the business failure process is generally characterized by a sequence of unfavorable circumstances over time. So, a firm is often weakened by some unfavorable conditions, which can be related to one of the five EBFP, and, then, one or several aggravating factors bring it to its knees (Argenti, 1976; Sheppard, 1994). As aggravating factors probably have an impact on the financial symptoms shown by distressed firms, a further study dedicated to the identification of various failure trajectories would perhaps permit to identify much stronger relationships between organizational and financial failure factors.

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45 and corrective actions can then eventually be taken in order to recover

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