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Essays on Efficiency of Reorganization Process

A Life Cycle Approach

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Tiivistelmä

Tämä väitöskirja käsittelee suomalaisia yrityssaneerauksessa olleita yrityksiä. Yrityssaneerausten määrä on lisääntynyt, ja itse saneerausprosessin on todettu toimivan tehottomasti niin Suomessa kuin maailmanlaajuisesti. Yrityssaneerausprosessin toimiminen tehokkaasti on tärkeää sekä yrityksille itselleen, että niiden sidosryhmille. Väitöskirjan neljä erillistä artikkelia käsittelevät aihetta eri näkökulmista. Tutkimusaineisto koostuu pienistä ja erittäin pienistä suomalaisista yrityksistä.

Tämän väitöskirjan tarkoituksena on tuoda uutta tietoa taloudellisten ja ei-taloudellisten tekijöiden roolista pienten suomalaisten yritysten saneerauksessa. Tutkimus sisältää saneerauksen eri vaiheissa olevia yrityksiä, ja kattaa siten koko saneerauksen elinkaaren. Tutkimuksen tulokset tuovat uusia näkökulmia saneerauksen epäonnistumisen ennustamiseen, ja toisaalta osoittavat, että ei ole yhtä tapaa, jolla yrityksen saneeraus epäonnistuu tai onnistuu. Lisäksi useiden taloudellisten ja ei-taloudellisten muuttujien huomattiin olevan tärkeitä epäonnistumisen ennustamisessa. Kokonaisuutena tämän väitöskirjan tutkimustulokset tuovat uutta tietoa yrityssaneerausprosessista ja sen tehokkuudesta Suomessa. Koska saneerausprosessit toimivat pääosin samalla tavalla maailmanlaajuisesti, voidaan tuloksia hyödyntää myös Suomen ulkopuolella.

Asiasanat

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Abstract
This thesis examines Finnish firms reorganized under the Finnish Company Reorganization Act (FCRA). The number of reorganizations is increasing, and the reorganization processes have been claimed to be inefficient both in Finland and worldwide. The efficiency of reorganization process is essential for the reorganizing firms and their stakeholders. Four separate essays examine the topic from different viewpoints. The data used are from small and very small firms.

The purpose of this doctoral dissertation is to provide new evidence on the role of financial and non-financial information in the context of small firms reorganizing under the FCRA. More precisely, the firms in different stages of reorganization process are examined, and therefore the study covers the whole life cycle of reorganization. The results of the research show new perspectives on failure prediction and that there is no single way a firm fails or succeeds. Moreover, several financial and non-financial variables were found important when predicting firm failure. All in all, the findings of the thesis provide new information on the reorganization process and its efficiency in Finland. Since the reorganization processes are similar worldwide, the findings of the paper can be applied to other countries as well.

Keywords
reorganization, entrepreneurial firms, failure processes, non-financial characteristics, financial information

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Abbreviations

FCRA	Finnish Company Reorganization Act

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Kärkinen, E-L. (2010). Taxonomy of Six Explanatory Reorganization Interruption Patterns: Empirical Evidence from the Finnish Firms June 2008–May 2009. *International Journal of Management and Enterprise Development* 9:3, 276–291.[1]

Kärkinen, E-L and Laitinen, E.K. (2015). Financial and non-financial information in reorganisation failure prediction. *International Journal of Management and Enterprise Development* 14:2, 144–171.[2]

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1 INTRODUCTION

Due to the large number of failed reorganizations worldwide, there has been a growing demand to study firms and their reorganization processes. It has been claimed that reorganization processes are inefficient because they force viable firms into bankruptcy and nonviable firms into reorganization, which causes large economic and social losses for stakeholders. In response to inefficient processes, changes to reorganization legislation have been made worldwide, but the number of failed reorganizations remains high. Prior reorganization research has mainly focused on differences between failed and non-failed firms in order to predict failure whereas failure prevention is largely neglected. However, several bankruptcy studies have focused on failure prevention by concentrating on why and how firms fail. Thus, the efficiency of reorganization processes has been at the center of the discussion among academics, practitioners, and regulators.

The purpose of this dissertation is to provide new evidence on the role of financial and nonfinancial information in the context of small firms reorganizing under the Finnish Company Reorganization Act (FCRA). The research aims to extend the existing literature by addressing how and which kind of financial and non-financial information should be included to examine firms in different stages of reorganization. This dissertation focuses only on small firms while prior research has mainly concentrated on large firms, even though small firms are important actors in the world economy (Keasey & Watson 1987, 1991; Lussier 1996; Pompe & Bilderbeek 2005). The FCRA is comparable to other reorganization systems worldwide (Couwenberg 2001; Philippe et al. 2002; Laakso 2012), and therefore the results of this dissertation may also be applied to other countries.

The results of this dissertation will increase academic understanding of the efficiency of reorganization processes in the context of small firms. The process starts when a firm files for reorganization and ends when the program is completed or the process is interrupted. The four essays of this dissertation contain the whole life cycle of reorganization, focusing on firms in different stages of the process. The first essay concentrates on firms in the first stage of reorganization, namely reorganization proceedings, whereas the second and third essays focus on firms implementing their reorganization plans. The fourth essay concentrates on the whole life cycle of firms filing for reorganization. The results of essays 1, 3, and 4 indicate that there is no single way in which a reorganizing firm fails or succeeds, but different financial paths can be identified among the firms in different stages of reorganization. The second essay focuses on the explanatory power of financial and non-financial information to predict failure during a reorganization program.

The study shows that the most efficient prediction model incorporates a combination of financial and non-financial information. In this combined model, operating cash flow is very important. Finally, the findings of the last essay suggest that different financial paths can be found within firms filing for reorganization. The findings further imply that firms' financial and non-financial information is connected to survival time in reorganization. The assumption is that the longer the survival time, the larger the chance of success. As a whole, the results of this dissertation provide new evidence on the role of financial and nonfinancial information in the context of small firm reorganizations. This information can be used, for example, by courts when deciding which firms could successfully reorganize or by stakeholders (entrepreneurs, administrators, and consultants) of the distressed firm when preparing a reorganization plan. This is the first study that examines the financial paths of reorganizing firms and the first to focus on the importance of cash flow information among reorganizing firms.

The remainder of this introductory chapter is organized as follows. The next section describes the legal reorganization procedure in Finland (FCRA). The third section summarizes the earlier literature on reorganization failure prediction employed in various countries. Finally, the last section summarizes the four essays that compose this dissertation.

2 THE REORGANIZATION PROCESS IN FINLAND

In Finland, the reorganization proceedings of a business are stipulated by the FCRA (47/1993; amendments up to 247/2007 included) that went into effect on February 8, 1993. The purpose of the FCRA is to provide a legal framework for firms that are economically viable but currently suffering financial difficulties (Philippe et al. 2002; Koskelo 2003). The FCRA renders it possible to rehabilitate a distressed debtor's viable business, ensure its continued viability, and facilitate debt arrangements. Another option within the legal context in Finland is the legal bankruptcy process (comparable to liquidation via Chapter 7 in the United States). There are two types of bankruptcy processes in the United States: liquidation (Chapter 7) and reorganization (Chapter 11). By contrast, in Finland, firms apply separately for reorganization or bankruptcy. (Laitinen 2013.)

The life cycle of reorganization can be divided into two larger stages: reorganization proceedings and reorganization plan implementation. Furthermore, reorganization proceedings can be divided into five stages: 1.) filing for reorganization, 2.) court's decision to open the proceedings, 3.) preparation of the reorganization plan, 4.) consideration of the proposed plan, and 5.) confirmation of the plan. The purpose of the reorganization proceedings is to produce a reorganization plan, including both business and debt restructuring, in order to recover the firm. (Laitinen 2013.)

A petition for reorganization proceedings can be filed by the debtor, a creditor, or several creditors (FCRA § 5). Proceedings are opened when no legal obstacles to reorganize a firm exist. However, proceedings may not be opened or an interruption may be requested for opened proceedings if a debtor is insolvent and reorganization cannot provide any long-term remedy to this insolvency. (FCRA § 6-7.) Within four months after a reorganization application, an administrator prepares a reorganization plan. A plan should include the firm's current situation and reorganization actions to rehabilitate the firm. These actions may include changes in personnel, organization, capital structure, and operations as well as a debt adjustment program. (FCRA § 40-44.) If a majority of creditors approves the plan, the court will confirm it (FCRA § 51-52). Finally, a court may appoint a supervisor to control plan implementation. For instance, an administrator may act as a supervisor. (FCRA § 61.) If necessary, a supervisor may propose a reorganization to lapse (FCRA § 65). The process may be interrupted during the reorganization plan implementation if the debtor fails to comply with any of the obligations laid down in the plan (FCRA 7§, 64 §).

The empirical evidence from prior studies indicates that the reorganization procedure in Finland is inefficient. Approximately 60 percent of reorganization petitions are approved by the courts, and 75 percent of approvals obtain a confirmed reorganization plan. However, 40–50 percent of firms will fail during the reorganization program. (Laitinen 2011.) Most firms fail during the first years in reorganization. According to Laakso, Laitinen, and Vento (2010), approximately 40 percent of firms fail during the first 20 months after reorganization plan confirmation, and almost all failures occur during the first 40 months after confirmation. The Finnish failure rate is comparable to that in the United States (Jensen-Conklin, 1992), but in Canada, the number of failed reorganizations is lower (Fisher & Martel, 1995). Although a large number of reorganizing firms fail during the reorganization program in Finland, the payoff rate to creditors has proven to be efficient. Creditors also receive a better payoff in reorganization under the FCRA than under bankruptcy proceedings in Finland. (Sundgren 1998; Bergström, Eisenberg & Sundgren 2004.) According to Ravid and Sundgren (1998), the median payback rate to creditors was 33.5 percent under the FCRA and 56.4 percent in the United States.

Comparisons presented by Couwenberg (2001), Philippe et al. (2002), and Laakso (2012) indicate that the FCRA is slightly different from other reorganization procedures. However, FCRA, like many reorganization systems, is plan-based (see Philippe et al., 2002), which allows for straightforward generalization of the results. Administrative events of the FCRA are particularly comparable to events in Australia for voluntary administration. By contrast, there are several differences between the Finnish and United States systems. In the United States, a debtor prepares the plan, whereas in Finland, an administrator is appointed to do so. (Laitinen 2013.) Moreover, plan consummation does not occur immediately after plan confirmation in the United States but changes to the reorganization plan can still be made until the effective date. In Finland, the plans are consummated immediately after confirmation. The priority of creditors is also different in the United States versus Finland, since there are more classes of creditors in the United States. (Laakso 2012.)

3 EFFICIENCY OF THE REORGANIZATION PROCESS

The relevant literature related to this dissertation can be classified into failure prediction and failure prevention studies. The pioneering work by Beaver (1966) has been a model for several failure prediction studies and the literature on this area is extensive (see, e.g., literature reviews by Dimitras, Zanakis & Zopoudinis 1996; Altman & Narayanan 1997; Balcaen & Ooghe 2006; Altman, Iwanicz-Drozdowska, Laitinen & Suvas 2017). The studies have examined which types of firms fail during reorganization (see e.g., Comerford 1976; LoPucki 1983; Jensen-Conklin 1992; Routledge & Gadenne 2000; Barniv, Agarwal & Leach 2002; Laitinen 2008, 2011, 2013), and which types of firms should be selected into reorganization (see e.g., White 1981, 1983, 1989; Hong 1983; Casey, McGee & Stickney 1986; Fisher & Martel 1995, 2004; Campbell 1996; Sundgren 1998; Routledge & Gadenne 2000). Fewer studies have examined firm performance after emerging from reorganization (see e.g., Franks & Torous 1989; Hotchkiss 1995). Several studies have used only pre-filing financial information and non-financial information is largely neglected. However, according to Laakso et al. (2010), factors affecting failure in reorganization are pre-filing financial information, non-financial information, and actions suggested in reorganization plans. Therefore, in this dissertation, all these aspects of failure are examined. The variables used are classified similarly, and they are presented in more detail in sections 3.1 and 3.2.

Failure prediction studies have developed different models based on various techniques to determine the best method. For instance, univariate models, risk index models, MDA models, and conditional probability models, such as logit, probit and linear probability models, have been applied (Zavgren 1983; Atiya 2001). However, a problem with classic statistical failure prediction models is that they use only a single observation (usually based on annual accounts) for each firm (Johnson 1970; Balcaen & Ooghe 2006). Hence, in these models, annual accounts are treated as independent repeated measurements, which do not necessarily represent the true conditions of a firm. For instance, a healthy firm suffering from temporary difficulties may be classified as failing by the model. (Mensah 1984; Shumway 2001; Balcaen & Ooghe 2006.) Moreover, these models are based on financial variables demonstrating financial symptoms of failure (see e.g., Ooghe et al. 1995; Dimitras et al. 1996; Altman, Sabato & Wilson 2010) and causes of failure are disregarded (see e.g., Hambrick & D'Aveni 1992; Everett & Watson 1998; Charan & Useem 2002).

Problems that have arisen within traditional failure prediction studies have inspired several studies to focus on failure prevention. However, these studies are conducted among bankruptcy studies (see e.g., Argenti 1976; Weitzel & Jonsson

1989; D'Aveni 1989; Laitinen 1991, 1993; Ooghe & De Prijcker 2008; Laitinen, Lukason & Suvas 2014). This type of studies aims to understand and explain why and how firms fail, rather than trying to discriminate between failed and non-failed firms (Dimitras et al. 1996). Argenti (1976) conducted one of the first studies related to the failure processes of firms. He found three different failure trajectories among distressed firms. The first group of firms are newly founded and have poor performance from the beginning. The second group contains similarly new firms that have excellent figures before the failure. The last group includes mature firms whose performance is good or excellent before a sudden partial collapse, a more stable phase, and a rapid decline to insolvency. However, in this group, at some stage, a major change occurs, and if there is a failure to respond to this change, a firm will collapse.

There are a few published studies on the failure processes of firms after Argenti (1976). These studies have found a small number of distinct failure processes, and the focus has been on firms' financial variables (e.g., Laitinen 1991; 1993), the non-financial variables (Crutzen & Van Caillie 2010), or both the financial and non-financial variables (e.g., Hambrick & D'Aveni 1988; D'Aveni 1989; Moulton et al. 1996). However, some of these studies lack large-scale empirical proof (e.g., Argenti 1976; Ooghe & de Prijcker 2008). Moreover, the terminology used in these studies is mixed; some studies use terms such as "trajectory" (Argenti 1976; du Jardin 2010; 2015), "patterns" (D'Aveni 1989; Crutzen 2009), "process" (Laitinen 1991; Ooghe & De Prijcker 2008), "pathways" (Moulton et al. 1996), and "extinction" (Sheppard & Chowdhury 2005), and some of these terms are applied differently. The studies examine either the whole life cycle of firms or the final stages before the collapse. Nevertheless, the extant literature lacks similar studies based on reorganizations. Therefore, in this study, both aspects of failure are considered. Essays 1, 3, and 4 take a more preventive perspective on failure. Essay 1 examines failure processes within firms in reorganization proceedings. Essays 3 and 4 consider financial paths within both failed and non-failed firms. In essay 3, firms with confirmed reorganization plans are examined. Essay 4 investigates firms that filed for reorganization. In essay 2, failure is predicted within firms with confirmed reorganization plans by using financial and non-financial information.

However, a large body of failure prediction literature has focused on large firms, even though small firms have vast relative impact on the economy (see e.g., Keasey & Watson 1987, 1991; Storey & Johnson 1987; Pompe & Bilderbeek 2005). Small firms have specific characteristics compared to large firms since for instance, the resources available, structure of the firm, and role of the owner/manager are different (see e.g., Mintzberg 1979; Keats & Bracker 1988). Similarly, the financial information of small firms may be more unstable, unreliable, or manipulated

(Balcaen & Ooghe 2006), and internal control systems may be insufficient (Keasey & Watson 1987; Charitou & Lambertides 2003). Therefore, results related to large firms cannot be directly applied to small firms. In this doctoral dissertation, only micro or small firms are examined. The factors to distinguish micro, small, and medium-sized firms are presented in the following table.

Table 1. Definition of micro, small, and medium-sized enterprises (definitions from EU recommendation 2003/361)

Company category	Staff headcount	Turnover	or	Balance sheet total
Medium-sized	< 250	≤ € 50 m		≤ € 43 m
Small	< 50	≤ € 10 m		≤ € 10 m
Micro	< 10	≤ € 2 m		≤ € 2 m

3.1 Financial variables in the reorganization literature

The existing failure prediction literature concentrates on financial variables because these are objective measures based on public information (see e.g., Micha 1984; Laitinen 1992; Dirickx & Van Landeghem 1994). Traditionally, variables measuring profitability, liquidity, leverage, cash flow, and efficiency are used in failure prediction studies (Dimitras et al. 1996). Financial variables are typically selected on empirical grounds because the existing failure prediction literature suffers from a generally accepted theory of failure (Scott 1981; Balcaen & Ooghe 2006).

However, previous failure prediction studies are unanimous on the role of accrual- and cash flow-based information in failure prediction models. Certain studies claim that cash-based information does not contain incremental information to accrual-based models (see e.g., Casey & Bartczak 1984; Gombola, Haskins, Ketz & Williams 1987). Several studies recommend using cash flow-based ratios only (Gentry et al. 1985; Gentry et al. 1987; Aziz & Lawson 1989) or including cash-flow-based ratios along with accrual-based variables (Gombola & Ketz 1983; Sharma & Iselin 2003). The studies recommending cash-flow-based variables claim that very distressed firms, such as those in the reorganization process, tend to manipulate their annual account figures through earnings management to hide their actual financial situation (see e.g., Argenti 1976; Charitou & Lambertides 2003). In this manipulation, accruals play a central role, and therefore cash flow-based variables should be used (Sharma 2001). The role of cash-based information is especially important in the context of reorganization of small firms, since the relation

between inventories, receivables, payables, and cash is complex and constantly changing in small firms (Thompson 1986).

Several reorganization studies have selected financial variables on the grounds of coalition behavior theory, first adopted by Bulow and Shoven (1978) (Laitinen 2013). Bulow and Shoven (1978) used coalition behavior theory to examine whether a firm would liquidate or continue under bankruptcy in the United States. White (1980, 1984, 1989) applied coalition behavior theory to reorganizations in the United States. White claimed that a coalition consisting of equity holders and secured and unsecured creditors affects the liquidation risk of the firm. According to the theory, coalitions make their decisions in terms of financial characteristics, such as leverage, equity commitments, future profitability, secured debt in the capital structure, and payoff rate to creditors in reorganization in comparison to liquidation. Even though coalition theory was originally used in the studies examining whether a firm would liquidate or continue under the reorganization procedure, it is also widely adopted in studies predicting reorganization success or failure. (Laitinen 2013.) These studies suggest that size, capital structure, liquidity, and profitability are important when examining which firms should be selected into reorganization and which firms will reorganize successfully (Fisher & Martel 1995; Campbell 1996; Frost-Drury, Greinke & Shailer 1998; Routledge & Gadenne 2000). However, financial restructuring as a reorganization strategy should be taken into account when predicting success or failure during a reorganization program. For instance, Routledge and Gadenne (2000) found that firms that are more profitable, more highly leveraged, and have higher short-term liquidity prior to reorganization reorganize more successfully (see also Laitinen 2013). It appears that pre-filing leverage positively affects success during a reorganization program. These conflicting results may be due to debt restructuring (see Routledge & Gadenne 2000; Laitinen 2013).

Cash-based operating cash flow ratios and accrual-based ratios are examined in essays 2–4. The accrual-based variables used in this dissertation represent the three financial dimensions of firms (profitability, solvency, and liquidity).

3.2 Non-financial variables in the reorganization literature

Despite the concern over financial variables, only a few reorganization studies have examined non-financial variables related to firms and their reorganization processes. However, bankruptcy studies have examined non-financial variables more widely. The evidence found in prior studies is mixed related to the

characteristics affecting the failure risk (Routledge & Gadenne 2000; Barniv et al. 2002; LoPucki & Doherty 2002). For instance, prior studies examined background information about a firm, its industry, and its reorganization process. The following paragraphs discuss the non-financial variables used in this dissertation.

There is conflicting empirical evidence related to the manager's gender (Watson 2003). Certain studies claim that gender may be an effective determinant of firm's success and therefore it may also affect reorganization success. Previous studies found evidence that female-owned firms may be less effective than male-owned firms in terms of revenue, profit, growth, discontinuance, and failure (Du Rietz & Henrekson 2000). This may be a consequence of several differences between female- and male-owned firms, such as industry, firm age, family commitments, access to capital, and the owner's personality traits (Watson 2003).

The industry reflects the environment of a firm's business and the complexity of its business processes. However, evidence found in previous studies is mixed. Part of the studies claim that industry has a significant effect on firm failure (LoPucki 1983; Hotchkiss 1995; Campbell 1996; Routledge & Gadenne 2000; LoPucki & Kalin 2001), but LoPucki and Doherty (2002) did not find any industry effect.

Prior failure prediction studies generally recognize the significance of age (see e.g., Argenti 1976; Keasey & Watson 1987; Shumway 2001; Laitinen 2005) while prior reorganization studies have largely overlooked the age effect. The pioneering work by Argenti (1976) found that failure rates of newly founded firms and old firms without adequate ability to renew are high. Similarly, studies by Lussier (1996), Laitinen (2005), Brinckmann, Dietmar and Kapsa (2010), and Altman, Sabato, and Wilson (2010) found age to be significant. However, Keasey and Watson (1987) and Shumway (2001) found no significant age effect. Moreover, the size of the firm has been suggested to affect success in reorganization since large firms are more likely to reorganize successfully (LoPucki 1983; Eisenberg & Tagashira 1994; Campbell 1996).

Several studies have found a significant legal form effect (corporation or non-corporation) when examining the likelihood of failure. Laitinen (1999) found a significant legal form effect on the credit risk of firms. Similarly, Fisher (2007) found a significant non-corporation effect in Canadian reorganization data. The underlying assumption is that the financial liability of the owner may affect motivation and decision making, since in partnerships or proprietorships, the liability covers the personal property of the owner, whereas in limited companies, the financial liability of the owner is limited to the equity invested. (Laitinen 2013.) Thus, in partnerships or proprietorships, the failure of the firm indicates personal

bankruptcy of the owner, which substantially affects the owner's commitment and task motivation (Keats & Bracker 1988).

Researchers such as Sundgren (1998) and LoPucki and Doherty (2002) postulated that there are differences in the confirmation rates of reorganization plans between courts. Sundgren (1998) examined Finnish firms and claimed that some courts may be more restrictive than others, which may affect the likelihood of reorganization in that particular court district. Similarly, LoPucki and Doherty (2002) examined failure rates in United States bankruptcy courts and found that the failure rate in one particular court district was higher, which may be caused by the reorganization process itself, not the characteristics of the firms. Moreover, reorganization actions have been shown to affect the outcome of reorganization (Routledge & Gadenne 2000, 2004; LoPucki & Doherty 2002; Laitinen 2008, 2009, 2011). These actions are presented in more detail in section 3.2.1.

In addition to examining the effect of non-financial variables separately, failure prediction studies also explored the combination effect of non-financial and financial variables. Peel and Peel (1987), Keasey and Watson (1987; 1988), Shumway (2001), Back (2005), and Laitinen (2013) found evidence that the best failure prediction model may be built upon a combination of financial and non-financial information.

3.2.1 Efficiency of reorganization actions

Since reorganization actions are an essential part of a reorganization plan, their efficiency should be precisely examined. However, prior studies have focused mainly on different types of actions within voluntary reorganizations (for a review see Smith & Graves, 2005), whereas this type of studies are scarce for legal reorganizations (Routledge & Gadenne 2000, 2004; LoPucki & Doherty 2002; Laitinen 2008, 2009). According to Laitinen (2013), reorganization actions can be classified into financial and business restructuring. Financial restructuring include actions such as remission of debt, increasing of equity or debt, and realization of fixed assets. Using financial actions permits the firm sufficient financial resources to continue business and to start business restructuring actions. Business restructuring actions are challenging and more risky, and they include for instance marketing, cost cutting, organizational changes, and improvement of planning systems. Business restructuring actions in particular are examined in prior studies. (Laitinen 2013.)

One of the first studies to examine business reorganization actions was Schendel, Patton and Riggs (1976) addressing voluntary reorganizations. According to the study, there are efficiency-oriented and entrepreneurial turnaround actions.

Efficiency-oriented actions, such as cost cutting, refer to the internal processes of an organization, and are applied to use organizational resources more efficiently (Woo & Cooper 1981). Entrepreneurial turnaround actions are more market oriented, since they deal with such issues as resource acquisition and revenue generation (Cameron, 1983) or changes in market niches (Hambrick & Schecter 1983). However, despite the differences between efficiency-oriented and entrepreneurial actions, Schendel et al. (1976) suggested that a set of actions should be used rather than one particular strategy. Several subsequent studies support efficiency-oriented reorganization actions (Robbins & Pearce, 1992; Chowdhury & Lang 1996; Smith & Graves 2005; Laitinen 2013). Certain studies suggest that efficiency-oriented actions should be used regardless of the cause of the failure (Robbins & Pearce 1992; Laitinen 2000).

By contrast, Hoffman (1989) classified reorganization actions into operational and strategic and indicated that operational actions should be applied when causes of failure are internal, whereas strategic actions should be used for external causes. Several researchers, such as Bibeault (1982), Pearce and Robbins (1993), and Arogyaswamy, Barker and Yasai-Ardekani (1995), suggested a classification of decline-stemming and recovery actions. By using decline-stemming actions, such as cost cutting, asset reduction, or both, the financial conditions of a firm could be stabilized. Afterwards, recovery actions focusing on efficiency maintenance and strategic actions that are more concerned with entrepreneurial reconfigurations should be used. (Smith & Graves 2005.)

In the previous literature, financial restructuring actions are not widely examined (Laitinen 2013). Mainly, the effect of the remission rate of unsecured debt is addressed, since unsecured creditors receive only a small portion of their claims, whereas secured creditors receive a full payment, according to the reorganization law (Sundgren 1998). Sundgren (1998) examined the remission rate of unsecured debt among Finnish reorganizing firms and found that unsecured creditors received only 42,9 percent of their claims. Laitinen (2008, 2011) showed that the remission rate of unsecured debt is positively connected to success in reorganization. Moreover, Laitinen (2008) found that the risk of failure is lower if the plan includes realization of fixed assets. However, prior studies claim that assets may not be easily converted into cash since they can be essential for a firm and its business, especially in the case of a small firm (Slatter, Lovett & Barlow 2006). For instance, in a micro firm, the assets may be privately used by the owner (Laitinen 2011).

Laitinen (2008, 2011, 2013) examined the effect of reorganization actions in Finland. Laitinen (2008) developed a data system based on pre-filing financial and

nonfinancial information, reorganization submission information, and reorganization plan information to assess the probability of failure in small and medium-sized firms. The results indicated that actions suggested in reorganization plans were not connected to reorganization success. Afterwards Laitinen (2011) examined the effect of efficiency-oriented and financial actions on the long-term performance of Finnish firms that carried out reorganization plans for approximately 4–9 years, via a survey sent to such firms. Debt restructuring, organizational changes, and alterations in the management control system showed positive effects on firm performance. Laitinen (2013) examined the effect of reorganization actions on firm failure and survival time within firms with confirmed reorganization plans in 2000. Only efficiency-oriented actions were connected to firm failure and survival time. The firms using efficiency-oriented actions were more successful in reorganizations, and the survival time was longer.

Essays 1 and 3 examine efficiency of reorganization actions. Essay 1 examines the connection between pre-filing financial information and reorganization actions, including both actions used before and during the reorganizations and actions suggested in reorganization plans. Essay 3 addresses the connection between clusters of reorganization actions and financial paths of firms. Only suggested reorganization actions were examined in the third essay.

4 SUMMARY OF THE ESSAYS

The purpose of the dissertation is to provide new evidence on the role of financial and nonfinancial information in the context of small firm reorganizations under the FCRA. This dissertation consists of four essays, which are briefly discussed below. The four essays concentrate on micro and small firms in different stages of the reorganization process, and therefore the whole life cycle of reorganization is examined in this dissertation. The first essay concentrates on firms in reorganization proceedings, whereas the second and third essays focus on firms implementing reorganization plans. The fourth essay encompasses the whole life cycle of firms filing for reorganization. The financial data used in the thesis was extracted from financial statements before and after the reorganization applications. The non-financial data was extracted from the confirmed reorganization plans available to courts and creditors. Non-financial information refers to background information for the firm, its industry, and its reorganization process.

4.1 Taxonomy of six explanatory reorganization interruption patterns: empirical evidence from Finnish firms

The first essay of this dissertation examines whether there are differences between the small firms that interrupt their reorganization processes in the first stage of reorganization. A traditional reason for interruption is bankruptcy. Prior research has provided evidence on differences between failed and non-failed firms, but the failure processes of reorganizing firms have not been studied. However, prior bankruptcy studies examined the failure processes of firms and identified differences (Argenti 1976; Weitzel & Jonsson 1989; D'Aveni 1989; Laitinen 1991, 1993; Ooghe & De Prijcker 2008; Laitinen & Lukason 2014). Prior reorganization research focuses mainly on the financial characteristics of firms, despite recognizing the importance of nonfinancial variables (see e.g., Routledge & Gadenne 2000; LoPucki & Doherty 2002; Barniv et al. 2002; Laitinen 2008, 2011).

This essay uses a sample of 60 firms that interrupted their reorganization proceedings during June 2008–May 2009 under the FCRA. All firms are small, and most (75 percent) are limited companies. The number of employees is approximately 17, and the mean revenue is approximately 1,4 millions of Euros. In this essay, pre-filing financial and non-financial information is extensively examined. In addition to the traditional nonfinancial background information for

the firms, causes of insolvency, reorganization actions, and causes of interruption are examined. The main analyses are conducted using cluster analysis.

The empirical findings of the essay highlight different failure processes in the reorganizing firms. Six different failure processes are found in terms of pre-filing profitability, solvency, liquidity, size, and growth, which implies that the failed firms are significantly different in several financial dimensions. There are also significant differences in non-financial variables for the six groups. These results are consistent with prior bankruptcy studies emphasizing the importance of failure processes and nonfinancial information (see e.g., Peel & Peel 1987; Keasey & Watson 1987, 1988; Poston, Harmon & Gramlich 1994; Shumway 2001; Barniv et al. 2002; Fisher & Martel 2004; Back 2005).

Furthermore, the results indicate that in several cases, the causes of insolvency equal the causes of interruption, which can be a consequence of using the incorrect reorganization actions. Thus, identifying the causes of insolvency and applying corrective actions is essential in reorganizations. Overall, the findings indicate that the failure processes of reorganizing firms are different and that these processes and non-financial characteristics should be taken into account by the courts when examining whether a firm will successfully reorganize or liquidate and by the stakeholders (entrepreneurs, administrators, and consultants) when preparing a reorganization plan. Hence, the findings of this essay provide important information for the legislators and key actors of reorganization, such as administrators and courts, and clarify the Finnish reorganization proceedings and their quality.

4.2 Financial and nonfinancial information in reorganization failure prediction

The second essay in this dissertation examines small firms (n=68) with reorganization plans confirmed in 2000 under the FCRA. Approximately half the firms failed during the program. More precisely, this study examines whether the pre-filing non-financial variables, either alone or in conjunction with pre-filing financial ratios, are able to predict firm failure more accurately than models based solely on financial information. Approximately half the sample firms are limited companies. These are very small (micro) firms since the median number of employees is 3.0, and the average pre-filing net (annual) sales is 550 thousands of Euros (TEUR). Financial and non-financial information is extracted from the pre-filing documents available to the court and creditors before the reorganization decision.

The earlier literature is unanimous on the importance of accrual- and cash flow-based financial variables to predict firm failure. This essay approaches this issue by examining whether the expected weak predictive ability of accrual-based financial ratios can be improved by using the cash flow-based (manipulation-free) operating cash flow ratio of reorganizing firms. Furthermore, prior reorganization studies have emphasized the role of nonfinancial information, although nonfinancial variables are not commonly used in the models (see e.g., Routledge & Gadenne 2000; LoPucki & Doherty 2002; Barniv et al. 2002; Laitinen 2008, 2011). Therefore, the contribution of non-financial information is also examined in this essay. The main analyses are conducted with logistic regression analysis.

The findings reported in this essay demonstrate that the best failure prediction model may rely on a combination of financial and nonfinancial information. More precisely, in this combined model, operating cash flow is one of the best nonfinancial variables. The results are consistent with prior failure prediction studies emphasizing the importance of cash flow-based financial ratios (see e.g., Gentry et al. 1985, 1987; Aziz & Lawson 1989) and non-financial information (see e.g., Peel & Peel 1987; Keasey & Watson 1987, 1988; Poston et al. 1994; Shumway 2001; Barniv et al. 2002; Fisher & Martel 2004; Back 2005). Moreover, the results related to combination effect of financial and nonfinancial variables are as well consistent with prior studies (Peel & Peel 1987; Keasey & Watson 1987, 1988; Shumway 2001; Back 2005; Laitinen 2013). However, the studies including both financial and nonfinancial information are scarce. Moreover, operating cash flow ratios have not been addressed in reorganization studies. This essay contributes to the existing literature by examining the impact of cash flow and non-financial information on micro firms.

4.3 Financial paths of reorganizing firms after reorganization plan confirmation

The third essay also investigates micro firms implementing their reorganization plans, but the focus of this essay is on post-filing financial information. Using a sample of 59 micro firms with confirmed reorganization plans, both financial and non-financial characteristics (mainly referring to the reorganization strategy) of firms are examined. The mean number of employees is 3.0, and the mean revenues are 264,400 TEUR. Approximately 55 percent of sample firms are limited companies. More precisely, this essay examines financial paths within failed and within non-failed firms and whether there is a connection between financial paths and reorganization actions. Financial information is extracted from the financial

statements for the year of reorganization plan confirmation and the subsequent three years. Factor and cluster analyses were used to examine the financial paths.

Prior literature has mainly investigated the differences between failed and non-failed firms by using a single annual account. Failure processes of firms were shown to be different among bankruptcy firms (Argenti 1976; Weitzel & Jonsson 1989; D'Aveni 1989; Laitinen 1991, 1993; Ooghe & De Prijcker 2008; Laitinen & Lukason 2014), but the subject is largely neglected for reorganizing firms. This essay fills the gap in the previous reorganization literature and examines the financial paths within failed and non-failed firms implementing reorganization plans. Traditionally, pre-filing financial information is used, whereas this study uses post-filing information. Moreover, the reorganization actions used should be efficient enough to turn around a firm. The efficiency of strategies was examined in prior studies related to voluntary reorganizations (see Smith & Graves 2005) but rarely for legal reorganizations (see Routledge & Gadenne 2000, 2004; LoPucki & Doherty 2002; Laitinen 2008, 2011). There are no prior studies examining the connection between reorganization actions and firms' post-filing financial paths. Therefore, in this study, the connection between reorganization strategies and firms' financial paths is examined. This study contributes to the existing literature by focusing on the post-filing financial paths of reorganizing firms and the connection between reorganization actions and financial paths.

The empirical findings of the study indicate that different financial paths exist within the group of failed firms and within the group of non-failed firms. This result supports the previous bankruptcy studies indicating that different failure processes exist among firms (Argenti 1976; Weitzel & Jonsson 1989; D'Aveni 1989; Laitinen 1991, 1993; Ooghe & De Prijcker 2008; Laitinen & Lukason 2014). Specifically, financial paths differ within the failed firms since three different failure processes appear in these firms whereas only two processes were found within the non-failed firms. Furthermore, most non-failed firms belong to one cluster, which may indicate that they behaved in the same way in terms of financial variables, whereas the failed firms are more heterogeneous. A connection between reorganization strategies and firms' financial paths is found. More precisely, using various strategies simultaneously seems to improve the financial situation most efficiently during the reorganization program. This result is consistent with Schendel et al. (1976), which claimed that a set of strategies should be used. However, prior studies suggest that efficiency-oriented reorganization strategies are the most efficient in the long run (see e.g., Robbins & Pearce 1992; Chowdhury & Lang 1996; Laitinen 2008, 2009), whereas in the current essay, the efficiency-oriented and finance strategies did not positively affect the financial variables of firms. This result was consistent with prior studies claiming that finance strategies

do not strongly affect the long-term performance of firms and that such strategies are mainly used for short-term decline-stemming purposes (see e.g., Laitinen 2011).

4.4 The effect of financial and non-financial information on survival time of Finnish reorganizing firms

The fourth essay examines whole life cycle of small limited companies (n=221) filing for reorganization under the FCRA. First, this study examines whether the financial paths are different within the firms filing a reorganizing petition and whether the financial information is connected to survival time in reorganization. Second, the essay addresses whether the non-financial variables, either alone or in conjunction with financial information, affect survival time in reorganization. It is assumed that the longer the survival time, the larger the chance of success. The median number of employees is 15, and the pre-filing net (annual) sales are 629,000 TEUR.

Because different failure processes have been found among bankruptcy firms (Argenti 1976; D'Aveni 1989; Laitinen 1991; Ooghe & DePricker 2008), the current study relies on the view that different financial paths exist within reorganizing firms as well. Moreover, the financial paths within non-failed reorganizing firms are assumed to be different. However, no prior studies have examined the connection between financial paths and survival time in reorganization and survival analysis has been mainly used to predict reorganization success (e.g., Partington et al. 2001; Wong et al. 2007; Fisher 2007; Laitinen 2013). Furthermore, nonfinancial variables have been claimed to be important in predicting reorganization success (see e.g., Laitinen 2013; LoPucki & Doherty 2002; Barniv et al. 2002; Routledge & Gadenne 2000), and therefore it is assumed in this study that they also affect the time spent in reorganization. The main analyses are conducted by using factor, cluster, and survival analyses. This study contributes to the existing literature by focusing on financial paths within reorganizing firms and the connection between financial paths and/or nonfinancial variables and survival time.

The empirical findings of this essay indicate that six types of financial paths appear among firms filing for reorganization. This result supports the previous bankruptcy studies indicating that different failure processes appear among the firms (Argenti 1976; Weitzel & Jonsson 1989; D'Aveni 1989; Laitinen 1991, 1993; Ooghe & De Prijcker 2008; Laitinen & Lukason 2014). The results also provide evidence on the connection between pre-filing financial information and survival

time. More precisely, it is shown that a pre-filing liquidity variable may affect the survival time in reorganization. This result supports the previous studies indicating that pre-filing leverage positively affects success during the reorganization program (see Routledge & Gadenne 2000; Laitinen 2013). Furthermore, the results also provide evidence on the connection between non-financial variables and survival time. More precisely, one variable, industry (dummy: manufacturing), was statistically significant in the model. Thus, manufacturing industry may positively affect survival time in reorganization. Prior studies found that industry may affect the likelihood of reorganization failure (LoPucki 1983; Hotchkiss 1995; Campbell 1996; Routledge & Gadenne 2000; LoPucki & Kalin 2001). Similarly, the last model combining financial and non-financial information was partially supported. There were two statistically significant variables in the model: industry (dummy: manufacturing) and one that is strongly positively linked to pre-filing liquidity. However, the results were only slightly significant. Therefore, the combined model does not outperform the financial and non-financial models.

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Taxonomy of six explanatory reorganisation interruption patterns: empirical evidence from the Finnish firms, June 2008–May 2009

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Abstract: The purpose of this study is to examine the characteristics of firms ($n = 60$) that have interrupted their reorganisation proceedings under Finnish Company Reorganization Act (comparable to Chapter 11 in Bankruptcy Act in the USA) during the period 1 June 2008–31 May 2009. Cluster analysis is applied to estimate the differences in characteristics of interrupted firms. The results show that the firms are statistically significantly different in terms of prefiling financial ratios. There are also some statistically significant differences in non-financial characteristics among the groups. Overall, the empirical evidence is consistent with a view that the interruptions are primarily caused by inefficient reorganisation proceedings.

Keywords: reorganisation; restructuring; firm failure; financial ratios; financially distressed firms; turnaround; enterprise development; cluster analysis; Finnish firms.

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1 Introduction

Efficiency of reorganisation procedures is a matter of importance both for academic society and for government and corporate policy (Ravid and Sundgren, 1998). The efficient reorganisation procedures force the unviable firms into bankruptcy and viable firms into reorganisation. However, occasionally conflicts of interest between equity and debt holders and asymmetric information can cause inefficiencies such as forcing a financially distressed but viable firm into liquidation and an unviable firm into reorganisation (Mooradian, 1994). These filtering errors may trigger large economic losses for all stakeholders. Therefore, this disputed nature of reorganisation has

encouraged researchers in different countries to analyse and compare the reorganisation procedures in different countries. It appears that most countries try to improve their procedures by supporting the reorganisation of viable firms and the liquidation of non-viable. Traditionally, the US Chapter 11 (reorganisation procedure) has been a model for many countries (Laitinen, 2009a).

In Finland, Restructuring of Enterprises Act (comparative to US Chapter 11) was legislated in 1993. The concept of reorganisation refers to significant change made to the debt, operations or structure of a firm. The object is to rehabilitate a firm that is distressed but viable and only temporarily unable to pay its financial obligations (Restructuring of Enterprises Act). Many proceedings are interrupted during the process and few cases get a confirmed reorganisation plan implying that the process is hampered by serious ineffectiveness. More specifically, according to Laitinen (2009a), approximately 60% of the reorganisation petitions are approved by the court, and about 75% of firms that filed a petition will get a confirmed plan. Moreover, approximately 40–50% of reorganising firms will enter bankruptcy during the programme (Laitinen, 2009a).

Traditionally, the reorganisation studies assume that the certain characteristics of firms are important predictors of reorganisation decision and success (Routledge and Gadenne, 2000). The example for many studies has been the coalition theory by Bulow and Shoven (1978), which shows the conditions under which the bankruptcy would occur. However, other line of research (Balcaen and Ooghe, 2006) postulates that the focus should be on a preventive approach. These preventive studies argue that the failure processes of firms are different, and therefore the first symptoms (early warning signals) and the timing of financial symptoms vary between the distressed firms (Crutzen, 2009; D'Aveni, 1989; Laitinen, 1991). More specifically, some reorganisation studies argue that the characteristics of firms in reorganisations are different, which means that the failure in reorganisation cannot be caused by certain characteristics of firms but the reorganisation process itself (Laakso, 2007; Laitinen, 2008, 2009a; LoPucki and Doherty, 2002). However, none of the studies have concentrated solely on reorganisation proceeding that is the phase before confirmed reorganisation plan.

Because of the gap in the previous studies and the amount of interrupted reorganisations, this paper examines the failure in reorganisation process by concentrating on interrupted reorganisation proceedings and the characteristics of firms in these proceedings. The study is based on the sample of 60 firms that have interrupted their reorganisation proceedings during the period June 2008–May 2009 under the Finnish Company Reorganization Act. Consequently, the research question of this study is whether differences could be found between the firms which have interrupted their reorganisation proceedings. The Finnish Restructuring of Enterprises Act is comparable with reorganisation systems in other countries (see Philippe et al., 2002). Therefore, the results reported here have relevance to several countries.

This study has two main contributions. Firstly, the study contributes to existing literature by focusing on the financial and non-financial characteristics of firms, as well as the external factors affecting the resolution of reorganisation. Secondly, the method in previous studies has traditionally been logistic regression analysis while this study uses cluster analysis. In addition, a special feature of the study is that it concentrates on interrupted reorganisation proceedings. Therefore, the main interest is whether the proceedings are interrupted due to the characteristics of firms.

The reminder of this paper is structured as follows. Section 2 provides a brief overview of the previous literature, resulting in the formulation of hypotheses. Section 3

includes the variables and Section 4 presents the data and the sample characteristics. In Section 5, the methods are introduced. Section 6 reports the results of the tests. Section 7 concludes this paper with a discussion of the findings and their implications as well as limitations.

2 Prior research and hypotheses

Traditionally, prior reorganisation studies have concentrated on the characteristics of firms in the reorganisation. Typically, these studies try to predict the outcome of reorganisation or examine the differences between two groups, such as successful reorganisations and liquidations, failed reorganisations or the firms that continue operating. Broadly, these studies can be classified into three categories:

1 prefiling financial and non-financial information

2 postfiling financial and non-financial information

3 turnaround strategies used.

However, the results of the studies are not directly comparable due to the different legal frameworks between the countries.

Firstly, the studies regarding prefiling financial information have confirmed that larger amount of free assets (Casey et al., 1986; White, 1981, 1984), good profitability in the near future (Casey et al., 1986; White, 1981, 1984), size of the firm (Sundgren, 1998; White, 1981, 1984), strong equity commitments by management (White, 1981, 1984), higher leverage (Routledge and Gadenne, 2000) and industry-adjusted operating margins (Sundgren, 1998) are significant predictors of success. On the other hand, the studies regarding prefiling non-financial information have found several variables to affect the resolution of reorganisation (Laitinen, 2009b). Examples of variables are as follows: industry classification (Campbell, 1996; Hotchkiss, 1995; Routledge and Gadenne, 2000; Sundgren, 1998), composition of firm debt (Barniv et al., 2002; Campbell, 1996), management change, evidence of fraudulent activity and change in the market price of securities in the prefiling period (Barniv et al., 2002). Moreover, the macroeconomic conditions are attested to affect distressed firms and the reorganisation process (Altman, 1971; Levy and Barniv, 1987).

Secondly, the studies of postfiling performance examine the determinants of success or failure of firms that proceed into reorganisation process. For instance, complexity of capital structure (LoPucki and Doherty, 2002) and management turnover (Hotchkiss, 1995) were evidenced to be different between successful and failed reorganisations. In addition, the researchers such as Sundgren (1998) and LoPucki and Doherty (2002) have stated that there can be found differences in confirmation rates of reorganisation plans between the courts.

Thirdly, turnaround strategies among financially distressed firms have been widely studied. The studies tend to focus on the content of successful strategies or the turnaround process. The very first studies by Hofer (1980) and others (e.g. Hambrick and Schecter, 1983; Schendel and Patton, 1976) described turnaround as a two-stage process consisting of retrenchment and recovery. O'Neill (1986) added that the selected strategy must be compatible with firm characteristics and the conditions of a firm. Later, several researchers such as Bibeault (1982) and Pearce and Robbins (1993) questioned the earlier

view and argued the turnaround process to consist of decline stemming and recovery strategies. More recently, many studies have insisted that the efficiency-oriented actions lead to the best performance in the long run (Laitinen, 2000; Smith and Graves, 2005).

2.1 Hypotheses

Most of the bankruptcy studies seek to find the best possible failure prediction model in order to examine the kind of firms that have to be selected to the reorganisation to maximise its efficiency. Examples of important studies are Campbell (1996), Casey et al. (1986), Fisher and Martel (1995), Hong (1983), Hotchkiss (1995) and Routledge and Gadenne (2000). These studies do not consider the failure as a process but assume that failure is a steady state. However, it is obvious that firm failure is not a sudden and unexpected event. All distressed firms do not behave the same way, but different failure processes may be distinguished. Therefore, financial symptoms and their timing depend on the causes of the failure and the turnaround strategies used (Crutzen, 2009; D'Aveni, 1989; Laitinen, 1991).

Traditionally, bankruptcy studies tend to omit most of the non-financial information and try to explain the success in reorganisation by using solely information from the financial statements. This is simply because non-financial information data are often difficult to obtain due to the confidentiality issues (Poston et al., 1994). Moreover, the non-financial variables used usually include only a limited number of variables such as firm form (Back, 2005). Arguably, considering non-financial information more extensively, the failure or success of a firm can be more fully understood.

Because this type of reorganisation research has not been conducted earlier, the hypotheses cannot be based on findings of earlier studies. Hence, the hypotheses are based on failure research and their findings of different failure processes. This study forms explanatory failure patterns that can differentiate the firms according to the reasons why they fail in reorganisation process. The study is methodically comparable with study by Crutzen (2009), which determines six explanatory failure patterns of distressed firms. Following prior research, both pre- and postfiling financial and non-financial information, as well as turnaround strategies are considered. Consequently, the main hypotheses of this study are formed in a null form and they are as follows:

H1: There can be found different groups of firms among interrupted reorganisation proceedings in terms of prefiling financial ratios.

H2: There can be found differences in non-financial characteristics between the groups of firms.

3 Variables

Selection of independent variables is based on the prior reorganisation and bankruptcy research. The variables are classified into five groups according to the stages of reorganisation proceeding: prefiling financial information, prefiling non-financial information, reorganisation submission information, reorganisation plan proposal information and reorganisation interruption information.

Firstly, variables of prefiling financial information are chosen on the basis of appearance in prior reorganisation and/or bankruptcy studies. The chosen ratios are return

on investment (ROI), quick ratio, equity to total assets, average yearly growth rate and firm size. Each variable has been found to be a significant predictor of reorganisation or bankruptcy in prior reorganisation and/or bankruptcy studies. In order to avoid potential multicollinearity problems, only one financial ratio from one financial dimension is chosen (see for instance, Chen and Shimerda, 1981; Routledge and Gadenne, 2000).

Secondly, reorganisation and/or bankruptcy research shows that in addition to the financial variables, non-financial variables affect the resolution of reorganisation (Back, 2005; Laitinen, 2009b). Therefore, prefiling non-financial information is included in the study. The information includes the following variables: court (16 dummies), industry branch (12 dummies), age of the firm, company legal form (3 dummies), number of employees and gender of the entrepreneur or manager (3 dummies). Each variable has been carefully selected to present the determinants of resolution of reorganisation.

Thirdly, the firms in reorganisation can eliminate financial distress and improve the overall performance of the business by using corrective turnaround strategies. Hence, the current study examines the differences in early warning signals (causes of failure) and turnaround strategies used between interrupted firms. The causes of the insolvency and interruption of the reorganisation proceeding are divided into six classes which are as follows: external causes, top management and planning skills, financial management and control skills, marketing management, human resource management and operations management. The percentages of causes are calculated for the firms. The variables are selected on the basis of several different studies regarding the failure of the firm (see for instance, Argenti, 1976; Balcaen and Ooghe, 2006). On the other hand, the turnaround strategies are divided into five groups according to the previous research by Laitinen (2000). These groups are efficiency strategies, product strategies, expense strategies, asset strategies and finance strategies. The percentages of strategies are calculated for the firms. To conclude, reorganisation submission information contains the following variables: causes of insolvency (six dummies) and turnaround strategies used before the petition (six dummies). Reorganisation plan proposal information contains information on used turnaround strategies during the proceeding (six dummies) and suggested turnaround strategies (six dummies). Finally, reorganisation interruption information contains information from the interruption petition and decision. This class includes the causes of the interruption of the proceeding (six dummies).

4 Data and sample characteristics

The initial data used in this study consist of Finnish companies ($n = 74$) that have interrupted their reorganisation proceedings during the period June 2008–May 2009. The data do not comprise all interruptions ($n = 104$) at that time period because of the difficulty in access to materials. The interrupted firms are published by Virallinen lehti, and the documents regarding the reorganisations were available at Finnish Courts. The documents contained all the information which the interruption decision has been based on, such as petition for reorganisation, plan proposal and financial information. However, the material does not contain complete financial statements concerning all the firms. Thus, the observations of insufficient data ($n = 5$) as well as the outliers ($n = 9$) were excluded. The final sample consists of 60 observations.

The descriptive statistics of sample firms are presented in Table 1. The three different measures of financial characteristics of firms as well as annual growth rate in revenues

and size of the firms as measured by total revenue are presented. The mean values of financial ratios are as follows: quick ratio 0.35, ROI −0.94, equity to total assets −0.82 and growth 5.99%. The size of the firms as measured by total revenue is approximately 1,394,876 euros and the median is 464,790 euros, which refers to microfirms (annual revenue lower than two million euros) (see Crutzen, 2009, p.58). The mean age of the firms indicates that the firms are approximately ten years old when starting the proceeding and that the number of employees is approximately 17. The male dummy indicates that 85% of firms have a male as a manager. Most of the sample firms (75.00%) are limited companies.

The firms were grouped into categories according to Statistic Finland's industrial classification codes (not tabulated). Evidently, construction is the biggest group (25.00%), and the second largest groups are manufacturing (23.33%) and wholesale and retail trade (23.33%).

Table 1 Descriptive statistics of the sample firms

Variable	*Mean*	*Minimum*	*Maximum*	*Median*	*SD*
Equity to total assets	–0.82	–8.50	2.77	–0.35	1.81
Quick ratio	0.35	–0.31	1.40	0.24	0.32
Return on investment	–0.94	–82.60	75.48	1.43	32.03
Growth	5.99	–91.15	128.88	–1.23	41.92
Total revenue	1,394,876.04	43,977.86	14,206,614.98	464,789.52	2,948,665.17
Age	10.15	1.83	29.44	8.25	7.08
Number of employees	16.88	0.00	477.00	4.00	64.33
Male dummy	0.85	0.00	1.00	1.00	0.36
Female dummy	0.13	0.00	1.00	0.00	0.34
Couples dummy	0.02	0.00	1.00	0.00	0.13
Limited company	0.75	0.00	1.00	1.00	0.44
Limited partnership/ partnership	0.17	0.00	1.00	0.00	0.38
Private entrepreneur	0.10	0.00	1.00	0.00	0.30

5 Methods

The statistical analysis tool in this study is cluster analysis. More precisely, cluster analysis was implemented in order to determine different groups of firms in terms of the prefiling financial ratios that can explain their failure in reorganisation proceeding. These ratios were used to group the similar firms together. All the values of financial ratios were standardised because the distances can be greatly affected by differences in scale between the dimensions from which the distances are computed (Statsoft, 1995).

In this study, hierarchical clustering analysis is applied. In the hierarchical clustering analysis, the data are not partitioned into a particular cluster in a single step. Instead, a series of divisions take place, starting from that the most similar observations or variables are amalgamated in one cluster and in the next step again most similar clusters are amalgamated. Hierarchical clustering method uses the dissimilarities (similarities) or

distances between the objects when formulating the clusters. The distance method in this study is Ward's (1963) method, which differs from the other methods because it uses an analysis of variance approach to evaluate the distances between the clusters. By using the Ward's method, the variation inside the groups is not increased too extremely, which results in clusters that are as homogeneous as possible (Statsoft, 1995).

Every financial variable was individually used to test its ability to separate the clusters from each other. The Kruskal–Wallis test was applied to test the differences in median values of financial ratios and some non-financial factors between the clusters. On the other hand, Fisher's exact test was used to compute the *p*-values of categorical non-financial data. The test was used to examine the significance of the association (contingency) between the groups (Fisher, 1922, 1954).

6 Results

This section reports the empirical results of testing the hypotheses defined in Section 2. More specifically, the purpose of this study was to define reorganisation interruption patterns among a sample of firms in terms of prefiling financial characteristics. In addition, non-financial characteristics were examined in order to find differences in non-financial factors between the clusters.

6.1 Six homogenous clusters

After a cluster analysis of 60 cases, 6 clusters (or different groups of homogeneous firms) were retained at a linkage distance of 0.05 (Figure 1). The hierarchical clustering is represented by a two-dimensional diagram known as dendogram, which illustrates the fusions or divisions made at each successive stage of analysis. The horizontal axis shows the linkage distance, and each node in the graph (a new cluster formed) represents the distance at which the elements were linked together into a new single cluster. Therefore, the dendogram shows that the amount of six clusters is a good discriminator, and any additional cluster would only focus on marginal information still not integrated in previous clusters (Greenacre, 1984; Lebart et al., 1984).

6.2 Characteristics of firms in different clusters

Table 2 presents the results of the statistical test used (Kruskal–Wallis test). The results of the test indicate that the clusters are statistically significantly different in terms of profitability, solvency, liquidity, size of the firms and average yearly growth rate. The distribution of financial ratios in different clusters is presented in Appendix.

In contrast, Fisher's exact test was used to examine the differences in non-financial characteristics between the clusters. The test shows that there were only few statistically significant differences in non-financial characteristics between the clusters which can be a consequence of a small sample. The statistically significant test results are presented in Table 3.

Figure 1 The amalgamation tree resulting from the cluster analysis

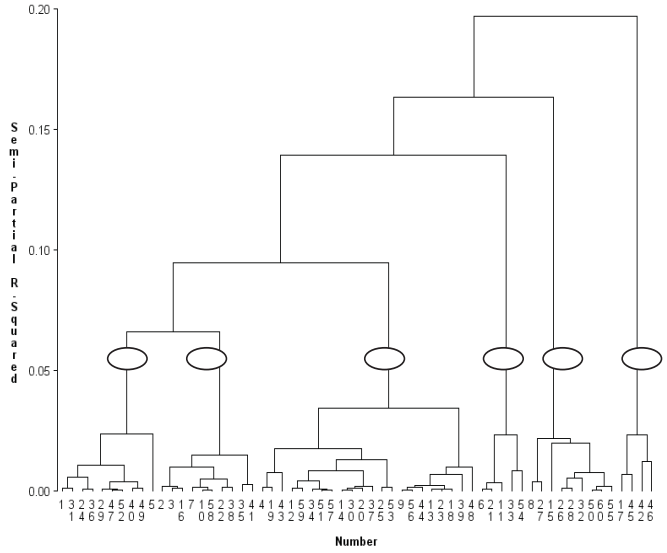

Table 2 Kruskal–Wallis test results

Variable	*p-value*
Size	0.0099***
Growth	0.0013***
Equity to total assets	0.0001***
Return on investment	0.0001***
Quick ratio	0.0001***

***Significant at 1% level.

Table 3 The results of the statistical tests regarding the non-financial variables

Variable	*p-value*
Asset strategies (suggested operations)	0.0939*
Asset strategies (used strategies during the proceeding)	0.0506*
Marketing management (causes for the interruption)	0.0695*
Operations management (causes for the interruption)	0.0695*

*Significant at 10% level.

In addition, age of the firm, number of employees, industry, company form, gender of manager and district of court were considered. However, there were no substantial differences in the values of variables between the clusters. For brevity, test statistics for these variables are not tabulated.

The firms included in the first cluster (nine firms) were smallest among the clusters, had negative growth rate (–13.35), poor solvency (–4.32), poor liquidity (0.09) and satisfactory profitability (9.77). The mean values of the solvency and liquidity ratios were

the worst among the clusters. On the other hand, the non-financial characteristics of firms indicate that the cluster firms have repeated the same strategies before and during the proceeding. Most of the efficiency-oriented strategies were implemented. Moreover, the strategies suggested in the plan proposal were the same as the strategies already done. Because of the repetition of same strategies, the reasons for reorganisation interruptions were the same as the early reasons for insolvency. Marketing management (44%), external causes (33%), top management and planning skills (22%) as well as financial management and control skills (22%) were determined to be the reasons for the interruption. Only human resource management was a reason for insolvency in 40% of the cases, but not considered as a reason for interruption anymore.

The largest proportion, approximately one-third of the sample firms, was included into the cluster 2 (22 firms). Firms in this cluster had negative growth rate (–5.2), poor solvency (–0.21), poor liquidity (0.17) and satisfactory profitability (18.66). However, the values of ratios were slightly better and the average size of the firms was larger (mean revenue 689,061.88 euros) when compared to the firms in the first cluster. In a similar vein to the firms in the first cluster, firms in the second cluster had also repeated the same strategies during and before the proceeding. Most of the firms had used efficiency strategies, expense strategies and asset strategies before and during the proceeding. The suggestions in the reorganisation plans contained the same strategies as previously done, mainly efficiency strategies (50%) and finance strategies (59%). Lastly, the reasons for interruptions were mainly firms' internal factors, such as financial management and control skills (23%), top management (14%) and external factors (14%). In these cases, the reasons for interruptions were also the same as the determined reasons for insolvency. However, some reasons for insolvency, such as human resource management and operations management, were not considered as reasons for interruptions in several cases.

In contrast, cluster 3 (ten firms) differs from previous clusters by its highly negative profitability ratio (–39.13). This cluster was similar to clusters 1 and 2 in terms of poor solvency (–0.37) and poor liquidity (0.34). Although the level of liquidity was slightly better (0.34), still it could not be considered as satisfactory. The mean revenue in cluster 3 was 668,814.19 euros and the growth rate was negative, –13.58%. In this cluster, the most common strategies used before and during the proceedings were efficiency strategies, expense strategies and product strategies. The suggestions regarding the future strategies were mostly the same as the strategies already used. In this cluster, the reasons for interruptions and the reasons for insolvency were as well the same. Most of the firms had accused the reasons for interruptions to be in external environment (30%) and in financial management and control skills (20%). Some insolvency causes, such as top management and planning skills, human resource management and operations management, were no more the reasons for interruptions.

Cluster 4 includes (ten firms) firms with better financial characteristics than previous clusters. In contrast to firms in prior three clusters, among the firms in the fourth cluster, the average yearly growth rate during the prefiling year was positive (10.87%), liquidity satisfactory (0.76) and profitability satisfactory (4.12). Solely, average solvency of firms was poor (0.04). In addition, the firms were bigger than other firms as measured by average total revenue (843,120.95 euros). In this cluster, the turnaround actions used before and during the proceeding and strategies suggested in the plan proposals were the same. Most of the firms had used efficiency strategies, product strategies, expense strategies and asset strategies. In addition, the original reasons for insolvency were mainly the same as the reasons for interruption. The reasons for interruptions were mostly

firms' internal factors such as financial management and control skills (40%), top management and planning skills (10%) and marketing management (10%). External environment was not the reason for interruptions.

Cluster 5 (five firms) relates to firms which have mean revenue of 591,558.01 euros and high growth rate, 112.87%. The cluster was similar to cluster 4 in terms of other aspects, except the profitability ratio, which was positive among cluster 4 firms and negative (–15.13) among cluster 5 firms. The solvency of the firms was negative (–0.38) and the liquidity was satisfactory (0.71). However, the operations before and during the proceeding differed from each other. For instance, product strategies and asset strategies were used before the proceeding but not during it. The suggestions for future strategies contained the same strategies already used. In this cluster, other interruption reasons, except financial management and control skills, were same as the reasons for insolvency. In 80% of cases, financial management and control skills were defined to be reasons for insolvency while none of the cases determined this as reason for interruption. On the other hand, human resource management was a reason for interruption in 20% of the cases but not a reason for insolvency.

Finally, cluster 6 (four firms) contains big firms with mean revenue of 11,722,816.90 euros. Median revenue was 5,843,269.47 euros. The firms in cluster 6 shared the worst properties among all clusters: poor solvency (–0.05), poor liquidity (0.46) and poor profitability (–32.16). The value of average yearly growth rate was positive (14.14%). Before the proceeding, 75% of firms had used no strategies and rest of the firms had used efficiency strategies. During the proceeding, all kinds of strategies were used. Similar to cluster 5, the reasons for interruptions were different than the reasons for insolvency. The reasons for insolvency were in firms' internal factors such as top management and planning skills (50%) and financial management and control skills (50%). On the other hand, the only reason for interruptions was marketing management in 25% of cases.

7 Summary of the study

The objective of this study was to obtain current reliable information on the interrupted reorganisation proceedings and the characteristics of firms in these proceedings under the Finnish Company Reorganization Act. This study was based on the final sample of 60 firms that had interrupted their reorganisation proceedings during the period June 2008–May 2009 under the Finnish Company Reorganization Act. The main objective was to examine whether there were systematic differences in the failure processes among the sample firms. In addition, this study determined whether the differences could be attributed to the differences in firm characteristics.

The empirical findings of this study indicate that different failure processes were identified among interrupted firms in terms of prefiling financial ratios. Six homogenous groups of firms were found by using cluster analysis. Across the six groups, there were significant differences in terms of profitability, solvency, liquidity, size and growth ratios (see Table 4). Thus, the hypothesis 1, i.e. there can be found different groups of firms among interrupted reorganisation proceedings in terms of prefiling financial ratios, was supported. However, only few non-financial characteristics were statistically significantly different between the groups. Therefore, hypothesis 2 was only weakly supported. The low relation between the clusters and non-financial variables may be a consequence of small sample ($n = 60$) or the large amount of non-financial (dummy) variables.

Table 4 The differences in financial dimensions of clusters

Cluster	*Growth*	*Profitability*	*Solvency*	*Liquidity*	*Size*
1	Negative	Satisfactory	Poor	Poor	Microfirms
2	Negative	Satisfactory	Poor	Poor	Microfirms
3	Negative	Poor	Poor	Poor	Microfirms
4	Positive	Satisfactory	Poor	Satisfactory	Microfirms
5	Positive	Poor	Poor	Satisfactory	Microfirms
6	Positive	Poor	Poor	Poor	Small firms

This study suggests that the reasons for the failure cannot be solely the prefiling characteristics of firms but the reorganisation proceeding itself. In many cases, the final reason for interruption of reorganisation was the same as the early reason for insolvency, which can be a consequence of using wrong turnaround strategies. Therefore, identifying the reasons for the insolvency and using corrective strategies are essential to succeed in reorganisation. In addition, an important role of administrators during the proceeding should be taken into account when assessing the success of reorganisations. However, in order to investigate the issue more precisely, there should be some data on firms that have finished their reorganisation proceeding and gained confirmed reorganisation plans.

This study has academic and managerial implications. Firstly, this study supports the results of the prior studies (Laakso, 2007; Laitinen, 2008; LoPucki and Doherty, 2002) and indicates that the failure processes of interrupted firms are not the same. Hence, the study suggests that the reasons for the failure cannot only be the characteristics of firms but the reorganisation proceeding itself. For instance, filtering of firms before the proceeding and the operations during the proceeding should be more efficient, which refers to the important role of administrator during the proceeding. Therefore, this study assumes that the reorganisation proceeding is inefficient and it should be improved. Secondly, the results of this study can help the key actors such as administrators and courts in their decision making, as well as clarify the Finnish reorganisation proceedings and their quality. Finally, this study demonstrates good applicability of cluster analysis approach in this field.

There are some limitations concerning the data. Firstly, it may be that the data do not always necessarily represent the true conditions of the interrupted reorganisations. The financial data can be manipulated by using creative accounting and the non-financial data are based on the opinions of the debtors, creditors and administrators. Secondly, it should be noted that this study examined only a small sample ($n = 60$) of interrupted reorganisations. Finally, the time period was short.

Future research could extend the time period and concentrate on identifying different failure paths which describe the events from the origins of the failure until the failure. Future research could, for instance, examine whether the failure can be detected earlier for some firms than for other ones. It would also be interesting to concentrate on the phase after the plan confirmation and the characteristics of firms in that phase.

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Appendix

Financial characteristics of firms in different clusters

Cluster	*No. of firms in a cluster*	*Variable*	*Mean*	*Minimum*	*Maximum*	*Median*	*SD*
1	9	Total revenue	396,088.00	104,296.92	1,752,589.69	160,185,89	528,546.33
		Growth	–13.35	–31.27	28.38	–21.75	20.47
		Equity to total assets	–4.32	–8.49	–2.78	–3.95	1.79
		ROI	9.77	–27.36	75.48	9.18	32.04
		Quick ratio	0.09	0.04	0.15	0.08	0.04
2	22	Total revenue	689,061.88	43,977.86	4,535,258.90	382,266.56	961,058.45
		Growth	–5.20	–91.15	42.73	–4.88	28.24
		Equity to total assets	–0.21	–1.47	2.77	–0.34	1.08
		ROI	18.66	–10.48	50.77	11.93	19.29
		Quick ratio	0.17	–0.31	0.62	0.13	0.19
3	10	Total revenue	668,814.19	77,912.08	2,374,888.32	489,832.49	670,423.13
		Growth	–13.58	–58.49	16.83	–7.47	23.57
		Equity to total assets	–0.37	–1.62	0.83	–0.46	0.75
		ROI	–39.13	–82.11	–10.24	–35.61	20.42
		Quick ratio	0.34	0.13	0.69	0.26	0.18
4	10	Total revenue	843,120.95	170,174.68	2,617,013.29	484,206.24	785,597.10
		Growth	10.87	–15.55	35.55	12.13	16.45
		Equity to total assets	0.04	–0.68	1.09	0.03	0.46
		ROI	4.12	–17.42	51.81	1.43	18.66
		Quick ratio	0.76	0.455	1.40	0.61	0.31
5	5	Total revenue	591,558.01	142,396.33	1,399,156.12	362,019.97	525,191.34
		Growth	112.87	77.67	128.88	123.48	21.16
		Equity to total assets	–0.38	–1.97	0.53	–0.06	0.96
		ROI	–15.13	–63.79	6.71	0.80	30.02
		Quick ratio	0.71	0.13	0.99	0.80	0.35

Financial characteristics of firms in different clusters (continued)

Cluster	*No. of firms in a cluster*	*Variable*	*Mean*	*Minimum*	*Maximum*	*Median*	*SD*
6	4	Total revenue	11,722,816.90	8,330,797.34	14,206,614.98	12,176,927.63	2,738,778.72
		Growth	14.14	–26.04	82.50	0.04	47.57
		Equity to total assets	–0.05	–0.83	0.90	–0.13	0.73
		ROI	–32.16	–82.60	0.57	–23.31	39.94
		Quick ratio	0.46	0.28	0.66	0.44	0.16

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Financial and non-financial information in reorganisation failure prediction

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Abstract: The purpose of this paper is to analyse the contribution of financial and non-financial information on predicting reorganisation failure of very small entrepreneurial firms. The data used in this study consist of a sample of Finnish firms (n = 68) reorganising under Finnish Company Reorganization Act (comparable to chapter 11 in Bankruptcy Act in the USA). Up to 50% of the firms have failed during the reorganisation program while the rest of the firms continued operating. This study examines whether the expected weak predictive ability of accrual-based financial ratios (Hypothesis 1) can be increased by using cash-based (manipulation-free) cash flow ratio (Hypothesis 2). In addition, it is examined whether non-financial variables either alone (Hypothesis 3) or in conjunction with financial ratios (Hypothesis 4) are able to predict firm failure more accurately than models based on financial information solely. Logistic regression analysis is used to test the four hypotheses. Empirical evidence supports all hypotheses.

Keywords: reorganisation; failure; entrepreneurial firms, non-financial characteristics; financial information.

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1 Introduction

Failure prediction has been an important financial research topic for many decades providing tools for managers of distressed firms, bankers, lending specialists, accounts receivable managers, investors, security analysts, auditors, bankruptcy and reorganisation lawyers and judges (Balcaen and Ooghe, 2006; Lensberg et al., 2006; Altman and Hotchkiss, 2006). The pioneering work by Beaver (1966) has been a model for several studies and the literature on this area is extensive. Most of the failure prediction studies have developed different models based on various modelling techniques in order to find the best way to predict failure (Zavgren, 1983; Atiya, 2001). However, the existing literature is concentrated on large firms even though small firms have vast relative impact on economy (see Keasey and Watson, 1987, 1991; Storey et al., 1987; Pompe and Bilderbeek, 2005). The main reason for neglecting small firms is the instability, unreliability, and manipulation of financial information in these kinds of firms [Balcaen and Ooghe, (2006), p.82]. In addition, annual accounts are not often available for small firms because only large firms with certain characteristics (asset size, sales level, and/or number of employees) are obligated to publish their annual accounts.

In this paper, we analyse the contribution of financial and non-financial information on predicting reorganisation failure of very small entrepreneurial firms reorganising under Finnish Company Reorganization Act (FCRA). FCRA establishes a legal framework for the reorganisation of firms that are economically viable but currently suffering financial difficulties (Philippe and Partners, and Deloitte and Touche, 2002; Koskelo, 2003), and it is comparable to other reorganisation systems worldwide such as chapter 11 in the USA. In Finland, new tools to predict reorganisation failure are very valuable, since approximately 50% of confirmed reorganisation plans will fail (Statistics Finland). This rate is very high when compared for example with reorganisation in Canada (Fisher and Martel, 1995) but comparable with the consummation rate of chapter 11 in the USA (Jensen-Conklin, 1992).

This paper builds upon three distinct lines of research. First, the existing literature reports that the distress models estimated for larger firms cannot be applied to small firms, due to specific characteristics related to small firms (see e.g., Altman et al., 2008; Keats and Bracker, 1988). However, small firm reorganisations are rarely examined in existing literature. Our analysis is further motivated by prior accounting literature that examines whether the accrual- or cash-based ratios are the best failure indicators (see e.g., Beaver, 1966; Gentry et al., 1985, 1987; Aziz and Lawson, 1989; Gombola and Ketz, 1983; Sharma and Iselin, 2003; Casey and Bartczak, 1984; Gombola et al., 1987). Interestingly, these studies are unanimous, whether the best prediction models should include cash-based ratios at all, or if they should be used in conjunction with accrual-based ratios. However, none of the prior studies have examined operating cash flows in the context of reorganisations, but some studies have focused for instance on bankruptcy prediction (see e.g., Gentry et al., 1985, 1987; Aziz and Lawson, 1989; Casey and Bartczak, 1984) or solvency of firms (see e.g., Gombola and Ketz, 1983; Sharma and Iselin, 2003). Finally, it has been long acknowledged in failure prediction literature that non-financial or qualitative variables may increase the accuracy of the failure prediction model. Especially in the context of reorganisation of very small firms, the role of non-financial information has been reported to be important (see e.g., LoPucki and Doherty, 2002; Routledge and Gadenne, 2000; Barniv et al., 2002; Laitinen, 2008, 2009),

even though the literature is scarce (Poston et al., 1994; Altman et al., 2008). In this paper, we will test the predictive ability of accrual- and cash-based ratios and non-financial information in the context of small firm reorganisations.

This study is based on the pre-filing financial and non-financial data from a sample of 68 firms whose reorganisation plan was confirmed in 2000 under FCRA. It makes 85% of all reorganising firms in Finland in 2000 (85% of the annual cohort). The sample firms are consistent with the typical firms under FCRA in Finland. Exactly 50% of the firms in the sample failed during the reorganisation program while the rest of the firms (50%) are still operating. The status of the firms (failure/success) was finally examined at the end of the year 2010 because the length of the reorganisation programs can be 5–10 years. Logistic regression analysis (LRA) will be applied to estimate the probability of failure and to test the four research hypotheses discussed below. In addition, several statistical tests are used in the study. For instance, the Lachenbruch (1975) classification accuracy test was used due to small sample size and lack of test data. However, due to the small sample size this study should be treated as case or pilot study and therefore more research is needed on this area. Hence, the results cannot be with cautious consideration generalised to the whole population.

The present study contributes to current reorganisation research at least in three different ways. First, the study focuses on a special situation rarely studied. It makes use of pre-filing financial and non-financial information in order to predict failure after the reorganisation plan is confirmed by the court. Pre-filing data is extracted from the pre-filing financial statements and pre-starting reorganisation plans available to the court and creditors. This pre-filing information is the main source available to the courts when estimating the probability of successful reorganisation. Second, the study concentrates on very small entrepreneurial firms, which is rare in prior reorganisation research. Third, the study develops and tests several new hypotheses on the contribution of financial and non-financial information. These hypotheses deal with the usefulness of accrual-based financial data (Hypothesis 1), the incremental information contained by operating cash flow (Hypothesis 2), the information contained by stand-alone non-financial variables (Hypothesis 3), and the incremental information contained by non-financial variables as combined with financial variables (Hypothesis 4). Evidence gives support for all hypotheses.

The structure of this paper is as follows. The background, purpose and contribution of the study are briefly discussed in the introductory section. The FCRA, formulation of the four hypotheses and a brief overview of the prior literature are presented in Section 2. The data, variables and the statistical methods are presented in Section 3. Section 4 reports the results of the tests. Finally, the last section concludes this paper with a discussion of the findings and their implications as well as limitations.

2 Prior studies and hypotheses development

2.1 FCRA

In order to understand the framework of reorganisations in Finland the main features of the FCRA are shortly presented in this section. FCRA was originally legislated in 1993, and later in 2007 the reform was legislated to improve the success in reorganisations.

Shortly, FCRA is a legal framework for the reorganisation of firms that are economically viable but currently suffering financial difficulties (Philippe and Partners, and Deloitte and Touche, 2002; Koskelo, 2003).

FCRA is comparable to other reorganisation procedures worldwide, and therefore, the results of this study can be applied to other countries although there are differences, too. In the US proceedings, for example, the firms will first go into bankruptcy and after that they have two options: liquidation (chapter 7) or reorganisation (chapter 11). Under Finnish proceedings, there are two alternatives for financially distressed firms under legal proceedings, namely FCRA and bankruptcy. In Finland bankruptcy means as a matter of fact liquidation (Laitinen, 2013.)

FCRA, such as many other reorganisation systems, is plan-oriented and debt restructuring plays a major role (see Philippe and Partners, and Deloitte and Touche, 2002). FCRA can be divided into two larger stages, namely the stage before the reorganisation proceedings (reorganisation event) and the stage after the plan confirmation (performance event). These stages in FCRA are comparable to events in Australia for Voluntary Administration (Laitinen, 2013). Under reorganisation event, the court attempts to filter the firms with chances to reorganise from those that eventually proceed into bankruptcy (liquidation) (Routledge and Gadenne, 2004). The courts evaluate the possibility of survival in reorganisation by concentrating on the financial and non-financial information related to the firm. In order to do this, the firms must submit fresh financial statements to show their financial situation. If the proceedings are opened, a reorganisation plan is prepared and the proposed plan is considered by the court. After this, the suggested plan is confirmed if certain conditions are met. The reorganisation plan may be approved in three ways: in acceptance of all known creditors, in acceptance of the majorities in the groups of creditors, or at the request of the person who had prepared the plan (the administrator or the debtor) when the certain conditions defined in the law are met (see FCRA § 54). In the second stage (performance event), the success to carry out the reorganisation plan is measured. Hence, the firms will either succeed in carrying out the plan or they will go bankrupt during the program period (Laitinen, 2013). In this study, the performance event is examined. Thus, the study is concentrated on the situation where the sample firms try to survive through the reorganisation program.

However, despite the reform of 2007, the failure rate of reorganisations is still fairly high in Finland. Approximately 60% of the reorganisation petitions will be approved by the courts, and 75% of the firms will get a confirmed reorganisation plan. 40% to 50% of the reorganising firms will fail during the reorganisation program (Laitinen, 2009). The failure rate is comparable to the failure rate of the USA (Jensen-Conklin, 1992), but in Canada, on the other hand, the amount of failed reorganisations is smaller (Fisher and Martel, 1995). Even though, a large part of reorganising firms fail during the reorganisation program in Finland, the payoff-rate to creditors has proven to be efficient. Sundgren (1998) showed that creditors have received a better payoff in reorganisation under FCRA than in bankruptcy liquidation. However, during the first years of FCRA, the median payback rate to the creditors was 33.5% and simultaneously in the USA it was 56.4% (Ravid and Sundgren, 1998).

2.2 Financial variables in failure prediction

During the past 45 years firm failure prediction has been one of the most important topics of accounting literature. The existing literature suffers however from a generally accepted theory of failure and therefore the variables selected are based on statistical or empirical considerations (Scott, 1981; Balcaen and Ooghe, 2006). Most of the failure prediction studies use financial variables because they are hard, objective measures and based on publicly available information (Micha, 1984; Laitinen, 1992; Dirickx and Van Landeghem, 1994). However, the studies are not unanimous which financial variables are the best failure predictors. More specifically, for instance, the role of cash flow and accrual information in firm failure prediction models has been debated since the pioneering work by Beaver (1966). Most of the studies argue that cash flow information does not contain incremental information to accrual-based models even though there is a clear causal relation between cash flows and firm bankruptcy (Sharma, 2001). Moreover, the role of operating cash flow and accrual-based information has not been previously examined in the context of reorganisations.

Despite the lack of reorganisation literature focusing both on cash- and accrual-based information, the raw accrual-based financial ratio data is expected to be less useful in reorganisations than cash-based data for many reasons. Firstly, all firms are strongly distressed prior to reorganisation and it can be difficult to distinguish potential failures from non-failures by using accrual-based pre-filing financial data. Moreover, the financial structure of firms is restructured in the beginning of the reorganisation proceedings, which makes the pre-filing information to lose at least part of its information value. Secondly, the reorganising firms are typically small entrepreneurial firms whose financial ratios are unstable and, in addition, can suffer from extreme values impairing performance of traditional stable prediction models. For instance, the study by Balcaen and Ooghe (2006) showed that the failure prediction models based on financial data may suffer from the extreme ratio values, errors, and missing values. Thirdly, very distressed firms tend to manipulate or manage their annual account figures through earnings management in order to hide the actual financial situation of the firm (Argenti, 1976; Charitou and Lambertides, 2003). In this manipulation, accruals play the central role (Sharma, 2001). Hence, the small firms under reorganisation proceedings may suffer from these kinds of accounting manipulations, too. Lastly, the financial information of small entrepreneurial firms can be unreliable due to insufficient internal control system (Keasey and Watson, 1987; Charitou and Lambertides, 2003). Therefore, this may be a threat in small reorganising firms too. However, there are some possibilities to improve the predictive ability of raw accrual-based information. First, the financial ratios can be transformed and divided by an asset concept instead of a flow concept, because assets are more stable than flows (ratio stabilisation). Second, by using winsorisation the extreme values of ratios can be cut off (Balcaen and Ooghe, 2006). However, these statistical procedures do not cancel the negative effects of financial restructuring and manipulation of the value of financial information.

Due to the problems related to accrual-based financial ratios, the previous accounting literature has examined the impact of cash-based information on predicting firm failure. One line of accounting research suggests using solely cash-based ratios (Gentry et al., 1985, 1987; Aziz and Lawson, 1989) or at least including cash-based ratios along financial ones in failure prediction models to improve the performance of the model (Gombola and Ketz, 1983; Sharma and Iselin, 2003). The other line of research argues

that cash-based ratios do not possess incremental information content to accrual models (Casey and Bartczak, 1984; Gombola et al., 1987). For instance, the study by Sharma and Iselin (2003) suggest that cash-based information has greater information content than accrual information in the context of corporate liquidity and solvency. Even without managerial manipulation, the accrual-based information containing accruals, allocations and transitory items seems to be more irrelevant (Sharma and Iselin, 2003). Shortly, evaluating solvency means evaluating the risk that a company will not be able to raise enough cash before its debts must be paid [Heath and Rosenfield, (1979), p.48]. However, it should be noted that the variability of the results may be caused by different statistical techniques and the diversity of the operating cash flow variables used (Sharma, 2001).

In the context of small firms, the importance of cash-based information may be even more important. Thompson (1986) argued that especially in small firms, the importance of cash flow information may be more significant than that of accrual information on accounting income. In small firms, the relation between inventories, receivables, payables and cash is complex and it changes constantly. By examining the cash flows the future of the firm may be more predictable (Thompson, 1986). Furthermore, the cash flow information may be important especially in smaller firms because of the possible inadequacies in internal control system. For instance, Keasey and Watson (1986, 1987) have reported on these inadequacies. The annual account adjustments made by the auditor (accommodated annual accounts) may also reduce the quality of accrual-based information (Charitou and Lambertides, 2003).

To summarise, the earlier literature has examined the role of accrual- and cash-based information in the context of bankruptcies. The results of the studies are not however unanimous in the best failure predictors, and none of the studies have focused on the combination effect of accrual- and cash-based variables in the context of reorganisations. In order to test the power of accrual- and cash-based ratios, the following hypotheses are presented separately:

H1a Pre-filing accrual-based financial ratios are not significant in reorganisation failure prediction.

H1b Pre-filing winsorised transformed financial ratios are not significant in reorganisation failure prediction.

H2 Pre-filing cash-based operating cash flow includes incremental information over accrual financial ratios in reorganisation failure prediction.

2.3 Non-financial variables in failure prediction

The existing literature on failure prediction contains various studies examining whether the failure prediction models should include financial variables alone or in conjunction with non-financial variables. Most of these studies suggest that non-financial variables should be included in failure prediction models [see e.g., Keasey and Watson, 1987, 1988; Barniv et al., (2002), p.497; Fisher and Martel, 2004; Poston et al., 1994; Peel and Peel, 1987; Back, 2005; Shumway, 2001). However, the number of reorganisation studies focusing on non-financial variables is minimal, even though non-financial information would bring incremental information to the failure prediction models (Poston et al., 1994).

The studies on reorganisations have found various different non-financial characteristics of firms to affect failure risk (LoPucki and Doherty, 2002; Routledge and Gadenne, 2000; Barniv et al., 2002). The empirical results regarding the importance of gender of the manager, age of the firm and industry in failure prediction are however conflicting. In addition, age of the firm, gender of the manager, and legal form of firms are rarely or never studied in prior reorganisation studies but they are typically analysed in traditional bankruptcy prediction studies (Laitinen, 2013). In this study, we will concentrate on the characteristics related to reorganising firm, reorganisation plan and entrepreneur.

Firstly, one of the most commonly used non-financial variables in reorganisation studies is industry. Industry reflects the circumstances of firms business and the complexity of business processes, which can affect reorganisation success. Industry has been found to have significant effect on failure in many reorganisation studies (see LoPucki, 1983; LoPucki and Kalin, 2001; Campbell, 1996; Hotchkiss, 1995; Routledge and Gadenne, 2000). Furthermore, Gadenne (1998) suggested that different management practices of different industries could be related to success and failure of small firms.

Secondly, age of the firm (or life cycle stage) has been often used in failure prediction models, but rarely in reorganisation studies. However, the evidence in failure prediction research is mixed since the pioneering work by Argenti (1976). Argenti (1976) found that the failure-rate of newly founded firms is high and that the old firms have also high risk of failure without adequate ability to renew. Conversely, Keasey and Watson (1987) and Shumway (2001) did not find any significant age-effect but Laitinen (2005) found it.

Thirdly, the gender of the managing director may also be an important predictor. However, the results of the prior studies are conflicting. The study by Watson and Robinson (2003) found that the differences related to the genders may be caused by differences in industry, age of the firm, family commitments or education and experience of the manager. In addition, the certain personal characteristics could be associated to the gender of the manager-owner, which may be related to success. Earlier Sexton and Bowman-Upton (1990) argued that female entrepreneurs may be more risk averting but they have less energy to maintain growth orientation. Du Rietz and Henrekson (2000) found that female-owned firms may not perform as well as male-owned firms in terms of financial factors such as revenue, profit, growth, discontinuance and failure.

Fourthly, in the case of small entrepreneurial firms, the legal form of the firm may affect the likelihood of reorganisation failure. The legal form of the firm may work as a motivator in reorganisations because in reorganisation of partnerships or proprietorships the whole personal property of the owner may be covered. Thus, the failure of these kinds of firms means simultaneously personal bankruptcy of the owner. In limited companies, the financial liability of the owner is limited to the equity invested which can negatively affect commitment (Keats and Bracker, 1988). In Finland, Laitinen (1999) found significant effects of legal form, when the credit risk estimates are explained by using LRA. In Canada, Fisher (2007) found significant non-corporation effect in Canadian reorganisation data.

Fifthly, reorganisation actions can affect the success in reorganisations. The actions can be classified as financial and business restructuring actions. Efficiency-oriented (active) restructuring actions such as cost cutting during the reorganisations are found to be essential factors for successful reorganisations in prior studies (Robbins and Pearce, 1992; Chowdhury and Lang, 1996; Laitinen, 2008, 2009). Irrespective of the cause of the failure efficiency-oriented actions can be associated with successful reorganisations

(Robbins and Pearce, 1992; Laitinen, 2000). Conversely, passive financial actions as recovery actions (such as remission of non-secured debt) may not be effective when reorganising a small firm.

Lastly, various different studies (Keasey and Watson, 1987, 1988, Peel and Peel, 1987, Back, 2005; Shumway, 2001) have examined the predictive ability of non-financial and financial variables as a combination, and found them to have significant incremental information content. Moreover, a recent study by Laitinen (2013) found that non-financial information is important stand-alone or as combined with financial information when estimating the success in reorganisations. Since, solely few studies have examined the non-financial and financial variables in the context of reorganisations this study examines the predictive ability of non-financial and financial characteristics of failed and reorganising firms, firstly standing alone and secondly in conjunction with financial information:

H3 Pre-filing non-financial information is more efficient than stand-alone financial information in failure prediction.

H4 Pre-filing non-financial information as combined with financial information is more efficient than stand-alone financial information and stand-alone non-financial information in failure prediction.

3 Research design and method

The empirical sample used in this study consists of Finnish firms (n = 68) that were reorganising under FCRA and whose reorganisation plans were confirmed by a court in 2000. These data include about 85% of the cohort, which started reorganisation program in 2000 in Finland. A part of the firms in the cohort are excluded due to insufficiency of pre-filing financial information. Exactly 50% of these firms failed during the reorganisation program while the rest (50%) still continue in business. The success or failure was assessed at the end of 2010 because the length of the reorganisation plans can be 5–10 years. Hence, all firms operating (not bankrupt) at the end of 2010 were classified as successful and bankrupt firms as failed.

The sample firms are very small which differentiates the study from the prior studies. The median number of employees in the sample firms prior to reorganisation proceedings is 3.0 employees and the average pre-filing net (annual) sales is 550 thousands of Euros (TEUR). About 27% of the firms are service firms, while 20% are transportation firms and 12% are construction firms. More than half of the firms (56%) are not limited companies, which mean that they are proprietorships or partnerships with increased financial risk in personal bankruptcy. The sample firms are similar to typical reorganising firms in Finland irrespective of the year.

The first two hypotheses of the study deal with financial variables. The financial data are extracted from the pre-filing financial statements available to the court and creditors before the reorganisation decision. The variables selected into the prediction models are supported by bankruptcy theory and related empirical evidence (see e.g., Scott, 1981; Laitinen, 1991; Balcaen and Ooghe, 2006). The first model (1) to test H1a includes the original raw variables reflecting the following financial dimensions:

1 profitability (return on investment ratio)

2 liquidity (quick ratio)

3 solvency (equity ratio)

4 size (logarithmic revenue).

The logarithmic transformation is used because size distribution is skewed. The ratios in the second model (2) to test H1b are similar but winsorised and transformed and they are as following:

1 winsorised EBIT to total assets

2 winsorised financial assets to total assets

3 equity to total assets

4 logarithmic assets.

The distributions are winsorised 5% from upwards and downwards, and this cut-off point was the best of several alternatives compared. Thus, the cut-off point of extreme values is set equal to lower and upper 5th percentile. The third model (3) to test H2 is similar to second model (2) but the winsorised operating cash flow to total assets is included to test the effect of cash-based cash flow.

The third and fourth hypotheses of the study deal with non-financial information. The fourth model (4) to test H3 uses only non-financial data by including 11 non-financial variables while the fifth model (5) to test H4 combines financial and non-financial information. The 11 non-financial variables are selected on the basis of prior studies in reorganising firms (Laitinen, 2008, 2009). The variables selected are as following:

1 industry (dummies: transportation, service, construction)

2 age of the firm

3 gender of the managing director (dummy: female or a married couple)

4 legal form of the firm (dummy: not a limited company)

5 court in which the reorganisation plan is confirmed (metropolis dummy: Vantaa, Helsinki, Espoo)

6 remission rate of non-secured debt

7 reason for financial distress (dummy: difficulties in market)

8 suggested reorganisation actions (dummies: focusing on core functions, focusing on marketing).

In this setting, variables 1, 2, 3, 4, 6, and 8 are discussed and justified above while variables 5 and 7 (court and reason of distress) are used as control variables. The non-financial data are extracted from confirmed reorganisation plans available to the court and creditors. In all, five different models are used to test the four hypotheses. The financial and non-financial variables used in models 1–5 are presented in Appendix 1.

All statistical estimations were done with the SAS statistical package (see SAS Institute Inc., 2012.) In the present study, (binary) LRA is applied for all five models in order to predict the failure in reorganisation. If the firm failed during the reorganisation plan, Y = 1, otherwise Y = 0 for non-failed firms. LRA does not require multivariate

normal independent variables or equal covariance matrices between the groups that are the assumptions required in linear discriminant analysis (Hosmer and Lemeshow, 1989). The LRA creates a score, a logit L, for every firm. The independent variables are assumed to be linearly related to L. This score is used to determine the probability of failure in reorganisation as follows:

$$\text{Probability of failure} = P(Y = 1 \mid X)\frac{1}{1+e^{-L}} = \frac{1}{1+e^{-(b_0+b_1X_1..+b_nX_n)}}$$

where b_i (i = 0, …, n) are regression coefficients and n is the number of independent variables X_i (i = 1, …, n).

The five logistic regression models are estimated using the independent variables described in Appendix 1 by the maximum likelihood method. The hypotheses are assessed by the following statistical tests. First, the significance of coefficients is tested by the Wald statistic. Second, the strength of association is assessed by standard tests such as Nagelkerke R-square and –2 log likelihood. Third, the linearity of logit is tested by the Hosmer and Lemeshow (1989) Chi-square test. This test is performed by dividing the predicted probabilities into deciles and then computing a chi-square to compare the predicted and observed frequencies. Higher p-value refers to good fit to the data. The likelihood ratio test compares the specified model with the unrestricted model (goodness-of-fit). Moreover, the accuracy ratio is used to measure the accuracy of the estimated model in relation to the perfect model. The accuracy ratio (AR or AUC, area-under-curve) is extracted from the receiver operating characteristic curve (ROC) and it is based on cumulative accuracy profiles (Sobehart et al., 2000). In addition, Somers D and percent concordant will measure as well the accuracy of the model. However, the Lachenbruch-validated binary classification accuracy (together with AUC) is used as the primary test to assess the four research hypotheses. Lachenbruch-validated classification accuracy test is useful for studies of small sample size [see Jones, (1987), p.152] although it also has weaknesses (Stevenson et al., 2007). Therefore, Lachenbruch test is used in this study because of a small sample size and because no test data were available for the study (see Lachenbruch, 1975). When using Lachenbruch procedure, a model is constructed using n – 1 observations in order to predict the missing observation. After that the process is repeated n times and lastly the misclassification rate is produced by using the percentage misclassified (Lachenbruch, 1975). Lastly, Akaike information criterion (AIC) and Schwarz criterion (SC) are used to measure the relative quality of the estimated models. Variance inflation factor (VIF) is used as an indicator of the multicollinearity.

4 Empirical results

4.1 Descriptive statistics

Appendix 2 presents the descriptive statistics of financial and non-financial data for failed (bankrupted) and non-failed reorganisations for models 1–5. Because of the non-normality of the variable distributions the univariate differences between the failed and non-failed firms are tested by a non-parametric Kruskall-Wallis test. The test results are presented in Appendix 2. Kruskall-Wallis test tests the similarity of the location of the

distributions of the variables in both groups. The results of the test for model 1 show that equity to total assets is the only statistically significant variable in model 1. In models 2 and 3, the only statistically significant variables are winsorised equity to total assets. In model 5, there are statistically significant differences in five of the 11 variables reflecting non-financial dimensions of firms. The most significant differences between failed and non-failed reorganisations are found in winsorised equity to total assets, reason for financial distress (dummy: difficulties in market), legal form of the firm (dummy: not a limited company), court in which the plan is confirmed (dummy: Vantaa, Espoo or Helsinki) and suggested reorganisation actions (dummies: focusing on marketing and focusing on core functions).

Table 1 Values of the VIF for the independent variables

VIF	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*
Quick ratio	1.065				
Equity to total assets	1.223				
Return on investment	1.023				
Ln revenue	1.164				
Winsorised financial assets to total assets		1.072	1.072		1.432
Winsorised equity to total assets		1.960	2.288		3.320
Winsorised EBIT to total assets		1.526	2.652		3.179
Winsorised Ln assets		2.106	2.187		4.518
Winsorised Operating cash flow to total assets			3.685		3.965
Gender (female or a married couple)				1.315	1.377
Legal form of the firm (not a limited company)				1.317	1.845
Court (Vantaa, Espoo or Helsinki)				1.139	1.244
Age of the firm				1.303	2.117
Reason for financial distress: market				1.290	1.399
Suggested action: focusing on core functions				1.213	1.319
Suggested action: focusing on marketing				1.263	1.362
Industry: transportation				1.719	1.823
Industry: service				1.711	1.820
Industry: construction				1.178	1.269
Remission rate of non-secured debt				1.391	1.575

Notes: The table reports the VIFs for the five models of the paper. The dependent variable for each model is reorganisation failure (Y = 1 for failed firms and 0 for non-failed firms). The independent variables for each model are defined in Appendix 1.

The correlations presented in Appendix 3 indicate that the estimated financial models may be affected by multicollinearity. Firstly, operating cash flow ratio is negatively correlated with equity to total assets ratio (–0.66) and size of the firm (ln assets) (–0.67). The negative correlations may be resulted from the situation where the assets of the firm decrease due to smaller investments and the cumulative losses reduce the asset size even more. The smaller asset size may dominate any sales movements (see Altman, 1968). Hence, the equity to total assets ratio and size of the firm (ln assets) may dominate the operating cash flow ratio. Secondly, operating cash flow ratio is strongly positively correlated (0.78) with EBIT to total assets ratio. This indicates that accrual-based variables are stand-alone basis irrelevant, but as combined with cash-based ratios accrual-based ratios do contribute to the prediction of failure. Thirdly, non-financial variables are moderately correlated as well. For instance, industry (dummy: service) is negatively correlated with reason for financial distress (dummy: difficulties in market), remission rate of non-secured debt and size of the firm (ln assets). Dummy for legal form of the firm (not a limited company) is negatively correlated with equity to total assets and size of the firm (ln assets) and positively correlated with operating cash flow to total assets and EBIT to total assets. Age of the firm is positively correlated with size of the firm (ln assets). However, none of the correlation coefficients were above 0.8 which is a boundary for serious multicollinearity (see Lewis-Beck, 1980). Moreover, the values of the VIF for the independent variables are not very high (over 10) which does not refer to serious multicollinearity (Table 1).

4.2 Logistic regression models

Table 2 presents the estimation results for LRA separately for the five models. First, the financial variables in model 1 contain raw traditional accrual financial ratios. None of the variables are statistically significant which supports Hypothesis 1. Second, model 2 includes winsorised total assets-based financial ratios. However, none of the variables in second model are statistically significant, and therefore, the Hypothesis 1b is also supported. Third, model 3 contains operating cash flow information along with winsorised total assets-based traditional ratios of model 2. In this model, operating cash flow to total assets is the most significant variable followed by equity to total assets and EBIT to total assets. The rest of the variables (financial assets to total assets and ln assets) are however insignificant. Therefore, by adding operating cash flow ratio to the model, equity to total assets and EBIT to total assets show also significance. This refers to the complementarity between accrual- and cash-based information. However, the parameter signs of the operating cash flow ratio and equity to total assets ratio are positive referring to negative effect on survival likelihood. On the other hand, the parameter sign of EBIT to total assets is negative which indicates that the higher the EBIT to total assets, the higher the chance to survive in reorganisation. This conflicting result may be technically due to multicollinearity but practically because the firms having high profitability but low cash flows may be good cases in reorganisation. The positive sign of equity ratio may indicate that by using financial restructuring financial support is provided to the firm until its equity ratio is positive. Therefore, the lower the pre-filing equity ratio, the more financial support is provided.

Table 2 Parameters of the logistic regression model

Parameter	*Coefficient*	*Wald statistic*	*p-value*
Model 1: Original raw data			
Intercept	0.832	0.424	0.5149
Quick ratio	0.225	0.130	0.7182
Equity to total assets	0.001	1.012	0.3143
Return on investment	–0.001	0.930	0.3361
Ln revenue	–0.143	0.466	0.4948
Model 2: Winsorised total assets-based ratios			
Intercept	1.171	0.511	0.4745
Winsorised financial assets to total assets	–0.011	0.461	0.4970
Winsorised equity to total assets	0.003	1.252	0.2631
Winsorised EBIT to total assets	–0.004	0.424	0.5152
Winsorised Ln assets	–0.102	0.153	0.6957
Model 3: Operating cash flow included			
Intercept	0.468	0,108	0.7926
Winsorised financial assets to total assets	–0.015	0,731	0.3962
Winsorised equity to total assets	0.008	4,062	0.0468**
Winsorised EBIT to total assets	–0.025	4,462	0.0352**
Winsorised Ln assets	0.003	0,002	0.9915
Winsorised operating cash flow to total assets	0.034	5,975	0.0142**
Model 4: Non-financial variables-model			
Intercept	1.807	2.554	0.1100
Gender (female or a married couple)	–2.876	5.725	0.0167**
Legal form of the firm (not a limited company)	–1.705	4.569	0.0326**
Court (Vantaa, Espoo or Helsinki)	–2.378	2.921	0.0874*
Age of the firm	–0.039	0.414	0.5199
Reason for financial distress: market	–0.660	0.926	0.3359
Suggested action: focusing on core functions	–0.535	0.406	0.5241
Suggested action: focusing on marketing	–3.241	9.619	0.0019***
Industry: transportation	–1.610	2.160	0.1417
Industry: service	0.820	0.869	0.3513
Industry: construction	–2.093	2.407	0.1208
Remission rate of non-secured debt	2.866	3.323	0.0682*

Notes: The table reports the LRA for the five models. The independent variables for each model are defined in Appendix 1. The dependent variable for each model is reorganisation failure (Y = 1 for failed firms and Y = 0 for non-failed firms). Statistical significance is based on two-tailed tests at the 1%, 5% and 10% are denoted by ***, ** and *, respectively.

Table 2 Parameters of the logistic regression model (continued)

Parameter	*Coefficient*	*Wald statistic*	*p-value*
Model 5: Combined model			
Intercept	4.377	1.096	0.2951
Winsorised financial assets to total assets	–0.038	1.067	0.3017
Winsorised equity to total assets	0.028	3.408	0.0649*
Winsorised EBIT to total assets	–0.090	4.593	0.0321**
Winsorised Ln assets	0.110	0.026	0.8709
Winsorised operating cash flow to total assets	0.107	4.891	0.0270**
Gender (female or a married couple)	–5.950	4.352	0.0370**
Legal form of the firm (not limited company)	–2.627	2.508	0.1133
Court (Vantaa, Espoo or Helsinki)	–5.064	5.720	0.0168**
Age of the firm	0.0390	0.119	0.7303
Reason for financial distress: market	–2.975	4.711	0.0300**
Suggested action: focusing on core functions	–0.972	0.743	0.3888
Suggested action: focusing on marketing	–6.347	7.538	0.0060***
Industry: transportation	–2.017	1.617	0.2035
Industry: service	2.657	3.769	0.0522*
Industry: construction	–4.742	4.003	0.0454*
Remission rate of non-secured debt	4.564	2.429	0.1191

Notes: The table reports the LRA for the five models. The independent variables for each model are defined in Appendix 1. The dependent variable for each model is reorganisation failure (Y = 1 for failed firms and Y = 0 for non-failed firms). Statistical significance is based on two-tailed tests at the 1%, 5% and 10% are denoted by ***, ** and *, respectively.

Lastly, model 4 utilises solely non-financial information and model 5 as a combined model uses both financial and non-financial variables. The empirical results support both hypotheses related to models (Hypothesis 3 and 4). In model 4, there are statistically significant coefficients for five variables and in model 5 there are statistically significant coefficients for nine variables. In model 4, the coefficients are statistically significant for the following variables: dummy for suggested reorganisation action: focusing on marketing, dummy for legal form (not a limited company), dummy for gender, dummy for remission rate of non-secured debt and dummy for court. The rest of the variables (dummy for age of the firm; dummy for reason for financial distress: market; dummy for suggested action: focusing on core functions; dummy for industry: transportation; dummy for industry: service and dummy for industry: construction) were insignificant. Therefore, the firms that are limited companies and managed by male will fail more often than firms that are not limited companies (proprietorships or partnerships) and managed by female or a married couple. In addition, the firms that do not have efficiency-oriented (active) reorganisation action (focusing on marketing) in their reorganisation plans will fail more

often. These results support the importance of non-financial variables in failure prediction models. Especially the study supports findings of efficiency-oriented reorganisation actions. On the other hand, the court dummy indicates that the firms processed in courts Helsinki, Espoo or Vantaa may be more successful in reorganisation. However, previously Sundgren (1998) found that the firms processed in some other courts than Helsinki, Espoo or Vantaa may be more successful.

In model 5, there are statistically significant coefficients for nine variables. The non-financial variables show the highest significance but the difference between them and the best financial variable (operating cash flow to total assets) is small. The statistically significant coefficients for variables are the same as in model 4 despite the variables dummy for legal form of the firm and dummy for remission rate of non-secured debt. On the other hand, three insignificant coefficients for variables in model 4 (dummy for industry: service, dummy for industry: construction and dummy reason for financial distress: market) are significant in model 5. This results from financial information included in model 5. The statistically significant financial variables are the same as in model 3. The suggested reorganisation action dummy (focusing on marketing) is the most significant in model 5 followed by court dummy, reason for financial distress dummy: market and gender dummy. The rest of the non-financial variables (dummy for age of the firm; dummy for suggested action: focusing on core functions; dummy for industry: transportation; dummy for legal form of the firm (not limited company); dummy for remission rate of non-secured debt; winsorised Ln assets and winsorised financial assets to total assets) are insignificant.

The results reported in Table 2 evidently demonstrate the complementarity between accrual and cash-based information and the importance of non-financial information. Firstly, the coefficients of accrual-based financial ratios became statistically significant when adding operating cash flow to the model (model 3). This refers to the importance of cash-based information when predicting reorganisation failure. Secondly, the model containing non-financial variables alone and the last model including both financial and non-financial information contain various statistically significant coefficients. In all, the best model seems to be the last model containing both financial and non-financial information.

4.3 Goodness of models

The model summary tests for all five models are reported in Table 3. Firstly, the Nagelkerke R-square is highest for the model 5 (0.56), which refers to a good strength of fit. However, for models 1–2 this strength is poor and for models 3–4 moderate. In models 1, 2, 3 and 4, the values of Nagelkerke R-squares are 0.04, 0.06, 0.17 and 0.37, respectively. On the other hand, the probability levels of likelihood ratio test for models 3 and 4 are approximately 0.03 and 0.0011, which reflects that the probabilities of the models are sufficient. The probability level of model 5 is less than 0.0001, which reflects a very good significance of the model. Furthermore, the Hosmer and Lemeshow (1989) test shows that the logit is linear in all models except for model 1. The higher the probability, the better is linearity.

Table 3 Results of statistical tests for the logistic regression models (p-values in parentheses)

Statistical tests	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*
AIC	101.335	100.434	93.966	87.347	73.192
SC	112.432	111.532	107.283	113.981	110.923
–2 Log L	91.335	90.434	81.966	63.347	39.192
Nagelkerke R^2	0.042	0.055	0.166	0.365	0.555
Likelihood Ratio	2.933 (0.5691)	3.834 (0.4289)	12.302 (0.0309)	30.921 (0.0011)	55.076 (<.0001)
Somers' D	0.311	0.287	0.434	0.708	0.896
Percent concordant	65.600	64.400	71.700	85.400	94.800
AUC	0.656	0.644	0.717	0.854	0.948
Hosmer and Lemeshow goodness-of-fit Chi-square	18.612 (0.0171)	12.932 (0.1142)	4.949 (0.7630)	7.268 (0.5080)	4.176 (0.8410)

Notes: The table reports the results of the statistical tests for the logistic regression models (p-values in parentheses). The independent variables for each model are defined in Appendix 1. The dependent variable for each model is reorganisation failure (Y = 1 for failed firms and Y = 0 for non-failed firms).

Secondly, the accuracy of the models is tested by the area under the curve (AUC), Somers D and percent concordant. The accuracy tested by AUC is very good for model 5 and low for models 1 and 2. The ROC curves presented in Appendices 4 and 5 demonstrate the accuracies for models 3 and 5. The curve does not refer to any good accuracy in model 3, but in model 5 the accuracy is very good. The differences between the ROC-curves were tested by two sample z-test. The results of the test show that there are differences in ROC-curves between almost all models, despite the models 1 and 2. The interpretation of Somers D and percent concordant is similar as that for AUC.

Lastly, Table 4 shows the Lachenbruch-validated classification accuracy of the estimated logistic regression models. The classification accuracy (cut-off value 0.5) for models 1 (51.5%) and 2 (42.6) is extremely low supporting hypothesis 1. However, the classification accuracy for model 3 (60.3%) clearly outperforms that of previous models although still being low. It shows that the effect of operating cash flow on the performance of the model is significant supporting Hypothesis 2. For model 4, the overall classification accuracy (cut-off value 0.5) is 61.8% exceeding that of model 3. This result supports Hypothesis 3 showing that non-financial variables include useful information for predicting failure in reorganisation. However, combined model 5 clearly reports the highest classification accuracy (70.6%). It implies that when predicting failure in small business reorganisation, a model with financial and non-financial information will lead to the best accuracy supporting Hypothesis 4. The differences between Lachenbruch-validated classification accuracies were tested by binomial proportion test. The statistically significant differences were found between all other models despite between models 1 and 2 and between models 3 and 4.

Table 4 Classification table for the estimated models

Probability level (cut-off point)	*All firms*	*Non-failed*	*Failed*
Model 1: Original raw data			
0.46	48.5	76.5	20.6
0.48	48.5	64.7	32.4
0.50	51.5	50.0	52.9
0.52	51.5	32.4	70.6
0.54	48.5	23.5	73.5
Model 2: Winsorised total assets-based ratios			
0.46	47.1	73.5	20.6
0.48	47.1	70.6	23.5
0.50	42.6	58.8	26.5
0.52	39.7	52.9	26.5
0.54	39.7	44.1	35.3
Model 3: Operating cash flow included			
0.46	52.9	64.7	41.2
0.48	55.9	64.7	47.1
0.50	60.3	64.7	55.9
0.52	60.3	64.7	55.9
0.54	57.4	58.8	55.9
Model 4: Non-financial variables-model			
0.46	61.8	61.8	61.8
0.48	60.3	58.8	61.8
0.50	61.8	58.8	64.7
0.52	61.8	58.8	64.7
0.54	66.2	58.8	73.5
Model 5: Combined model			
0.46	69.1	67.6	70.6
0.48	72.1	67.6	76.5
0.50	70.6	64.7	76.5
0.52	70.6	64.7	76.5
0.54	70.6	64.7	76.5

Notes: The table reports the Lachenbruch validated classification accuracy for the logistic regression models (p-values in parentheses). The independent variables for each model are defined in Appendix 1. The dependent variable for each model is reorganisation failure (Y = 1 for failed firms and Y = 0 for non-failed firms).

5 Summary and discussion

The purpose of the study was to analyse the contribution of pre-filing financial and non-financial information in predicting reorganisation failure of small entrepreneurial firms. The study is motivated by earlier literature reporting that the distress models estimated for larger firms cannot be applied to small firms. Moreover, the existing failure prediction literature is unanimous whether to use financial and non-financial information in combination and whether to use accrual- and/or cash-based ratios in the models. However, none of the prior studies have examined operating cash flows in the context of reorganisations. Moreover, the reorganisation studies including both financial and non-financial information are scarce.

Based on the sample of small Finnish firms (n = 68) reorganising under FCRA, the findings reported in this paper demonstrate that the best failure prediction model may be built as a combination of financial and non-financial information. In this combined model, operating cash flow is a very significant variable along the best non-financial ones. These results are consistent with the prior failure prediction studies emphasising the importance of cash-based financial ratios (see e.g., Gentry et al., 1985, 1987; Aziz and Lawson, 1989) and non-financial information [see e.g., Keasey and Watson, 1987, 1988; Barniv et al., (2002), p.497; Fisher and Martel, 2004; Poston et al., 1994; Peel and Peel, 1987; Back, 2005; Shumway, 2001]. However, this was the first research to study the explanatory power of cash-based ratios in the context of reorganisations. Moreover, there are solely few reorganisation studies examining the financial and non-financial characteristics of firms.

The research question of the study is important for reorganisation practice, since pre-filing information is the main source of information used by the court when assessing probability of successful reorganisation for a firm applying for FCRA. This information is used to reflect the pre-filing situation of the firm but also, together with reorganisation plan, possibilities for survival in the future. The results of this study provide tools as well for managers of distressed firms, bankers, lending specialists, accounts receivable managers, investors, security analysts, auditors, bankruptcy and reorganisation lawyers and judges. Because FCRA is a plan-oriented reorganisation act as in most countries, the results of this study would have general value beyond FCRA and Finland. The sample size is however small and larger sample size would be needed to test the hypotheses properly. Hence, more research in this area is needed.

5.1 Hypotheses

The first hypothesis assumed that the predictive ability of traditional accrual financial ratios based on original raw financial information in predicting reorganisation failure of small entrepreneurial firms is low (H1a). Empirical evidence supported the hypothesis H1a because none of the coefficients of the ratios were statistically significant leading to insignificant classification ability. Hypothesis H1b expected that the predictive ability of traditional accrual-based model cannot be increased by using winsorised transformed-based ratios. The hypothesis H1b was as well supported by the results.

The second hypothesis (H2) assumed that the predictive ability of accrual-based financial ratios can be increased by using (cash-based) operating cash flow ratio. This hypothesis was supported by evidence because the model three (3) including operating

cash flow information contained statistically significant coefficients for three variables: operating cash flow to total assets, equity to total assets and EBIT to total assets. The resulted model was statistically significant and was found to have moderate classification accuracy both in the estimation sample and in Lachenbruch validation.

The third hypothesis (H3) assumed that stand-alone non-financial variables include important information for reorganisation failure prediction. The results of the study supported the hypothesis, because the model four (4) contained statistically significant coefficients for five variables: dummy for gender of the managing director (female or a married couple), dummy for legal form of the firm (not limited-company), court (Vantaa, Espoo or Helsinki), remission rate of non-secured debt and dummy for suggested reorganisation action: focusing on marketing. In addition, the model showed moderate classification accuracy. The fourth hypothesis (H4) expected that non-financial variables include incremental information over financial information. Empirical results supported the hypothesis and indicated that substantially better predictions can be obtained by using non-financial data. The combined model (model 5) contained statistically significant coefficients for six non-financial variables and three financial variables. The significance of operating cash flow showed to be of the same significance than best non-financial variables. Consequently, empirical results support both H1a on the insignificance of original raw accrual-based financial information and H1b on the insignificance of transformation and winsorisation. In addition, the results support H2 on the importance of cash-based (operating cash flow) information and H3 and H4 on the importance of non-financial information in predicting reorganisation failure.

5.2 Implications

This study gave several implications for cash flow, bankruptcy and reorganisation research. Previous studies have not examined cash flows in the context of small firm reorganisations even though cash flow is important for distressed firms. Distressed firms tend to manipulate their annual account figures but cash-based ratios cannot be manipulated same way as accrual-based ratios. The main finding of the study is that including operating cash flow information in the prediction model includes incremental information but that it simultaneously makes the information of equity ratio and EBIT to total assets ratio statistically significant. However, the parameter signs are inconsistent. The sign of coefficients of equity to total assets and operating cash flow to total assets are positive while the coefficient of EBIT to total assets is negative. The negative sign of EBIT to total indicates that the higher the EBIT to total assets, the higher the chance to survive in reorganisation. This conflicting result may be caused by multicollinearity or because the firms with higher profitability but lower cash flows, may be the good cases for successful reorganisation. In addition, the lower the equity ratio the more financial support is provided to the firm until its equity ratio is positive. All in all, these financial ratios should be used as a combination when predicting survival or failure in reorganisation by courts.

In addition, the study showed clearly the importance of non-financial variables in prediction of reorganisation failure. Evidence showed that the active reorganisation action (focusing on marketing) is important for survival in reorganisation. It also showed that gender of the managing director (dummy: female or a married couple) and legal form of the firm (dummy: not a limited company) are significant determinants of non-failed reorganisations. The firms that are limited companies and managed by male will fail

more often than firms that are not limited companies (proprietorship or partnership) and managed by female or a married couple. In addition, the court dummy (Helsinki, Espoo or Vantaa) and reason for financial distress (dummy for difficulties in market) can contribute to survival. The reorganisations processed in courts Helsinki, Espoo or Vantaa will be more successful and if the reason for financial distress has been difficulties in market the firms will not fail in reorganisations that often. This kind of qualitative information is not exposed to extreme values, instability, or manipulation such as raw financial information, which stresses their importance.

Overall, the results presented in this study imply that the most efficient prediction model can be built as a combination of financial and non-financial information. In this combined model, operating cash flow is a very significant variable along the best non-financial ones. Thus, evidence implies that the combination effect of accrual and cash-based ratios found in model 3 and the combination of financial and non-financial variables in model 5 are effective in predicting survival or failure of a firm reorganising under FCRA. Due to the similarities between the reorganisation systems worldwide the results may be applied to other countries as well.

5.3 Limitations

In interpreting the findings of the study, it is also necessary to consider the following limitations. First, this study examined only a small sample (n = 68) of reorganisations, even though the sample included almost all Finnish firms with a reorganisation plan confirmed by court in 2000. Due to the small sample size, the results cannot be properly generalised to the whole population. Therefore, the research should be regarded as a case or pilot study. In further research, larger sample size could be applied by using cohorts from several years. Second, the data includes solely pre-filing information due to lack of post-filing financial information. Pre-filing information is important as a filter when selecting firms for reorganisation while post-filing information can be used later when assessing the feasibility of reorganisation plans. Third we used solely one single observation (i.e., one annual account) for each firm, which relates to the snapshot character of the annual account. In the future, a longer time series data could be used when estimating the potential of successful reorganisation.

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Appendix 1

Table A1 Independent variables used in models

Variables	*Definition*
Model 1	
Ln revenue	Ln revenue
Return on investment	Return on investment
Equity to total assets	Equity to total assets
Quick ratio	Quick ratio
Model 2	
Winsorised Ln total assets	Winsorised Ln total assets
Winsorised EBIT/total assets	Winsorised EBIT/total assets
Winsorised equity to total assets	Winsorised equity to total assets
Winsorised financial assets/total assets	Winsorised financial assets/total assets
Model 3	
Winsorised Ln total assets	Winsorised Ln total assets
Winsorised EBIT/total assets	Winsorised EBIT/total assets
Winsorised equity to total assets	Winsorised equity to total assets
Winsorised financial assets/total assets	Winsorised financial assets/total assets
Winsorised operating cash flow/total assets	Winsorised operating cash flow/total assets
Model 4	
Gender (female or a married couple)	Gender of the manager (female or a married couple)
Legal form of the firm (not a limited company)	Legal form of the firm (not a limited company)
Court (Vantaa, Espoo or Helsinki)	The case processed in courts Vantaa, Espoo or Helsinki
Age of the firm	Age of the firm when reorganisation plan confirmed
Reason for financial distress: market	Difficulties in market reported in reorganisation application
Suggested action: focusing on core functions	Dummy: focusing on core functions
Suggested action: focusing on marketing	Dummy: focusing on marketing
Industry: transportation	Industry: transportation
Industry: service	Industry: service
Industry: construction	Industry: construction
Remission rate of non-secured debt	Remission rate of non-secured debt

Note: The table reports the independent variables for each model (models 1–5).

Table A1 Independent variables used in models (continued)

Variables	*Definition*
Model 5	
Winsorised Ln total assets	Winsorised Ln total assets
Winsorised EBIT/total assets	Winsorised EBIT/total assets
Winsorised equity to total assets	Winsorised Equity to total assets
Winsorised financial assets/total assets	Winsorised Financial assets/total assets
Winsorised operating cash flow/total assets	Winsorised Operating cash flow/total assets
Gender (female or a married couple)	Gender of the manager (female or a married couple)
Legal form of the firm (not a limited company)	Legal form of the firm (not a limited company)
Court (Vantaa, Espoo or Helsinki)	The case processed in courts Vantaa, Espoo or Helsinki
Age of the firm	Age of the firm when reorganisation plan confirmed
Reason for financial distress: market	Difficulties in market reported in reorganisation application
Suggested action: focusing on core functions	Suggested action in reorganisation application focusing on core functions
Suggested action: focusing on marketing	Suggested action in reorganisation application focusing on marketing
Industry: transportation	Industry: transportation
Industry: service	Industry: service
Industry: construction	Industry: construction
Remission rate of non-secured debt	Remission rate of non-secured debt predented in reorganisation application

Note: The table reports the independent variables for each model (models 1–5).

Appendix 2

Table A2 Descriptive statistics (variables in models 1–5)

Variable	*Group 1 (non-failed)*					*Group2 (failed)*					
	Mean	*Minimum*	*Maximum*	*Median*	*Std. dev.*	*Mean*	*Minimum*	*Maximum*	*Median*	*Std. dev.*	*K-W*
Quick ratio	0.344	0.000	1.659	0.277	0.339	0.396	0.025	2.945	0.306	0.493	0.4999
Equity to total assets	–173.258	–1,233.810	1.526	–94.261	246.133	–113.574	–1,617.910	47.511	–38.400	283.450	0.0248**
Return on investment	–16.585	–621.709	215.933	4.281	132.137	–163.300	–4,503.570	795.447	–0.174	825.134	0.3029
Ln revenue	5.561	2.452	8.225	5.702	1.458	5.516	3.848	7.778	5.485	1.101	0.8927
Winsorised financial assets to total assets	29.712	4.308	58.224	26.180	17.386	25.808	4.308	58.224	24.169	15.659	0.3480
Winsorised equity to total assets	–135.767	–482.166	1.526	–94.261	149.965	–79.298	–482.166	8.631	–38.400	119.341	0.0244**
Winsorised EBIT to total assets	16.249	–56.039	162.887	1.208	55.180	1.630	–56.039	162.887	–3.328	42.331	0.2131
Winsorised Ln assets	5.024	1.550	8.591	5.054	1.542	5.371	2.407	7.724	5.385	1.339	0.1894
Winsorised operating cash flow to total assets	27.470	–21.015	181.397	15.125	47.797	27.614	–21.015	181.397	7.236	55.370	0.2616
Gender (female or a married couple)	0.235	0.000	1.000	0.000	0.431	0.147	0.000	1.000	0.000	0.359	0.3584
Legal form of the firm (not a limited company)	0.559	0.000	1.000	1.000	0.504	0.324	0.000	1.000	0.000	0.475	0.0524*
Court (Vantaa. Espoo or Helsinki)	0.147	0.000	1.000	0.000	0.359	0.029	0.000	1.000	0.000	0.171	0.0896*
Age of the firm	11.412	3.000	32.000	10.500	6.209	10.029	3.000	23.000	8.000	5.895	0.2604
Reason for financial distress: market	0.588	0.000	1.000	1.000	0.500	0.353	0.000	1.000	0.000	0.485	0.0537*
Suggested action: focusing on core functions	0.294	0.000	1.000	0.000	0.462	0.118	0.000	1.000	0.000	0.327	0.0741*
Suggested action: focusing on marketing	0.500	0.000	1.000	0.500	0.508	0.176	0.000	1.000	0.000	0.387	0.0051***
Industry: transportation	0.206	0.000	1.000	0.000	0.410	0.118	0.000	1.000	0.000	0.327	0.3268
Industry: service	0.265	0.000	1.000	0.000	0.448	0.353	0.000	1.000	0.000	0.485	0.4344
Industry: construction	0.118	0.000	1.000	0.000	0.327	0.059	0.000	1.000	0.000	0.239	0.3960
Remission rate of non-secured debt	0.629	0.000	0.932	0.700	0.234	0.599	0.000	0.997	0.700	0.288	0.8779

Note: Statistical significance is based on two-tailed tests at the 1%, 5% and 10% are denoted by ***, ** and *, respectively.

Appendix 3

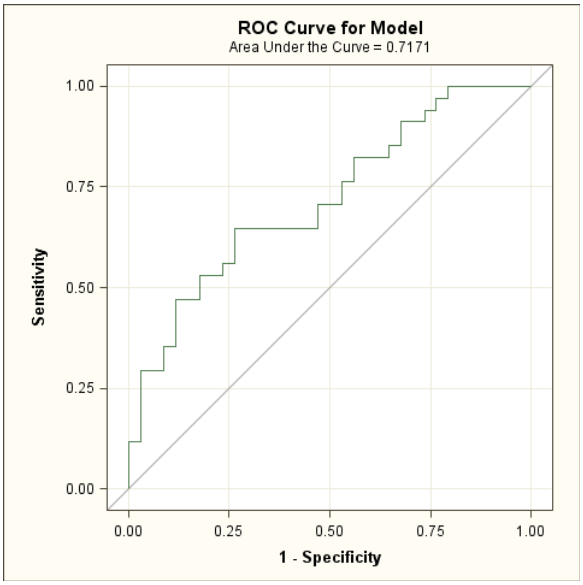
Table A3 Correlation coefficients between financial and non-financial variables (models 1–5)

	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*
1	1.0000	0.2372	0.0870	0.0730	0.2012	0.3255	–0.0668	0.1696	–0.2082	0.0296	–0.1477	0.1609	–0.0731	–0.0963	–0.0671	–0.0663	0.0478	0.0803	–0.0072	0.0435
2	0.2372	1.0000	0.0777	0.3614	–0.1769	0.8267	–0.4982	0.5729	–0.6570	–0.1291	–0.3264	0.1446	0.0448	0.0631	0.1467	0.1038	–0.0031	–0.1140	0.0950	–0.1230
3	0.0870	0.0777	1.0000	–0.0723	–0.1725	0.2048	0.3342	0.1238	–0.0361	–0.1955	0.1772	0.0350	0.0979	0.0995	0.0103	–0.0325	0.0989	–0.0976	–0.0345	–0.0133
4	0.0730	0.3614	–0.0723	1.0000	0.0653	0.3013	–0.4548	0.6700	–0.3564	–0.0847	–0.2138	0.3038	0.2651	0.3214	0.1558	0.1036	–0.0587	–0.2106	0.0657	0.0707
5	0.2012	–0.1769	–0.1725	0.0653	1.0000	–0.2345	0.0333	–0.1742	0.1084	0.0957	–0.1144	0.1057	–0.2134	–0.1429	0.0118	–0.0799	0.1148	0.0590	0.1825	–0.1097
6	0.3255	0.8267	0.2048	0.3013	–0.2345	1.0000	–0.4903	0.6740	–0.6680	–0.1708	–0.4297	0.1972	0.0079	0.0372	0.1486	0.1067	–0.0914	–0.2288	0.1279	–0.0516
7	–0.0668	–0.4982	0.3342	–0.4548	0.0333	–0.4903	1.0000	–0.5596	0.7820	0.0992	0.3803	–0.1342	0.0075	–0.0972	–0.2499	–0.2562	0.1757	0.1391	–0.1729	–0.1087
8	0.1696	0.5729	0.1238	0.6700	–0.1742	0.6740	–0.5596	1.0000	–0.6579	–0.1692	–0.3493	0.2528	0.4336	0.2223	0.1671	0.1227	–0.1317	–0.3907	0.1418	0.2123
9	–0.2082	–0.6570	–0.0361	–0.3564	0.1084	–0.6680	0.7820	–0.6579	1.0000	0.1444	0.3421	–0.1518	–0.1296	–0.0414	–0.2461	–0.2448	0.1549	0.1587	–0.1497	–0.0428
10	0.0296	–0.1291	–0.1955	–0.0847	0.0957	–0.1708	0.0992	–0.1692	0.1444	1.0000	0.0199	–0.1512	–0.0770	0.0661	0.0299	–0.1104	–0.1120	0.2417	–0.1512	0.1790
11	–0.1477	–0.3264	0.1772	–0.2138	–0.1144	–0.4297	0.3803	–0.3493	0.3421	0.0199	1.0000	–0.0676	0.1647	–0.0663	0.0603	–0.0092	0.2531	0.1112	–0.0676	0.1070
12	0.1609	0.1446	0.0350	0.3038	0.1057	0.1972	–0.1342	0.2528	–0.1518	–0.1512	–0.0676	1.0000	0.1008	0.2261	–0.0302	–0.0032	0.1449	–0.0957	0.0860	–0.0027
13	–0.0731	0.0448	0.0979	0.2651	–0.2134	0.0079	0.0075	0.4336	–0.1296	–0.0770	0.1647	0.1008	1.0000	0.1567	0.0298	0.1057	–0.2257	–0.1279	0.0058	0.1292
14	–0.0963	0.0631	0.0995	0.3214	–0.1429	0.0372	–0.0972	0.2223	–0.0414	0.0661	–0.0663	0.2261	0.1567	1.0000	0.1029	0.1355	0.1459	–0.3114	0.0183	0.2417
15	–0.0671	0.1467	0.0103	0.1558	0.0118	0.1486	–0.2499	0.1671	–0.2461	0.0299	0.0603	–0.0302	0.0298	0.1029	1.0000	0.1741	–0.1249	–0.1829	0.2263	–0.0310
16	–0.0663	0.1038	–0.0325	0.1036	–0.0799	0.1067	–0.2562	0.1227	–0.2448	–0.1104	–0.0092	–0.0032	0.1057	0.1355	0.1741	1.0000	–0.2297	–0.0069	–0.0032	0.2139
17	0.0478	–0.0031	0.0989	–0.0587	0.1148	–0.0914	0.1757	–0.1317	0.1549	–0.1120	0.2531	0.1449	–0.2257	0.1459	–0.1249	–0.2297	1.0000	–0.2936	–0.1367	0.1360
18	0.0803	–0.1140	–0.0976	–0.2106	0.0590	–0.2288	0.1391	–0.3907	0.1587	0.2417	0.1112	–0.0957	–0.1279	–0.3114	–0.1829	–0.0069	–0.2936	1.0000	–0.2079	–0.3029
19	–0.0072	0.0950	–0.0345	0.0657	0.1825	0.1279	–0.1729	0.1418	–0.1497	–0.1512	–0.0676	0.0860	0.0058	0.0183	0.2263	–0.0032	–0.1367	–0.2079	1.0000	–0.0179
20	0.0435	–0.1230	–0.0133	0.0707	–0.1097	–0.0516	–0.1087	0.2123	–0.0428	0.1790	0.1070	–0.0027	0.1292	0.2417	–0.0310	0.2139	0.1360	–0.3029	–0.0179	1.0000

Notes: The table reports the correlation coefficients between the variables. The explanations of Appendix 3 are as follows: 1= quick ratio; 2 = equity to total assets; 3 = return on investment; 4 = Ln revenue; 5 = winsorised financial assets to total assets; 6 = winsorised equity to total assets; 7 = winsorised EBIT to total assets; 8 = winsorised Ln assets; 9 = winsorised operating cash flow to total assets; 10 = industry: transportation; 11 = industry: service; 12 = industry: construction; 13 = age of the firm; 14 = gender (female or a married couple); 15 = reason for financial distress: market; 16 = suggested action: focusing on core functions; 17 = suggested action: focusing on marketing; 18 = legal form of the firm (not a limited company); 19 = court (Vantaa, Espoo or Helsinki); 20 = remission rate of non-secured debt.

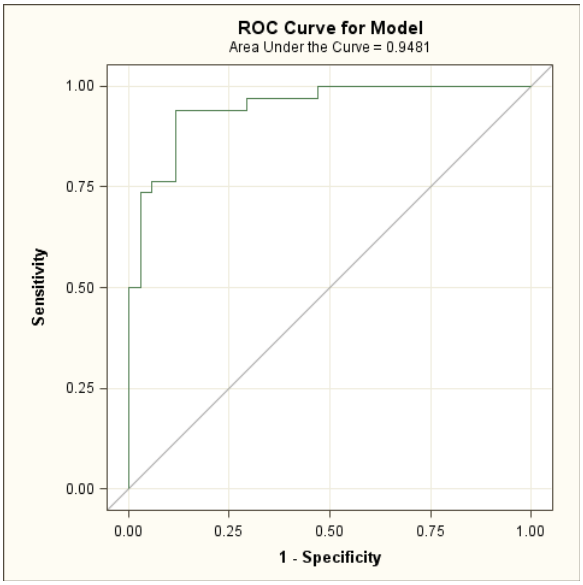
Appendix 4

Figure A1 ROC curve for model 3 including operating cash flow information (see online version for colours)



Appendix 5

Figure A2 ROC curve for model 5 combining financial and non-financial information (see online version for colours)



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Financial Paths of Reorganizing Firms After Reorganization Plan Confirmation

Abstract: The purpose of this paper is to examine the financial paths of small entrepreneurial firms (n=59) that are reorganizing under the Finnish Company Reorganization Act (FCRA, comparable to chapter 11 in the Bankruptcy Act in the US). The reorganization plans of firms were confirmed in 2000, and up to 55% of the firms failed during the first four years of reorganization and were forced into bankruptcy. The rest of the firms continued to operate. The financial data consist of financial statements for the year of plan confirmation and the subsequent three years. This study examines 1.) whether different financial paths can be found within the group of failed firms and within the group of non-failed firms (H1) and 2.) whether specific reorganization strategies are connected to the financial paths of firms (H2). Factor and cluster analyses are applied in the study. The empirical evidence supports both hypotheses.

Keywords: reorganization; failure; entrepreneurial firms, non-financial characteristics, reorganization strategies, factor analysis, cluster analysis

JEL classification: G Financial Economics G3 Corporate Finance and Governance G33 Bankruptcy; Liquidation G34 Mergers; Acquisitions; Restructuring; Corporate Governance

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1. Introduction

During the past decades the reorganization processes around the world have been claimed to be inefficient, since the processes have forced viable firms into bankruptcy and non-viable firms into reorganization (see e.g., Laitinen, 2013). Inefficient processes cause large economic and social losses for each stakeholder of a firm, and therefore, it is important to investigate reorganization processes of firms by identifying paths and strategies which lead to failure and non-failure of firms. Utilizing financial time series data and non-financial information, this study investigates Finnish small firms implementing reorganization programs under the Finnish Company Reorganization Act (FCRA, comparable to chapter 11 in the Bankruptcy Act in the US). More precisely, the study investigates whether the financial paths within the group of failed firms and within the group of non-failed firms are different (hypothesis 1) and whether the reorganization strategies are connected to financial paths of firms (hypothesis 2). In this context, "financial paths of firms" refer to the development of financial variables for the year of reorganization plan confirmation and the subsequent three years. The findings of the study will increase academic understanding of how reorganizing firms fail or survive and whether the strategies used are connected to financial paths of firms.

Previous reorganization research, typically employing financial information from prior to reorganization filing, assumes that all firms fail according to the same process and that therefore, a single observation (usually an annual account) has been considered sufficient for each firm (Johnson, 1970; Balcaen and Ooghe, 2006). However, failure-prediction models do not work properly if the firms do not go through similar failure processes (Laitinen, 1991; Laitinen, 1993). In prior bankruptcy studies different failure paths have been found for different firms (Argenti, 1976; Weitzel and Jonsson, 1989; D'Aveni, 1989; Laitinen, 1991, 1993; Ooghe and De Prijcker, 2008; Laitinen and Lukason, 2014) but within the reorganization studies the failure processes have not been studied. Hence, in this study, the financial paths within the group of failed firms and within the group of non-failed firms are examined.

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Because the FCRA is plan-oriented, like most reorganization processes, the role of the reorganization strategies applied during the process is important. The strategies typically refer to the changes in the organization and the business of a reorganizing firm, and they are used to improve the financial performance and to make a firm viable. Empirical evidence regarding the efficiency of different types of strategies used in voluntary reorganizations (see Smith and Graves, 2005) has been found, but within legal reorganizations, the subject remains largely neglected (see Routledge and Gadenne, 2000, 2004; LoPucki and Doherty, 2002; Laitinen, 2011, 2013). However, none of the prior studies have examined the connection between reorganization strategies and the financial paths of firms, despite the fact that understanding of the reasons for these paths requires an analysis of the strategies behind the paths. Hence, this study will fill the gap in previous studies and examine the connection between reorganization strategies and the financial paths of firms during the reorganization program.

Using a sample of 59 firms with confirmed reorganization plans, both the financial and non-financial characteristics (mainly referring to the reorganization strategy) of the firms are examined. Typical for Finnish reorganizing firms, the sample firms are very small. Financial information is extracted from the financial statements for the year of reorganization plan confirmation and the subsequent three years. The sample includes solely firms with confirmed reorganization plans in year 2000 because the firms in that particular year are consistent with typical Finnish reorganizing firms. Non-financial information is extracted from the confirmed reorganization plans available to the court and creditors. Non-financial information refers to the reorganization strategies suggested in reorganization plans and other background information for the firm, its industry, and the reorganization process.

The empirical findings of this study indicate that there are different financial paths within the group of failed firms and within the group of non-failed firms. In addition, a connection between reorganization strategies and the financial paths of firms is found. Firstly, within the group of failed firms, three financial paths are found. Most of the firms follow the chronic failure path. Rest of the firms follow the suddenly collapsing path, which has two subtypes, namely path with decreasing values of financial variables and path with increasing values of financial variables. These three paths are partially consistent with those three given in literature (given in D'Aveni, 1989; Laitinen,

1991). For instance, D'Aveni (1989) and Laitinen (1991) found as well a path with lingering firms and a path with rapidly declining firms. In the current study, within the group of non-failed firms, two financial paths are found. The first path is followed by firms with solvency problems, while the second path is followed by firms whose financial variables seem to substantially improve. Hence, there are more financial paths among failed firms than among non-failed firms, which may indicate that especially the failed firms may behave more differently. Secondly, the current study found that using various strategies simultaneously seems to be the most efficient option improving financial situation the most during the reorganization program. This result is consistent with the prior study by Schendel et al. (1976), which claimed that a set of strategies should be used instead of a single strategy. Most studies have, however, suggested using efficiency-oriented strategies (see, e.g. Robbins and Pearce, 1992; Chowdhury and Lang, 1996; Laitinen, 2008, 2009). The findings also show that the financial variables of firms applying the efficiency and finance strategies do not develop positively. The finding of inefficiency of finance strategies is consistent with prior studies claiming that these strategies do not strongly affect the long-term performance of firms, but such strategies are mainly used for short-term decline stemming purposes (see, e.g. Laitinen, 2011). Lastly, the results of the study show that the reorganization strategies and financial paths of failed firms are connected. However, no connection between the reorganization strategies and financial paths of non-failed firms is found.

This study contributes to current reorganization research in at least six ways. Firstly, this study focuses on financial paths of reorganizing firms, which have largely been neglected in prior studies. In particular, this study uses post-confirmation financial information, while prior studies are mainly based on pre-confirmation financial information. Secondly, this study concentrates on very small entrepreneurial firms, which are consistent with typical Finnish reorganizing firms. However, most empirical studies on reorganization are focused on large, publicly owned firms. Thirdly, non-financial variables are examined in the study, which has been rare in prior reorganization studies. Fourthly, the connection between reorganization strategies and the financial paths of reorganizing firms is examined. Lastly, this study forms clusters in terms of financial and non-financial information, which is new in reorganization research. In prior studies, logistic regression analysis or discriminant analysis is typically applied.

The current paper is structured as follows. The second section summarizes the FCRA and the related literature. In addition, the section focuses on the development of the hypotheses**.** Section 3 presents the data and variables and describes the methodology used to test the hypotheses. Section 4 presents the results. In the final section, the main findings, limitations, and implications of the research are summarized.

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2. Related literature and hypotheses development

2.1 Reorganization procedure in Finland

In Finland, the FCRA provides an opportunity for financially distressed but viable firms to rehabilitate their businesses, to ensure continued viability, and facilitate debt arrangements. The FCRA came originally into force in 1993 (Act 1993/47), and later, in 2007, the reform was legislated to improve the success of reorganizations (amendments up to 247/2007 included). Another option within the legal context in Finland is legal bankruptcy procedure (comparable to liquidation via chapter 7 in the US) (Laitinen, 2013). However, the payback-rate is higher in reorganizations because in 96.8% of bankruptcy liquidations, the creditors receive nothing. Hence, bankruptcies can cause large economic losses and other negative consequences. (Laitinen 2013). In the first years of the FCRA, the median payback-rate was 33.5 % in Finland (Sundgren, 1998), while it was 56.4% in the US (Ravid and Sundgren, 1998). The comparisons of different reorganization systems performed by Philippe et al. (2002) and Laakso (2012) reveal that the FCRA is somewhat different from other reorganization acts worldwide, even though the FCRA, like many other reorganization systems, is plan-based and debt-restructuring plays a major role (for a comparison of different systems see Philippe et al., 2002; Couwenberg, 2001).

The purpose of the FCRA is to produce a reorganization plan including both business and debt restructuring that is aimed at recovering the firm. The FCRA can be divided into two larger stages: the stage before the reorganization plan confirmation (the reorganization event) and the stage after the plan confirmation (the performance event). These stages are comparable to Voluntary Administration in Australia (Laitinen, 2013; Routledge and Gadenne, 2000). In the reorganization event, the role of the courts is important because the courts evaluate the possibility of surviving reorganization by concentrating on the financial and non-financial information related to the firm. If the firm is selected for reorganization, reorganization proceedings are opened, and a reorganization plan is prepared. The plan is considered by the court and confirmed if certain conditions are met. The reorganization plan may be approved in three ways: upon the acceptance

of all known creditors, upon the acceptance of the majorities among the groups of creditors, or at the request of the person who prepared the plan (the administrator or the debtor) when certain conditions defined in the law are met (see FCRA § 54). The second stage of the FCRA (the performance event) refers to the reorganization plan implementation. In this stage, the firms will carry out the plan or fail and go bankrupt during the program (Laitinen, 2013). Most reorganization studies concentrate on the reorganization event, while this study focuses on the performance event.

In light of the empirical evidence of prior studies, the reorganization procedure in Finland seems to be inefficient. Altogether, 4,482 reorganization petitions were submitted by the firms to the courts from 2003 to 2013. The annual number of reorganization petitions has been approximately 500 since 2009 (Statistics Finland). Around 60% of these petitions have been approved by the courts, and approximately 75% of these firms will obtain a confirmed reorganization plan. Furthermore, 40-50% of the firms will fail during the reorganization program. Therefore, the failure rate among Finnish firms is very high but comparable to the failure rate in the US (Jensen-Conklin, 1992). On the other hand, the failure rate is smaller, for example, in Canada (Fisher and Martel, 1995).

2.2 Financial paths of reorganizing firms

Prior reorganization studies have mainly focused on predicting the failure of reorganization. Because failure in reorganization means, as a matter of fact, bankruptcy under the Finnish Bankruptcy Act (FBA), reorganization-failure-prediction studies are related to firm-failure-prediction studies indicating bankruptcy (Laitinen, 2013). Most prior studies have focused on predicting the failure of firms (see, e.g., literature reviews by Dimitras et al., 1996; Altman and Narayanan, 1997; Balcaen and Ooghe, 2006), while studies on failure processes are scarce. Failure process studies have examined either the whole lifecycle of firms or the final stages before the collapse. The terminology used in prior failure studies is mixed because some studies have used terms such as “trajectory” (Argenti, 1976; du Jardin, 2010; 2015), “patterns” (D’Aveni, 1989; Crutzen, 2009; Crutzen and Van Caillie, 2010), “process” (Laitinen, 1991; Ooghe and De Prijcker, 2008), “pathways” (Moulton et al., 1996), and “extinction” (Sheppard and Chowdhury, 2005), and some of these are applied in different ways in different studies. In this study, the term “financial

path" is used referring to the financial variables for the year of reorganization plan confirmation and the subsequent three years (years 2000-2003) which presents the financial situation of firms during the first four years of reorganization.

Despite the large number of static failure-prediction studies, firm failure cannot be considered a sudden and unexpected event (Luoma and Laitinen, 1991). Firstly, almost all classic statistical failure-prediction models use only a single observation (usually based on annual accounts) for each firm (Johnson, 1970). When using a single observation, it is assumed that annual accounts are independent "repeated measurements," even though the observations are not entirely independent. It is also difficult to know when to observe a firm, which may introduce a selection bias in the resulting model (Mensah, 1984; Shumway, 2001). For instance, a healthy firm suffering from temporary difficulties may be classified as failing by the model. Hence, it is more natural and justified to consider the time-series behavior of failing firms, instead of a cross-sectional analysis.

The pioneering work of Argenti (1976) was one of the first to present failure as a process consisting of three types of failure trajectories. The firms belonging to the first type of failure group are newly founded, and the performance of these firms is constantly poor before the failure. The second group contains young firms that have excellent figures before the failure. The last group includes mature firms whose performance has been good or excellent for a number of years or decades. However, at some stage, major change occurs, and without responding to this change, the firm will collapse. Argenti's study is based on the entire lifecycle of a firm. After the seminal work by Argenti (1976), few studies on the failure processes of firms have been published. These studies have found a small number of distinct failure processes, and the focus has been on the financial variables of firms (e.g., Laitinen, 1991; Laitinen, 1993), the non-financial variables (Crutzen and Van Caillie, 2010), or both the financial and non-financial variables (e.g., Hambrick and D'Aveni, 1988; D'Aveni, 1989; Moulton et al., 1996). However, some of these studies lack large-scale empirical proof (e.g., Argenti, 1976; Ooghe and de Prijcker, 2008). However, none of the studies have examined the financial paths of reorganizing firms, even though doing so might increase the understanding of failure prediction. In the same way, all firms do not survive in the same manner, which weakens the prediction of survival. Therefore, this study is the first to examine the financial

paths of reorganizing firms. The paths are identified by using factor and cluster analyses. Hence, the first hypothesis is as follows:

H1: Different financial paths exist within the group of failed reorganizing firms and within the group of non-failed reorganizing firms

2.3 Financial variables in the reorganization literature

Firm failure-prediction studies mainly use financial variables because the financial data are based on hard, objective, publicly available information (Laitinen, 1992). The most commonly used financial variables are those representing the profitability, liquidity, leverage, cash flow, and efficiency of firms (Dimitras et al., 1996). The variables used in the studies are selected on empirical grounds because the existing literature suffers from prevailing theories (Scott, 1981; Balcaen and Ooghe, 2006).

Prior reorganization studies examining the reorganization decisions (event 1) have found that size, capital structure (equity-to-assets ratio), liquidity, and profitability have a positive impact on the likelihood of a reorganization decision. However, when predicting failure during the reorganization program (event 2), these results cannot be applied in total, due to the fact that financial restructuring will affect the leverage position of a firm positively. For instance, the study by Routledge and Gadenne (2000) found that firms that reorganize successfully are more profitable and more highly leveraged and have higher short-term liquidity than before reorganization. Hence, pre-filing leverage is suggested to positively affect success during the reorganization program due to debt forgiveness (see Laitinen 2013, Routledge and Gadenne, 2000).

However, previous failure prediction studies are not unanimous regarding the role of accrual- and cash-flow-based information. Several studies suggest using only cash-based variables (Gentry et al., 1985, 1987; Aziz and Lawson, 1989) or at least including cash-based variables along with financial variables (Gombola and Ketz, 1983; Sharma and Iselin, 2003), while other studies claim that only accrual-based variables are needed in the models (Casey and Bartczak, 1984; Gombola et al., 1987). However, there are several reasons why cash-based variables should be included in

the models of small distressed firms. Firstly, distressed firms tend to hide the actual financial situation by manipulating or managing their annual accounts, which makes accrual-based information more vulnerable to managerial manipulation (Argenti, 1976; Charitou and Lambertides, 2003). Secondly, most of the distressed firms are small, and the financial variables of small firms are typically unstable and contain extreme values, which may affect the accrual-based models more strongly than cash-based models (see Balcaen and Ooghe, 2006). Moreover, the internal control systems of small firms may be insufficient (Keasey and Watson, 1987; Charitou and Lambertides, 2003), which decreases the prediction accuracy of accrual-based information. However, the predictive ability of accrual-based information can be improved by dividing the ratios by an asset concept, which is more stable than a flow concept. Moreover, the extreme values of financial variables can be eliminated by winsorizing the variables (Balcaen and Ooghe, 2006).

2.4 Non-financial variables in reorganization literature

Even though the existing failure prediction studies have mainly focused on financial variables, the use of non-financial or qualitative failure indicators is recommended as well (Laitinen, 2008; 2009). Non-financial information is not exposed to extreme values, instability, or manipulation, which is often true of financial information. Furthermore, the values of non-financial information are not changed in financial restructuring, as financial information is. Especially in the case of very small firms, this can be critical (Balcaen and Ooghe, 2006). According to the literature on reorganization, many non-financial failure predictors have been suggested. For instance, the background characteristics of the firm, business and management, information on owner-managers (entrepreneurs), and the reorganization strategies used have been found to be important in prior studies, even though the results of the studies are mixed. However, this study focuses on the connection between reorganization strategies and the financial paths of firms. Other non-financial variables related to the firm, its industry, and its reorganization process is only used to interpret the contents of the clusters.

Prior research has provided evidence regarding the efficiency of various types of reorganization strategies. The strategies are largely studied in voluntary reorganizations (see Smith and Graves,

2005) and rarely studied in legal reorganizations (Routledge and Gadenne, 2000, 2004; LoPucki and Doherty, 2002; Laitinen, 2008, 2009), and studies of micro-firms are scarce (Laitinen, 2011). However, the literature is not unanimous regarding how these strategies should be classified and which strategies are the most efficient in improving performance (Smith and Graves, 2005). One of the most important studies related to reorganization strategies within voluntary reorganizations is that of Schendel et al. (1976). The study grouped strategies into efficiency-oriented and entrepreneurial-oriented strategies. The efficiency oriented strategies deal with internal processes of an organization (Cameron, 1983). These strategies refer to improvement of efficiency of the company and they are used in order to better use the organizational resources (Woo and Cooper, 1981). As such, they deal with the internal processes of an organization. An example of efficiency-oriented actions is cost-cutting. On the other hand, entrepreneurial turnaround actions are more market-oriented. They deal with resource acquisition and revenue generation (Cameron, 1983) or on changes in market niches (Hambrick and Schecter, 1983). Examples of entrepreneurial strategies are diversification, vertical integration, new market share thrusts and divestment. However, Schendel et al (1976) suggest that a set of strategies should be used, rather than one particular strategy.

Hoffman (1989) classified reorganization strategies into operational and strategic actions. That study suggests that operational actions should be applied when the firm has internal failure causes, whereas strategic actions should be applied when the cause of the failure is external. Later several researchers such as Bibeault (1982), Robbins and Pearce (1992), and Arogyaswamy et al. (1995) argued that strategies should be classified into decline-stemming and recovery strategies. The findings of their studies suggest that decline-stemming strategies stabilize the financial conditions of a firm, while recovery strategies can be used after stabilization. Overall, the prior literature has suggested that efficiency-oriented (active) reorganization strategies, such as cost-cutting, seem to be the most important in reorganizations (Robbins and Pearce, 1992; Chowdhury and Lang, 1996; Laitinen, 2008, 2009; Smith and Graves, 2005). In addition, Robbins and Pearce (1992) and Laitinen (2000) claim that efficiency-oriented strategies should be used regardless of the cause of failure. In contrast, passive financial actions (such as the remission of non-secured debt) may not be effective in the long run (see e.g Laitinen, 2000; Laitinen, 2011) when reorganizing a small firm

because financial actions only concentrate on improving the financial situation of the firm but not the profitability. In summary, we present the following general hypothesis:

H2: Reorganization strategies are connected to the financial paths of reorganizing firms

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3. Research design and method

3. 1 Data

The original sample consists of all Finnish firms (n=89) whose reorganization plans were confirmed by the courts in 2000. Firms with insufficient pre-filing non-financial information (n=5) or financial information (n=25) are excluded from the analysis. More precisely, the firms excluded due to insufficient pre-filing financial data include those that are not obliged to use the double-entry accounting system. Hence, the final sample consists of 59 firms, which is approximately 66% of the cohort that started the reorganization program in 2000.

Because of the length of the reorganization programs (5-10 years), the status of the firms (failure/success) was examined at the end of 2010. The distribution of the length of the reorganization programs at the time of interruption is presented in Figure 1. In total, approximately half of the firms failed (n=28) by the end of 2010 and were forced into bankruptcy. For 2001, 2002, and 2003, the number of failed firms was 1, 10, and 13, respectively. Between the years 2004 and 2010 solely four firms have failed. Later, the interruptions were examined at 2016 and the number of failed reorganizations between the years 2010 and 2016 was 14. Therefore, in total, 42 firms have interrupted their reorganization process by 2016, and solely 17 firms are still operating.

The secondary data are obtained from reorganization petitions, including pre-filing financial statements (income statements and balance sheets for the previous year) and reorganization plans confirmed by the courts. The financial data consist of financial statements for the year of confirmation and the subsequent three years (2000-2003). However, the legal form of a firm may affect its annual accounts because more than half of the sample firms (64.4%) are limited companies (corporations), with the others being non-limited. The annual accounts may differ between limited and non-limited companies due to drawings by the owners in non-limited companies. These drawings replace the salaries in the annual accounts of non-limited companies, and they indicate a reduction of the owners' equity, which affects the balance sheet of a firm.

Because the drawings do not affect the income statements of the firm, as salaries do, the profitability may be better in non-limited companies than in limited companies.

The sample consists of typical firms filing a petition for reorganization under the FCRA because the firms in the sample are very small and distressed. The median number of employees in the sample prior to reorganization is three employees. The average pre-filing net (annual) sales are 264,400 Euros (TEUR). The firms fall into different industrial categories. About 32.2% of the firms are manufacturing firms, 23.7% are service firms, and 11.9% are transportation firms. Industry is controlled in the study by including the industry dummy as a background variable when interpreting the clusters.

3.2. Variables

The hypotheses of the study deal with financial and non-financial variables. Financial variables are used in order to examine whether different financial paths exist within the group of failed firms and within the group of non-failed firms (H1) and also to test the connection between reorganization strategies and the financial paths of firms (H2). The financial variables are extracted from the post-filing financial statements for the year of reorganization plan confirmation and the subsequent three years (2000-2003). The study includes five financial variables that reflect the profitability, liquidity, solvency, size, and cash flow of firms during the first four years of reorganization (2000-2003). The variables are presented in Appendix 1. The variables selected are LN ASSETS for years 1-4, FATA for years 1-4, ETA for years 1-4, EBIT for years 1-4, and OPCF for years 2-4. The variables for the first year (2000) do not include OPCF, because the changes related to OPCF could not be calculated due to a lack of data from the previous year. The variables are winsorized by 5 percent, both upwards and downwards (this cutoff point was the best of several alternatives considered). Thus, the cutoff point for extreme values is set equal to the lower and upper 5th percentiles. In addition, all selected variables are divided by assets. This is advantageous because asset concepts are more stable over time than cash-flow concepts. The financial variables and ln assets measuring the size of the firm are found to be important factors in prior bankruptcy

theory and related empirical evidence (see, e.g., Scott, 1981; Jones, 1987; Laitinen, 1991; Dimitras et al., 1996; Altman and Narayanan, 1997; Balcaen and Ooghe, 2006).

The non-financial variables reflect the reorganization strategies used in the reorganization plans of firms. The strategy variables are used in order to cluster the firms in terms of their reorganization strategies (H2). The strategy dummies selected for the analysis (n=14) are as follows: 1) changing the manager, 2) organizational changes, 3) changing the firm's legal form, 4) focusing on core business, 5) improving production efficiency, 6) increasing revenue, 7) improving the planning of activities, 8) improving the control of activities, 9) the realization of fixed assets, 10) the realization of current assets, 11) the additional deployment of equity, 12) searching for new sources of debt, 13) focusing on marketing, and 14) cutting expenses. The dummies receive a value of 1 when the firm is using the strategy and a value of 0 otherwise. The variable groups are named based on a study by Laitinen (2000), and similar factors are found in the prior literature on voluntary reorganizations (see Smith and Graves, 2005). Within legal reorganizations, the effect of reorganization strategies is largely neglected (see Routledge and Gadenne, 2000, 2004; LoPucki and Doherty, 2002; Laitinen, 2008, 2009).

Other non-financial variables are used to reflect the background information of the firm, its industry, and its reorganization process. Hence, the background variables are only used to interpret the contents of the clusters. The background variables selected are 1) industry (dummies: transportation, service, construction), 2) the age of the firm, 3) the gender of the managing director (dummy: female or a married couple), 4) the legal form of the firm (dummy: not a limited company), 5) the remission rate of non-secured debt, 6) the reason for financial distress (dummy: difficulties in the market), and 7) payment default (dummy). Industry is measured by three binary (dummy) variables referring to the transportation, service, and construction industries. The dummy variable receives a value 1 if the firm is operating in that particular industry and receives 0 otherwise. The age of the firm is calculated in years as the period from the founding year to the year of reorganization plan confirmation (2000). Thirdly, the gender of the owner-manager is measured by a dummy variable that is 1 for firms managed by females or couples. Firms managed by male managers receive a value of 0. The legal form of the firm (not a limited company) receives a value of 0 for limited companies and 1 for non-limited companies. The remission rate of non-

secured debt is calculated as the percentage of remission used by the firms. The difficulties-in-the-market dummy variable, showing the reason for the financial distress, receives a value of 1 when the reason for distress prior to reorganization has been the market. The payment default dummy receives a value of 1 if the firm has defaulted on payments prior to reorganization in 1999-2000. The non-financial variables selected are found in bankruptcy and reorganization studies, though the results of these studies are mixed. Reorganization studies using these variables are scarce, even though these variables may include incremental information about financial ratios (see, e.g., Barniv et al., 2002; Fisher and Martel, 2004; Poston et al., 1994; Laitinen, 2013).

3.3 Statistical methods

Factor and cluster analyses, Kruskal-Wallis test, and Fisher's exact test are applied in order to test the hypotheses. Firstly, factor and cluster analyses are used to find the financial paths within the cluster of failed firms and those within the cluster of non-failed firms. The analyses are applied separately for both groups. By using factor analysis, the financial variables presented in Chapter 3.2 are reduced to a small number of independent latent dimensions of the financial variables. These dimensions are used in the cluster analysis to extract a taxonomy of firms and illustrate the differences in the financial characteristics of firms. More precisely, the factor scores are used in the cluster analysis to classify the firms into groups. The highest factor score of a firm is associated with the most important characteristic of a specific firm. Later, the financial paths of firms are examined by interpreting the median values of the variables presented in Section 3.2. However, the samples for the four years are unequal due to interrupted reorganizations, and therefore, the financial paths represent the financial variables of the remaining firms for every year. The differences between the median financial and non-financial variables in the hypothesized clusters are tested via a non-parametric Kruskal-Wallis statistic.

Secondly, the factor and cluster analyses and Kruskal-Wallis test are similarly applied when testing the connection between reorganization strategies and the financial paths of firms (H2). Factor analysis is first used to extract factors related to 14 explanatory variables concerning the reorganization strategies. The factor scores are then used in the cluster analysis to group the firms according to the strategies. Afterwards, the difference in the medians of the financial and strategy

variables in the hypothesized clusters is tested via a non-parametric Kruskal-Wallis statistic. These differences are also tested for the background variables to facilitate the interpretation of the clusters. Lastly, the connection between the financial variables and reorganization strategies is tested via Fisher's exact test.

In the current study, the eigenvalue-greater-than-one rule (K1 or Kaiser criterion, see Kaiser, 1960) is used in order to determine the number of factors. Hence, the factors that have eigenvalues greater than one are retained for interpretation. In addition, in the current analysis, the typology of firms is interpreted via an orthogonal Varimax solution, which leads to the factors being statistically linearly independent of one another. A Varimax solution refers to a situation in which the variables receive high loadings on the factor in question and low loadings on other factors. Therefore, the coefficient of correlation between them is zero, and there is no multicollinearity (Fabrigar et al., 1999).

The clustering method used in the current study is hierarchical cluster analysis. The study uses rotated factor scores as input variables for the cluster analysis because they are standardized and uncorrelated. In the hierarchical cluster analysis, a series of divisions takes place, starting with the most similar observations or variables being amalgamated in one cluster. In the next step, the remaining most similar clusters are amalgamated. The hierarchical clustering method uses the dissimilarities (similarities) or distances between the objects when formulating the clusters. The distance method used in this study is Ward's (1963) method, which uses an analysis of variance approach to evaluate the distances between the clusters. By using Ward's method, the variation within the clusters is not increased by too extreme a degree, which results in clusters that are as homogeneous as possible (Statsoft, 2001).

The significance of differences in medians between the clusters is tested via a non-parametric Kruskal-Wallis statistic. Here, the Kruskal-Wallis non-parametric test is based on the Wilcoxon scores of the location of the distributions and has been used to test whether the distribution of a variable has the same location parameter across the clusters of firms (Statsoft, 2001). Lastly, the connection between financial variables and reorganization strategies is tested via Fisher's exact

test, which is used to examine the significance of the association (contingency) between the clusters (see: Fisher, 1922, 1954).

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4. Empirical results

4.1 Descriptive statistics

The descriptive statistics for financial variables for the first four years of reorganization for the entire sample are reported in Appendix 2. The median values of the variables demonstrate that the sample firms are very small, non-profitable, and indebted. The cash flows of the sample firms are minor, and the liquidity of firms is moderate. Interestingly, during the first four years, the size of the firms remained stable, and the solvency of firms decreased. The profitability and cash flows of firms increased slightly. However, the observations are relatively heterogeneous in all respects. For example, the lowest ETA, representing solvency, is -846.26, whereas the largest ETA amounts to 90.76. In terms of EBIT, representing profitability, the range is from -133.83 to 344.04.

Appendix 3 displays the Pearson correlation coefficients of the selected financial variables. Some interesting remarks can be made regarding this table. For example, LN ASSETS is correlated with several variables. It is positively correlated with ETA and negatively correlated with FATA and EBIT over the sample period. Moreover, in 2003, LN ASSETS is negatively correlated with OPCF. Hence, the larger firms may be more solvent during reorganization, but their liquidity and profitability may be lower. The correlations presented show that there may be some multicollinearity between the variables. However, none of the correlation coefficients are above 0.8, which can be considered the boundary of serious multicollinearity (see Lewis-Beck, 1980).

4.2 Testing Hypothesis 1 - Identification of financial paths

Financial paths of failed firms

The factor analysis applied to the failed reorganizing firms reveals that each factor has special characteristics of its own. By using eigenvalue-greater-than-one rule and scree test (see chapter 3.3) the number of factors is restricted to three. The model of three factors accounts for about 51%

of the total variation of the initial variables for failed firms. The factor loadings in the Varimax rotated factor matrices are reported in Table 1. The factor loadings demonstrate how the variables are connected to one another and to the factors. The variables with high (absolute) loadings are strongly associated with the hidden dimension behind the factor solution. For example, the first latent variable (Factor 1) links various variables together. The factor is strongly associated with the development of ETA and LN ASSETS in the first three years of reorganization. The loadings for EBIT(2), EBIT(3) and OPCF(3) are negative. This indicates that increasing the EBIT and OPCF during these years will decrease the value of the factor score. The second factor (Factor 2) is especially linked to FATA during the first three years of reorganization. The loadings for OPCF(2) and LN ASSETS(4) are negative, indicating that these characteristics decrease the value of the factor score. Lastly, the third factor (Factor 3) links together EBIT(1), EBIT(4), OPCF(4), FATA(4), and ETA(4). The loadings for FATA(4) and ETA(4) are negative, and hence, they decrease the value of the factor score.

(TABLE 1 HERE)

Next, the factor scores are used as inputs in the cluster analysis to find different financial paths within the group of failed firms and within the group of non-failed firms. The number of clusters is restricted to three because the fourth cluster does not add to the explanatory power and the sample is small. After reducing the number of clusters to two, almost all firms are grouped into the first cluster. Hence, having three clusters is optimal. The first cluster of failed firms contains 14 firms, while the second cluster includes six firms, and the third cluster includes eight firms.

Last, the financial paths of firms in each cluster are examined. The median values of financial variables are presented in Table 2. However, the financial variables are not available for all years, due to insufficient financial data and interrupted reorganizations. Hence, the median values demonstrate the values of existing firms during the first four years. Table 2 illustrates that three types of financial paths can be found.

The first type of financial path symbolizes a chronic failure due to poor performance according to most of the variables during the studied four-year period. During the first three years, the values

of ratios have collapsed in a steady manner, and there are no sudden changes. However, during the fourth year, the values of LN ASSETS, EBIT, OPCF, and FATA, representing size, profitability, cash flow, and liquidity, have suddenly increased, even though the value of EBIT remains negative. EBIT increased the most from the third year (-36,473) to the fourth year (-5,61). Thus, despite the increase of variables during the fourth year of reorganization, it may be relatively easy to predict the bankruptcy of firms during the program due to the negative values of the variables throughout the years.

The second type of path can be characterized as sudden failure because the values of the financial variables of firms (n=6) have changed rapidly during the four years. The firms connected to this type of financial path attempt to solve their problems early in the reorganization process because the values of the variables increased a great deal during the second year of reorganization. However, during the third year, the values of FATA and ETA decreased again, and during the fourth year, all values other than ETA decreased again, and all values of variables other than FATA(4) are negative during the fourth year. Hence, only the liquidity of these firms is good during the fourth year. The values of EBIT(4), ETA(4), and OPCF(4) are very low, which inevitable leads to liquidity problems. Hence this type of firms can be characterizes as sudden failures with decreasing values of financial variables.

The third type of financial path symbolizes sudden failure as well because the values of the financial variables of firms (n=9) change rapidly between the years. However, almost all financial variables are higher during the fourth year of reorganization than during the first year and the firms are larger as well. Only FATA is lower during the fourth year. During the fourth year, financial variables other than ETA are positive, which indicates better financial performance during the fourth year. In addition, the values of FATA, EBIT, and OPCF are positive every year. OPCF also shows the highest values in this cluster. Only ETA is negative every year. Hence, the firms in this cluster perform better than the firms in the second cluster in terms of EBIT and OPCF. Therefore this failure process can be characterized as sudden failure with increasing values of financial variables.

Table 2 presents the Kruskal-Wallis test results. The results show that there are statistically significant differences in some variables between the clusters. These variables are LN ASSETS(1), LN ASSETS(2), FATA(1), FATA(2), FATA(3), EBIT(3), EBIT(4), OPCF(3), and OPCF(4). Therefore, the empirical findings support Hypothesis 1 regarding the different financial paths within the cluster of failed firms. In addition, this result is consistent with prior literature reporting various failure processes.

(TABLE 2 HERE)

Financial paths of non-failed firms

The results of the factor analysis for non-failed firms (n=31) are presented in Table 3. As above, the eigenvalue-greater-than-one rule and scree test (see chapter 3.3) are used in order to find the optimal number of factors (see Cattel, 1966). By interpreting these, the number of factors is restricted to three for this group of firms. The models of these three factors account for about 76% of the total variation of the initial variables for non-failed firms. The results indicate that the first factor is linked to LN ASSETS in all four years of reorganization and also to ETA(3) and ETA(4). However, the loadings for EBIT(1) and OPCF(4) are negative, which indicates that they decrease the value of the factor score. The second factor is associated with EBIT(2), EBIT(3), EBIT(4), OPCF(2), and OPCF(3). The loadings for ETA(1) and ETA(2) are negative in this factor. Lastly, the third factor is strongly associated with the time-series development of FATA.

(TABLE 3 HERE)

Afterwards, two clusters of firms are formed by using the factor scores. The number of clusters is restricted to two because the third cluster does not add to the explanatory power and the sample is small. The first cluster includes 21 firms, while the second cluster contains ten firms. The median values of financial variables demonstrate the financial paths of firms, and these median values are reported in Table 4. The first type of financial path among non-failed firms (n=21) characterizes those firms whose FATA and EBIT values improved from Year 1 to Year 4. However, ETA is poor every year, and it continues deteriorating until Year 3. After that, it increases a bit during

Year 4. LN ASSETS decreased in the fourth year in comparison to the first year. Hence, the first type of financial path can be characterized as that experienced by firms with solvency problems.

The second type of financial path is similar to the first path, but the firms (n=10) perform better in terms of financial variables in this cluster. Only ETA is negative every year, and EBIT is negative during the first year. Most of the values of the variables are drastically higher during the fourth year than in the first year. LN ASSETS and OPCF remain stable over the years. However, the firms are smaller during the fourth year. Therefore, the second type of path symbolizes firms whose financial variables are improving substantially.

Lastly, the Kruskal-Wallis test results reported in Table 4 show that there are statistically significant differences in certain variables between the clusters. Firstly, LN ASSETS and FATA are statistically significantly different every year. Secondly, ETA(1) and EBIT(2) are statistically significantly different. Thus, these results support Hypothesis 1 regarding the differing financial paths of firms within the cluster of non-failed firms.

(TABLE 4 HERE)

Additional tests

The analyses in the previous sections indicate that the financial paths of firms within the clusters of failed firms and within the cluster of non-failed firms are different. In the following, the differences in financial information between all clusters are examined by using a Kruskal-Wallis test. Overall, the results reported in Table 5 show that the differences in several financial variables between clusters are statistically significant. Firstly, FATA and LN ASSETS are statistically significant every year. Secondly, ETA(1), EBIT(2), EBIT(3), and OPCF(4) appear to be statistically significant. Furthermore, non-financial background information is examined separately for the failed and non-failed firms and between all clusters of failed and non-failed firms by conducting Kruskal-Wallis tests. However, the results lack significance, because the only statistically significant variable is the age of the firm between the clusters of non-failed firms.

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(TABLE 5 HERE)

4.3 Testing Hypothesis 2 – The effect of reorganization strategies

The results of the factor and cluster analyses in the previous sections indicate that the financial paths between the firms in the clusters of failed and non-failed firms are different. In the following, the connection between reorganization strategies and financial paths is examined by applying several tests. First, the reorganization strategy groups are identified by using factor analysis. Four factors were chosen because the factor solution of these four factors explains 53% of the variation, the sample is small, and the fifth factor does not significantly add to the explanatory power. The factor loadings for the Varimax rotated factor matrix are presented in Table 6. The variable groups represented in Table 6 are named after the study by Laitinen (2002).

(TABLE 6 HERE)

As can be seen from Table 6, the first latent variable (Factor 1) is especially linked to efficiency improvement strategies. The second factor (Factor 2) is associated with efficiency improvement and expense strategies. The expense-cutting strategies obviously also relate to improving efficiency. On the other hand, the loading for increasing revenue (product strategy) is negative, which indicates that increasing revenue will decrease the value of the factor score. The third latent variable (Factor 3) refers, above all, to finance strategies. The variables "additional equity deployment" and "searching for new sources of debt" have the highest loadings on this factor. The loading for improving production efficiency is negative, which indicates that improving production efficiency will decrease the value of the factor score. Finally, the fourth factor is associated with asset strategies and the "focusing on marketing" product strategy.

As discussed earlier, the factor scores are next used in order to categorize the firms when performing the hierarchical cluster analysis (see Appendix 4). The number of clusters is restricted to three because the fourth cluster does not add to the explanatory power and the sample is small. The first cluster includes 29 firms, while the second and third clusters contain 19 and eleven firms,

respectively. The strategies are reported in Table 7, and the five most important measures are presented in bold.

(TABLE 7 HERE)

As Table 7 indicates, firms (n=29) in the first cluster (cluster 1) have used, above all, product and expense strategies. Eighty-six percent of these firms have used the "cutting expenses" expense strategy. Thus, the first cluster contains firms that have used product and expense strategies. The firms in the second cluster (n=19) deal mostly with the efficiency and finance strategies. Of the efficiency strategies, "focusing on core business" and "improving control of activities" are the most often used strategies among the firms. Interestingly, the firms in this cluster use finance strategies more than the firms in other clusters. Hence, the second cluster contains firms using efficiency and finance strategies. Lastly, the firms in the third cluster (n=11) use various strategies. Of all the strategies, only "searching for new sources of debt" is not actively used, while the "changing the firm legal form" (64%), "improving planning of activities" (73%), and "improving control of activities" (73%) efficiency strategies are most often used. Furthermore, 36% of firms have used the "realization of current assets" asset strategy, which distinguishes these firms from the firms in the other clusters. Hence, the third cluster contains firms that have used various strategies. The differences between the clusters are tested via the Kruskal-Wallis test. The test results reported in Table 7 demonstrate that there are statistically significant differences in various variables between the clusters.

In order to show the financial paths of the firms in the three clusters, the median values of the financial variables are reported in Appendix 5. As can be noted from Appendix 5, the financial paths of firms are different between the clusters. In the first cluster (Cluster 1), FATA and ETA are relatively stable during the first four years of reorganization. However, ETA remains poor every year. On the other hand, EBIT and OPCF increase, whereas LN ASSETS remains stable. EBIT increased from year 1 (-0,58) to year 4 (16,71). Thus, product and expense strategies may impact the profitability and cash flows of firms positively, as well as stabilize the liquidity and solvency of firms. EBIT, OPCF, and FATA are also highest among the firms in this cluster. In the second cluster (Cluster 2), the median values of financial variables decrease over all years of

reorganization. Only EBIT varies considerably between years. LN ASSETS is slightly higher in the fourth year in comparison to the first year. Thus, the efficiency and finance strategies applied in Cluster 2 do not positively affect the financial variables of firms. Lastly, in the third cluster (Cluster 3), the values of all financial variables other than FATA improve during the years examined. However, FATA is still positive during the fourth year. The firms are also larger during the fourth year in comparison to the first year. In addition, this cluster is the only cluster with positive ETA values (measuring solvency). Hence, using various strategies may improve the financial conditions of firms.

These results are consistent with the prior studies to a degree. First, the findings related to the third cluster are consistent with the prior study by Schendel et al. (1976), suggesting that a set of strategies should be used rather than one particular strategy. The efficiency and finance strategies applied in Cluster 2 do not positively affect the financial variables of firms. This result is consistent with prior studies claiming that finance strategies do not strongly affect the long-term performance of firms; rather, they are mainly used for short-term decline-stemming purposes (see, e.g., Laitinen, 2011). However, the results of the Kruskal-Wallis test show only a few significant differences in the financial variables between the clusters. These differences are related to LN ASSETS(3) and LN ASSETS(4).

Afterwards, the frequency distributions of three clusters of firms related to reorganization strategies and five clusters of firms related to financial paths are introduced (see Table 8). Then, the connection between clusters of financial variables and reorganization strategies is examined by using Fisher's exact test. However, the results of Fisher's exact test show no connection between the reorganization strategy clusters (three clusters) and all the financial paths of the failed and non-failed firms (five clusters), but the results of the test show that there is a clear connection between the strategy clusters and financial paths of failed firms (three clusters) because the p-value of Fisher's exact test is 0,0302. Therefore, Hypothesis 2 is partly supported because a connection between the reorganization strategies and financial paths of failed firms has been found.

(TABLE 8 HERE)

27

Background information on firms

Because the role of non-financial information during reorganizations has been found important in prior studies, the current study examines non-financial background information between the clusters by applying Kruskal-Wallis tests. The test results reported in Table 9 demonstrate that there are no statistically significant differences between the clusters. However, some interesting remarks can be made. For instance, in Panel 1 of Table 9, it is demonstrated that the share of production and service firms is largest among all three clusters. Furthermore, approximately 50% of firms in each cluster experienced payment defaults prior to reorganization plan confirmation.

(TABLE 9 HERE)

5. Summary and discussion

This paper examined Finnish firms (n=59) reorganizing under the Finnish Company Reorganization Act (FCRA). More precisely, it was examined whether there are different financial paths within the cluster of failed firms and within the cluster of non-failed firms and whether certain reorganization strategies are connected to the financial paths of firms during the year of reorganization plan confirmation and the subsequent three years (years 2000-2003). Only firms with confirmed reorganization plans in year 2000 were used because the firms are typical firms reorganizing under the FCRA. The study was motivated by earlier bankruptcy literature reporting that different financial processes can be found for the failing firms (Argenti, 1976; D'Aveni, 1989; Laitinen, 1991; Ooghe and DePricker 2008) and that various turnaround strategies affect firm performance in different ways. Prior research has provided evidence regarding the efficiency of different types of turnaround strategies within voluntary reorganizations (see Smith and Graves, 2005), but within legal reorganizations, the subject is largely neglected (see Routledge and Gadenne, 2000, 2004; LoPucki and Doherty, 2002; Laitinen, 2008, 2009). In Finland, Laitinen (see, for example, 2011; 2013) has examined the efficiency of the reorganization strategies of firms reorganizing under the FCRA. However, this study was the first to study the financial paths of reorganizing firms and the effect of certain reorganization strategies on the financial paths of firms.

The empirical findings of this paper were in line with the previous bankruptcy literature emphasizing the difference between financial paths of firms. In this study, three financial paths were found within the failed firms and two paths within the non-failed firms supporting the first hypothesis (H1). The most common path among the failed firms was the chronic failure path, which was followed by 14 firms. The rest of the firms followed the suddenly collapsing path with two subtypes, namely path with decreasing values of financial variables and path with increasing values of financial variables during the years. These paths were partly consistent to those in the previous literature. For instance, in the studies by Laitinen (1991) and D'Aveni (1989) paths symbolizing chronic failures and rapid declines were found as well. In the current study, within the group of non-failed firms, two financial paths were found. The firms following the first path had solvency problems, while the second path contained firms whose financial variables seemed

to substantially improve. Most of the non-failed firms (n=21) followed the first path, which may indicate that most of the non-failed firms behave in the same way in terms of financial variables, while the failed firms are more heterogeneous.

Lastly, the connection between reorganization strategies and financial paths was examined. The results were not totally in line with the previous studies. While most previous studies suggest that efficiency-oriented reorganization strategies are the most efficient in the long run (see, e.g. Robbins and Pearce, 1992; Chowdhury and Lang, 1996; Laitinen, 2008, 2009), in the current study, the efficiency-oriented and finance strategies applied in Cluster 2 did not positively affect the financial variables of firms, because the median values of financial variables decreased throughout all the years of reorganization. This result was consistent with prior studies claiming that finance strategies do not strongly affect the long-term performance of firms and that such strategies are mainly used for short-term decline-stemming purposes (see, e.g., Laitinen 2011). In contrast, using various strategies was found to be the most effective option because the financial variables were improved the most during the reorganization program when the firms applied various strategies, as seen in Cluster 3. Similarly, a previous study by Schendel et al. (1976) suggested that a set of strategies should be used rather than one particular strategy. On the other hand, the product and expense strategies applied in Cluster 1 may affect profitability and cash flows positively and may stabilize liquidity and solvency of firms. However, there were only few statistically significant differences in financial variables between the clusters. Later, in Fisher's exact test a clear connection between the clusters of reorganization strategies and clusters of failed firms was found. However, no connection between all financial paths of failed and non-failed firms and reorganization strategies was found. Therefore, this result implies that the reorganization strategies may be connected to the financial paths of failed firms, and hence, Hypothesis 2 was partly supported.

The study carries several theoretical and practical implications for legal reorganization practice in the context of small entrepreneurial firms. Firstly, the study found different financial paths within the cluster of failed firms and within the cluster of non-failed firms reorganizing under the FCRA. In total, three financial paths were found among failed firms, and two paths were found among non-failed firms. Hence, the failed firms behaved especially differently during the FCRA, and

therefore, the failure of firms may not be easy to predict. However, many prior studies assume that all firms fail in the same way, which is obviously not the case in the context of reorganizations. Secondly, the results of the study showed that the reorganization strategies and financial paths of failed firms were connected. There were, however, no connections between the reorganization strategy clusters and financial paths of non-failed firms. Thirdly, the results of the study showed that approximately half of the firms failed during the program, which indicates that the reorganization process may not be efficient enough in Finland. In particular, the role of the supervisor should be emphasized in Finland because the supervisor should take into account the financial situation of the firm and suggest corrective strategies as early as possible. Due to the similarities between the reorganization systems worldwide, the results may be applied to other countries as well. Moreover, this pilot study hopefully initiates a series of research projects on this topic. In addition, in the future, it will be interesting to examine the pre-filing financial paths of firms as well.

In interpreting the findings of this study, it is also necessary to consider the following limitations. First, the sample of the study was small, even though the sample included almost all Finnish firms with a reorganization plan confirmed by a court in 2000. Hence, the results of this study cannot be properly generalized to the entire population, and this research should be regarded as a case or pilot study. Second, the samples for the four years were unequal due to interrupted reorganizations. Hence, the financial variables demonstrated the financial paths of the remaining firms only. Third, the data may not represent the actual conditions of interrupted reorganizations because the financial data could be manipulated or the non-financial information could be false, because the non-financial information is partly based on the opinions of debtors, creditors, and administrators. Fourth, because the sample included only small firms, the results may not be applicable to larger firms. Fifth, the study focused only on Finnish firms, and the results are not fully generalizable, although Finnish procedure is largely consistent with most procedures worldwide (see, e.g., Philippe et al., 2002; Couwenberg 2001). Sixth, the time period examined was short, and the procedure can last longer than four years, although most of the firms had already failed during the first four years. Seventh, due to drawings by the owners, the annual accounts of limited companies were different than the annual accounts of partnerships or proprietorships, which may have affected the results.

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Tables

Table 1. Rotated factor loadings for failed firms

	Factor 1	**Factor 2**	**Factor 3**
Year 1			
Ln assets (1)	**0,646**	-0,381	-0,099
Financial assets/Total assets (1)	0,187	**0,753**	0,140
Equity/Total assets (1)	**0,825**	0,147	0,000
EBIT/Total assets (1)	-0,088	0,069	**0,157**
Year 2			
Ln assets (2)	**0,607**	-0,501	-0,113
Financial assets/Total assets (2)	0,001	**0,911**	-0,024
Equity/Total assets (2)	**0,843**	0,169	0,106
EBIT/Total assets (2)	**-0,495**	0,295	-0,109
OPCF/Total assets (2)	0,120	**-0,525**	0,106
Year 3			
Ln assets (3)	**0,757**	-0,266	0,058
Financial assets/Total assets (3)	-0,170	**0,422**	0,098
Equity/Total assets (3)	**0,796**	0,052	0,112
EBIT/Total assets (3)	**-0,675**	0,209	0,123
OPCF/Total assets (3)	**-0,596**	0,108	0,229
Year 4			
Ln assets (4)	0,174	**-0,458**	0,203
Financial assets/Total assets (4)	-0,080	0,339	**-0,455**
Equity/Total assets (4)	-0,113	0,178	**-0,535**
EBIT/Total assets (4)	-0,088	0,128	**0,792**
OPCF/Total assets (4)	-0,010	0,011	**0,922**
Variance explained by the factor:	26,29	13,05	11,59
Cumulative proportion of total variance:	26,29	39,33	50,93

Table 2. Median values of financial variables for failed firms

	Cluster 1		Cluster 2		Cluster 3		
Variable	**N**	**Median**	**N**	**Median**	**N**	**Median**	**K-W probability level**
Year 1							
LN ASSETS	11	12,41	6	11,87	8	11,32	0,0126**
FATA	11	8,19	6	57,03	8	14,24	0,0019***
ETA	11	-19,35	6	-3,12	8	-114,7	0,1669
EBIT	11	-4,49	6	-19,20	8	15,28	0,3451
Year 2							
LN ASSETS	13	12,21	6	11,35	9	11,13	0,0058***
FATA	13	2,41	6	84,61	9	15,06	0,0001***
ETA	13	-31,81	6	31,08	9	-69,79	0,346
EBIT	13	-11,33	6	-1,15	9	3	0,1398
OPCF	13	-0,08	6	-0,82	9	0	0,1951
Year 3							
LN ASSETS	8	12,11	2	11,81	7	11,49	0,3815
FATA	8	2,53	2	38,51	7	23,63	0,0381**
ETA	8	-39,44	2	-10,75	7	-44,34	0,7297
EBIT	8	-36,47	2	24,07	7	30,04	0,0198**
OPCF	8	-0,50	3	-0,21	7	0,34	0,0529*
Year 4							
LN ASSETS	3	12,10	2	11,73	4	12,14	0,946
FATA	3	6,16	2	23,23	4	1,71	0,2865
ETA	3	-56,01	2	-7,91	4	-40,74	0,4111
EBIT	3	-5,61	2	-21,42	4	18,23	0,0498**
OPCF	3	0,02	2	-0,24	4	0,56	0,0471**

,,*** denote significance at the 0,10, 0,05 and 0,01 p-level, respectively*

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Table 3. Rotated factor loadings for non-failed reorganizations

	Factor 1	**Factor 2**	**Factor 3**
Year 1			
Ln assets (1)	**0,545**	-0,419	-0,363
Financial assets/Total assets (1)	-0,312	0,425	**0,523**
Equity/Total assets (1)	0,448	**-0,562**	-0,306
EBIT/Total assets (1)	**-0,207**	0,159	0,155
Year 2			
Ln assets (2)	**0,599**	-0,541	-0,319
Financial assets/Total assets (2)	0,251	0,272	**0,838**
Equity/Total assets (2)	0,551	**-0,772**	0,021
EBIT/Total assets (2)	-0,339	**0,802**	0,123
OPCF/Total assets (2)	-0,183	**0,786**	0,016
Year 3			
Ln assets (3)	**0,825**	-0,214	-0,333
Financial assets/Total assets (3)	-0,297	-0,013	**0,852**
Equity/Total assets (3)	**0,896**	-0,072	0,062
EBIT/Total assets (3)	-0,176	**0,742**	-0,022
OPCF/Total assets (3)	0,167	**0,912**	0,010
Year 4			
Ln assets (4)	**0,827**	-0,208	-0,371
Financial assets/Total assets (4)	-0,196	-0,219	**0,859**
Equity/Total assets (4)	**0,915**	-0,213	0,032
EBIT/Total assets (4)	-0,432	**0,732**	0,170
OPCF/Total assets (4)	**-0,827**	0,242	0,095
Variance explained by the factor:	46,37	14,81	10,89
Cumulative proportion of total variance:	50,55	65,35	76,24

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Table 4. Median values of financial variables for non-failed reorganizing firms

		Cluster 1		Cluster 2	
Variable	**N**	**Median**	**N**	**Median**	**K-W probability level**
Year 1					
LN ASSETS	20	12,57	9	11,17	0,0016**
FATA	20	7,19	9	24,3	0,0022***
ETA	20	-2,64	9	-140,88	0,0019***
EBIT	11	-0,96	9	-3,29	0,9249
Year 2					
LN ASSETS	19	12,52	10	11,49	0,0132**
FATA	19	4,46	10	25,87	0,0018***
ETA	19	-19,86	10	-15,37	0,5509
EBIT	19	7,21	10	20,21	0,0896*
OPCF	20	0,13	10	0,24	0,5975
Year 3					
LN ASSETS	19	12,19	10	10,96	0,0051***
FATA	19	5,12	10	28,71	<0,0001***
ETA	19	-34,39	10	-46,17	0,7136
EBIT	19	17,74	10	17,13	0,7831
OPCF	20	0,2	10	0,16	0,9649
Year 4					
LN ASSETS	19	12,14	9	10,97	0,0034***
FATA	19	7,56	9	34,86	0,0002***
ETA	19	-18,52	9	-61,62	0,3132
EBIT	19	9,29	9	21,57	0,2477
OPCF	20	0,2	9	0,24	0,3704

,,*** denote significance at the 0.10, 0.05 and 0.01 p-levels, respectively*

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Table 5. Differences in median values between all clusters of failed and non-failed firms

Variable	K-W probability level
Year 1	
LN ASSETS	0,0011***
FATA	0,0001***
ETA	0,0133**
EBIT	0,6781
Year 2	
LN ASSETS	0,0012***
FATA	0,0001***
ETA	0,5671
EBIT	0,0056***
OPCF	0,2564
Year 3	
LN ASSETS	0,0346**
FATA	<0,0001***
ETA	0,9583
EBIT	0,0231**
OPCF	0,1079
Year 4	
LN ASSETS	0,0473**
FATA	0,0009***
ETA	0,6626
EBIT	0,1300
OPCF	0,0863*

, **, * denote significance at the 0.10, 0.05, and 0.01 p-levels, respectively*

Table 6. Rotated factor loadings for the sample firms

	Factor 1	**Factor 2**	**Factor 3**	**Factor 4**
1. Efficiency strategies				
Changing the manager	**0,54**	0,305	-0,16	0,121
Organizational changes	0,3	**0,746**	0,235	0,026
Changing the firm legal form	**0,52**	0,044	-0,14	-0,14
Improving planning of activities	**0,82**	-0,07	0,025	0,058
Improving control of activities	**0,78**	0,015	0,144	0,024
Focusing on core business	-0,31	**0,419**	0,185	0,079
2. Product strategies				
Improving production efficiency	0,16	0,428	**-0,57**	0,389
Focusing on marketing	0,14	0,129	0,03	**0,66**
Increasing revenue	-0,1	**-0,55**	0,039	0,254
3. Asset strategies				
Realization of fixed assets	-0,38	0,316	-0,23	**-0,47**
Realization of current assets	0,25	0,13	-0,11	**-0,66**
4. Expense strategies				
Cutting expenses	-0,27	**0,587**	-0,38	0,375
5. Finance strategies				
Additional deployment of equity	-0,07	-0,01	**0,565**	0,155
Searching for new sources of debt	0,04	0,248	**0,782**	0,084
Variance explained by the factor:	17,22	14,14	11,34	9,83
Cumulative proportion of total variance:	17,22	31,36	42,7	52,52

Notes: The table reports the factor loadings for reorganization strategies and the variance explained by the factor. Non-financial variables receive a value of 1 when the firm is using the strategy and 0 otherwise.

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Table 7. The percentage of strategies used in the three clusters of companies

	Cluster 1	**Cluster 2**	**Cluster 3**	**K-W probability level**
1. Efficiency strategies				
Changing the manager	0,17	0,00	0,36	0,0276**
Organizational changes	0,24	0,11	0,18	0,5015
Changing the firm legal form	0,10	0,00	0,64	<0,0001***
Improving planning of activities	0,17	0,21	0,73	0,0019***
Improving control of activities	0,24	0,32	0,73	0,0160**
Focusing on core business	0,38	0,26	0,09	0,1956
2. Product strategies				
Improving production efficiency	0,79	0,00	0,36	<0,0001***
Focusing on marketing	0,48	0,26	0,27	0,2349
Increasing revenue	0,10	0,37	0,09	0,0492**
3. Asset strategies				
Realization of fixed assets	0,28	0,16	0,18	0,5978
Realization of current assets	0,00	0,00	0,36	0,0001***
4. Expense strategies				
Cutting expenses	0,86	0,11	0,09	<0,0001***
5. Finance strategies				
Additional deployment of equity	0,17	0,37	0,09	0,1481
Searching for new sources of debt	0,00	0,16	0,00	0,0380**

, **, * denote significance at the 0.10, 0.05, and 0.01 p-levels, respectively*

Notes: The table reports the factor loadings for non-financial variables (presented in Chapter 3.2). Non-financial variables receive a value 1 when the firm is using the strategy and 0 otherwise. K-W level shows the significance of the Kruskal-Wallis non-parametric test statistic based on the Wilcoxon scores of the location of the distributions.

Table 8. Frequency distributions of firms

		Strategy clusters			
		1	2	3	Total
Financial paths of failed and non-failed firms					
Cluster 1, non-failed firms	Frequency	9	8	4	21
	Percentage	31,03	42.11	36.36	
Cluster 2, non-failed firms	Frequency	6	2	2	10
	Percentage	20.69	10,53	18.18	
Cluster 1, failed firms	Frequency	9	3	1	13
	Percentage	31,03	15.79	9,01	
Cluster 2, failed firms	Frequency	0	4	2	6
	Percentage	0.00	21,05	18.18	
Cluster 3, failed firms	Frequency	5	2	2	9
	Percentage	17,24	10,53	18,18	

Table 9. The mean values of background variables of three clusters

	Cluster 1	**Cluster 2**	**Cluster 3**	**K-W probability level**
Panel 1. Industry				
Production	0,38	0,21	0,36	0,6457
Transportation	0,07	0,21	0,09	0,5750
Service	0,24	0,21	0,27	0,7837
Construction	0,10	0,16	0,00	0,2226
Panel 2. Other information				
Gender of the manager:	0,28	0,16	0,18	0,3372
Firm legal form	0,41	0,32	0,27	0,4545
Payment default	0,55	0,42	0,45	0,6326
Failure rate	0,48	0,47	0,45	0,9975
Age of the firm	11,93	12,95	12,72	0,1121
Number of employees	5,7	8,2	10,5	0,6532
Remission rate	0,62	0,59	0,50	0,8944

,,*** denote significance at the 0.10, 0.05, and 0.01 p-levels, respectively*

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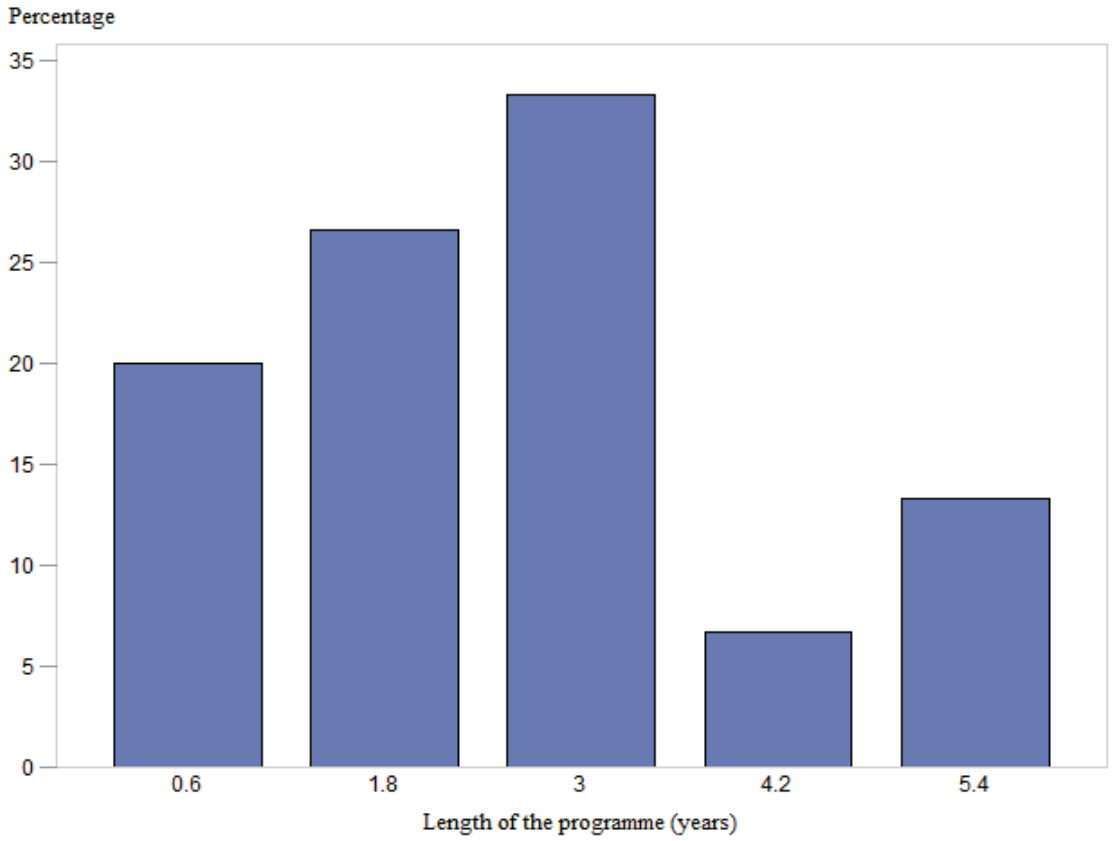
Figures

Figure 1. The length of the reorganization programs before reorganization interruption



Appendices

Appendix 1. Financial variables and equations

Profitability
EBIT = Ebit to total assets
where EBIT = Earnings before interest and taxes = Net income + interests + taxes

Liquidity
FATA = Financial assets to total assets
where financial assets = cash and equivalents + marketable securities + accounts receivable

Solvency
ETA = Equity to total assets
where equity = assets - liabilities

Cash flow
OPCF = OPCF to total assets
where OPCF = Net income + depreciation – increase in inventories – increase in accounts receivable + increase in accounts payable + increase in advances received – increase in advances paid – increase in accrued income and deferred expenses + increase in accrued expenses and deferred income

Size
LN ASSETS = Ln assets = Natural logarithm of total assets (years 1-4)

Appendix 2. Descriptive statistics of financial variables

Variable	Mean	Minimum	Maximum	Median	Standard deviation
Year 2000					
LN ASSETS	12,09	9,63	15,41	11,99	1,30
FATA	18,82	1,54	60,78	12,42	17,22
ETA	-58,08	-267,14	44,05	-22,08	93,60
EBIT	-3,25	-133,83	108,21	-2,73	52,20
Year 2001					
LN ASSETS	11,77	8,80	13,94	11,94	1,36
FATA	18,87	0,19	100	11,15	24,43
ETA	-86,19	-696,91	90,76	-21,11	198,67
EBIT	25,22	-67,76	344,04	2,78	79,93
OPCF	0,10	-2,11	3,26	0,07	1,13
Year 2002					
LN ASSETS	11,91	9,11	14,70	11,92	1,32
FATA	15,35	0,75	52,53	9,04	16,36
ETA	-93,11	-846,26	46,87	-36,32	212,91
EBIT	27,62	-84,74	245,34	16,33	80,65
OPCF	0,13	-3,38	2,45	0,19	1,22
Year 2003					
LN ASSETS	11,97	8,68	14,49	11,90	1,41
FATA	15,87	0,22	59,29	11,27	16,33
ETA	-66,29	-441,82	60,31	-34,34	128,45
EBIT	29,39	-53,04	300,27	11,98	74,62
OPCF	0,41	-0,61	3,77	0,20	0,95

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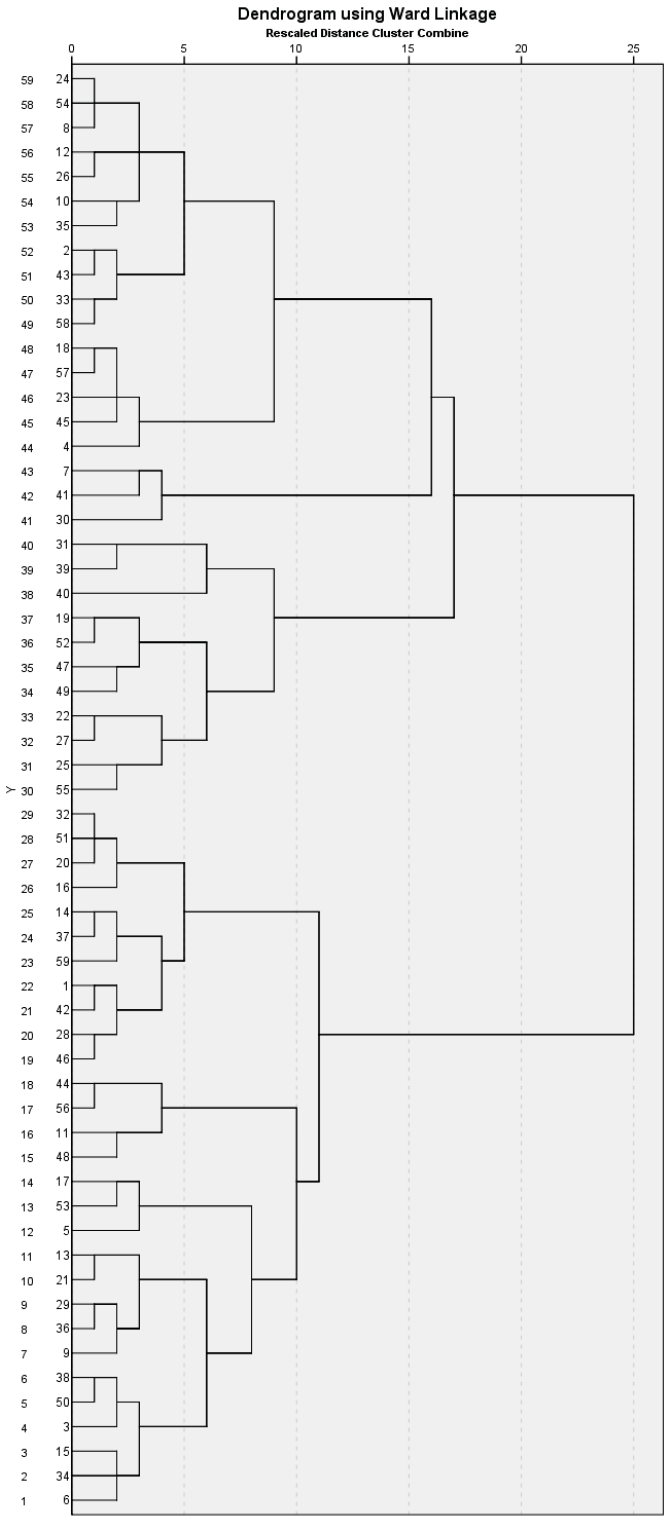
Appendix 3. Correlations of financial variables

Year 2000	**LN ASSETS**	**FATA**	**ETA**	**EBIT**	
LN ASSETS	1,0000	-0,3300**	0,5910***	-0,16330	
FATA	-0,3300**	1,0000	-0,13089	0,1047	
ETA	0,5910***	-0,13089	1,0000	-0,09634	
EBIT	-0,16330	0,1047	-0,09634	1,0000	
Year 2001	**LN ASSETS**	**FATA**	**ETA**	**EBIT**	**OPCF**
LN ASSETS	1,0000	-0,4257***	0,6121***	-0,4354***	-0,0369
FATA	-0,4257***	1,0000	0,0076	0,2333*	-0,2764**
ETA	0,6121***	0,0076	1,0000	-0,5452***	-0,3285**
EBIT	-0,4354***	0,2333*	-0,5452***	1,0000	0,1999
OPCF	-0,0369	-0,2764**	-0,3285***	0,1999	1,0000
Year 2002	**LN ASSETS**	**FATA**	**ETA**	**EBIT**	**OPCF**
LN ASSETS	1,0000	-0,3989***	0,6385***	-0,3795***	-0,1829
FATA	-0,3989***	1,0000	-0,2419	0,1212	-0,0840
ETA	0,6385***	-0,2419	1,0000	-0,3149**	-0,0991
EBIT	-0,3795***	0,1212	-0,3149***	1,0000	0,6321***
OPCF	-0,1829	-0,0840	-0,0991	0,6321***	1,0000
Year 2003	**LN ASSETS**	**FATA**	**ETA**	**EBIT**	**OPCF**
LN ASSETS	1,0000	-0,3669**	0,7152***	-0,5007***	-0,6090***
FATA	-0,3669**	1,0000	-0,1522	0,1359	0,2021
ETA	0,7152***	-0,1522	1,0000	-0,5254***	-0,7304***
EBIT	-0,5007***	0,1359	-0,5254***	1,0000***	0,7136***
OPCF	-0,6090***	0,2021	-0,7304***	0,7136***	1,0000

,,*** denote significance at the 0.10, 0.05, and 0.01 p-levels, respectively*

Appendix 4. Clusters of strategies



Appendix 5. Median values of financial variables in three clusters of firms

Variable	Number of firms	Cluster 1	Number of firms	Cluster 2	Number of firms	Cluster 3	K-W probability level
Year 1							
LN ASSETS	26	11,98	18	12,11	10	11,93	0,6888
FATA	26	14,68	18	13,66	10	8,43	0,4442
ETA	26	-33,31	18	-15,87	10	-29,30	0,8180
EBIT	26	-0,58	18	4,59	10	-18,40	0,1062
Year 2							
LN ASSETS	29	11,99	17	11,87	11	11,94	0,9818
FATA	29	9,52	17	13,05	10	12,98	0,5988
ETA	29	-29,55	17	-22,73	11	-8,06	0,8509
EBIT	29	6,35	17	-0,88	10	0,68	0,6540
OPCF	29	0,00	17	0,13	10	0,29	0,3065
Year 3							
LN ASSETS	24	11,63	15	12,00	7	12,47	0,0853*
FATA	24	10,80	15	9,30	7	5,45	0,7514
ETA	24	-33,17	15	-44,10	7	-7,73	0,5385
EBIT	24	17,37	15	17,74	7	5,35	0,7827
OPCF	24	0,36	15	0,23	7	0,11	0,2101
Year 4							
LN ASSETS	18	11,44	12	12,28	7	12,90	0,0938*
FATA	18	13,74	12	8,02	7	4,93	0,5103
ETA	18	-22,54	12	-50,06	7	3,31	0,3427
EBIT	18	16,71	12	9,56	7	6,49	0,4448
OPCF	19	0,29	12	0,24	7	0,15	0,5928

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THE EFFECT OF FINANCIAL AND NON-FINANCIAL INFORMATION ON SURVIVAL TIME OF FINNISH REORGANIZING FIRMS

The co-author of this essay is Nina Sormunen

Abstract: The objective of our study is to examine small entrepreneurial firms (n=167) filing a petition for reorganization under the Finnish Company Reorganization Act, which is comparable to Chapter 11 of the Bankruptcy Act in the United States. Approximately 77 percent of the final sample firms interrupted the reorganization process after filing a petition for reorganization. In particular, the study examines whether the financial paths are different within the firms filing for reorganization and whether the pre-filing financial and non-financial information or both are connected to survival time in reorganization. In this study it is assumed that longer the survival time the better the chance of success. The findings of this study indicate that different financial paths can be found within firms filing a petition for reorganization. The results also provide evidence on the connection between pre-filing financial information and survival time. Especially a pre-filing liquidity variable, may be connected to survival time in reorganization. Furthermore, the results show evidence on the connection between non-financial information and survival time. However, the combined model, including both financial and non-financial information does not outperform models based on financial or non-financial variables.

Keywords: reorganization; failure; entrepreneurial firms, non-financial characteristics, survival analysis, cluster analysis

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1. Introduction

Over the past several decades, the failure of firms has been the subject of much research and discussion at both academic and professional levels (Dimitras, Zanakis and Zopoudinis, 1996: Altman and Narayanan, 1997; Balcaen and Ooghe, 2006; Altman, Iwanicz-Drozdowska, Laitinen & Suvas, 2016). Inefficient processes have forced viable firms into bankruptcy and non-viable firms into reorganization, and the failure rate among reorganizations has been high. These inefficiencies cause large economic and social losses for stakeholders. Utilizing financial and non-financial information, this study examines small firms (=167) that filed a petition for reorganization under the Finnish Company Reorganization Act (FCRA), which is comparable to Chapter 11 of the Bankruptcy Act in the United States, during the years 2001 and 2002. The failure rate is high among the sample firms since approximately 77 percent failed after filing a petition for reorganization. The purpose of this study is to examine whether the financial paths are different within firms filling for reorganization (Hypothesis 1) and whether the pre-filing financial information, non-financial information (Hypothesis 2) or both (Hypothesis 3) are connected to the survival time in reorganization (Hypothesis 4). In this context, "financial path" refers to the development of financial variables for the pre-filing year, for the year of filing and the subsequent years.

This paper builds upon four distinct lines of research. First, prior studies report that static models, concentrating on a single observation of a firm (usually an annual account) (Johnson, 1970; Balcaen and Ooghe, 2006), may not work properly if the firms do not go through similar failure processes (Laitinen, 1991; Laitinen, 1993). In bankruptcy studies, different failure processes have already been found (see eg. Argenti, 1976; Weitzel and Jonsson, 1989; D'Aveni, 1989; Laitinen, 1991, 1993; Ooghe and De Prijcker, 2008; Laitinen, Lukason and Suvas, 2014) but, to our knowledge, within reorganization studies failure processes have not been studied. Second, because the traditionally used statistical models (probit and logistic regression) examine whether the firm is distressed in terms of certain covariates, survival analysis takes into account the time to an event, which can be for example bankruptcy. However, only a few reorganization studies have used survival analysis (see e.g., Partington, Russel, Stevenson and Torbey, 2001; Fisher, 2007; Wong, Partington, Stevenson and Torbey, 2007; Laitinen, 2013), while it is used more often in bankruptcy studies (see LeClere, 2000 for

a literature review). Third, our analysis is further motivated by accounting literature emphasizing the role of non-financial variables (see e.g., Poston, Harmon and Gramlich, 1994; Barniv, Agarwal and Leach, 2002; Fisher and Martel, 2004; Laitinen, 2013), and the combined effect of financial and non-financial variables (see e.g., Keasey and Watson, 1987, 1988; Peel and Peel, 1987; Shumway, 2001; Back, 2005) in failure prediction models. Finally, prior studies concentrate mainly on large firms whereas in this study only small firms are examined. The distress models estimated for larger firms cannot be applied to small firms, due to specific characteristics related to small firms (see e.g., Keats and Bracker, 1988; Altman, Sabato and Wilson, 2008). Moreover, the annual accounts in small firms may be more instable, unreliable, and manipulated because there may not be internal control systems in smaller firms (Balcaen and Ooghe, (2006), p.82).

The empirical findings of this study show that the financial paths within the firms filing a petition for reorganization are different. More precisely, six types of financial paths are found in terms of profitability, liquidity, solvency, cash flow, and size. Moreover, both failed and non-failed firms have followed all financial paths. Thus, the financial paths of firms filing for reorganization are different and the failures may be hard to distinguish from non-failures. Second, the findings of this study indicate that there may be a connection between pre-filing financial information and survival time in reorganization. One variable reflecting pre-filing liquidity was connected to survival time in reorganization. Third, the results show that one non-financial variable (industry: dummy manufacturing) was connected to survival time indicating that non-financial information may be connected to survival time. Fourth, the combined model, including both financial and non-financial variables, contains two statistically significant variables linked to liquidity for the pre-filing year and industry. However, the results are only marginally statistically significant, suggesting that the combined model does not outperform models based on financial or non-financial variables. Therefore, in addition to demonstrating that the financial paths within the failed and within the non-failed reorganizing firms are different, this study further contributes to the literature by revealing that pre-filing financial and non-financial information may be connected to survival time in reorganization. Furthermore, our study adds to the extant reorganization literature by focusing on small firms, which is very rare in prior reorganization research (see e.g., Laitinen, 2013). These results will increase academic understanding of the factors that affect the failure risk of a small entrepreneurial firm. The information provided by our study can be used by courts when deciding which firms could successfully reorganize, or by the stakeholders (entrepreneurs,

administrators, consultants) of the distressed firm when preparing a reorganization plan. Moreover, the results reported here may have relevance outside Finland for predicting reorganization failure for a small entrepreneurial firm.

The structure of the paper is as follows. The background, purpose, and contribution of the study are briefly discussed in the introductory section. The context of reorganization in Finland and a short literature review are presented in the second section. The data, variables, and statistical methods are outlined in the third section. In the fourth section the results of the statistical tests are reported. In the final section, the findings, limitations, and implications of the research are summarized.

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.2. Context of reorganizations and literature review

2.1 Reorganization process in Finland

In Finland, the reorganization proceedings of a business are stipulated by the Finnish Company Reorganization Act (47/1993; amendments up to 247/2007 included) that came into force on 8 February 1993. The purpose of reorganization proceedings is to rehabilitate a distressed debtor's viable business, to ensure its continued viability, and to facilitate debt arrangements. Additionally, reorganization proceedings can be instigated to avoid bankruptcy, which under Finnish legislation means liquidation. The difference between the Finnish and US systems is that in the United States, firms will first go into bankruptcy, and then into liquidation (Chapter 7) or reorganization (Chapter 11). The purpose of the reorganization proceedings is to produce a reorganization plan, including both business and debt restructuring, in order to recover the firm. According to Laitinen (2013) reorganization process includes five steps that are as following:

1 Filing a reorganization petition by the debtor or a creditor
2 Court's decision to open the proceedings
3 Preparation of the reorganization plan by an administrator appointed
4 Consideration of the proposed plan by a court
5 Confirmation of the plan by a court

However, it has been shown that the FCRA can be inefficient in terms of picking up and rejecting reorganization petitions (Laitinen, 2013). The courts approve approximately 60 percent of applications for reorganization, and of those about 75 percent lead to an approved reorganization plan. Many of these businesses, however, are unsuccessful in implementing the reorganization plan and go bankrupt during the program. According to Laitinen (2013), this occurs in up to 50 percent of the reorganizing firms. This failure rate is high when compared to Canada (Fisher and Martel, 1995) but similar to the consummation rate of Chapter 11 in the USA (Jensen-Conklin, 1992). The comparisons of different reorganization systems performed by Philippe and Partners, (2002) and Laakso (2012) reveal that the FCRA is somewhat different from other reorganization acts, even though it, like many other reorganization systems, is plan-based, and debt-restructuring plays a major role (for a comparison of different systems see

Couwenberg, 2001; Philippe et al., 2002;). There are several differences between the Finnish and United States systems. First, in the United States the debtor prepares the plan, while in Finland an administrator is appointed to prepare the plan (Laitinen, 2013). Second, the plan consummation does not occur immediately after the plan confirmation in the United States but changes to reorganization plan can still be made until the effective date. In Finland, the plans are consummated right after the plan confirmation. Third, the priority of creditors is also different in the United States than in Finland since there are more classes of creditors in the United States. (Laakso, 2012.)

2.2 A review of the literature

Over the past several decades, failure prediction has been one of the most widely addressed topics in accounting literature (see e.g., Altman and Hotchkiss, 2006; Balcaen and Ooghe, 2006; Lensberg et al. 2006). Both reorganization and bankruptcy studies have examined the topic, but because failure in reorganization refers usually to bankruptcy, the reorganization literature is strongly related to bankruptcy literature (Laitinen, 2013). The classic failure prediction models use a single observation (usually an annual account) to predict firm failure (Johnson, 1970; Balcaen and Ooghe, 2006), but these models have several problems. For example, such models require that relationships between predictors and between the event measure and predictors remain stable even though the statistical significance of predictors is shown to vary in the years prior to distress (Zavgren, 1983; Zavgren and Friedman, 1988; Laitinen, 2005). One single cross-sectional model cannot be optimal for every year, as the first symptoms and their timing vary between financially distressed firms (D'Aveni 1989; Laitinen, 1991). Another issue with these models is that a healthy firm may suffer from temporary difficulties and, as a result, be classified as failing. This evidence indicates that the prediction of company failure should not depend solely on a single annual account, but on multiple accounts, or on the change in financial position (Shumway, 2001).

To consider the time series behavior of financial variables, several bankruptcy studies have focused on failure processes of firms, while reorganization studies have largely neglected the topic. Previous bankruptcy studies have found various taxonomies of failure processes, most of which follow the one established in Argenti's (1976) seminal study. However, it should be noticed that there are various terms used in prior studies. The studies have used terms such as "trajectory" (Argenti, 1976; du Jardin, 2010; 2015), "patterns" (D'Aveni, 1989; Crutzen and

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Van Caillie, 2010), "process" (Laitinen, 1991; Ooghe and De Prijcker, 2008), "pathways" (Moulton, Thomas and Pruett, 1996), and "extinction" (Sheppard and Chowdhury, 2005). Many of these terms have been applied in different ways, which can affect the interpretation of the results. Some studies have attempted to find archetypes of failing firms without considering the time dimension, while other studies have assessed patterns of decline over time. In this study, only the term "financial path" is used. Moreover, this study takes into account the time dimension by using survival analysis to examine the impact of several variables on survival time in reorganization. In this study it is assumed that longer the survival time the better the chance of success. Survival analysis is primarily used in other fields of research, such as medicine, marketing, economics, and political science (Fisher, 2007), but rarely in accounting studies. In a study by LeClere (2000), 12 studies using survival analysis to predict financial distress were presented. Along with these studies, Luoma and Laitinen (1991), Catanach and Perry (2001), Shumway (2001), Turetsky and McEven (2001), and Duffie, Saita and Wang (2007) have used survival analysis to predict financial distress. Furthermore, survival analysis has been used to predict reorganization success by Partington et al. (2001), Fisher (2007), Wong et al. (2007), and Laitinen (2013), but the focus of these studies is different from this study. The benefit of using survival analysis is its ability to use censored observations and time-invariant or time-varying covariates to explain the survival time preceding financial distress (Laitinen, 2005).

Argenti (1976) conducted one of the first studies related to failure processes of firms. He found three different failure processes in terms of financial variables. The first process describes firms with poor performance from the beginning while the second process characterizes firms with fantastic figures before failure. The last failure process encompasses firms with good or excellent performance before sudden partial collapse, which is followed by a more stable phase, then a rapid decline to insolvency. After Argenti's study, D'Aveni (1989) examined a small sample of firms filing for bankruptcy and found three patterns of decline: lingering firms, gradually declining firms, and rapidly declining firms. Similarly, Laitinen (1991) identified three different failure processes for bankruptcy firms. On the other hand, Ooghe and De Prijcker (2008) found four failure processes in their study relating the fundamental causes of bankruptcy to the financial and non-financial consequences. However, none of the studies examined the financial paths of reorganizing firms. The financial paths of reorganizing firms differ from financial paths of bankruptcy firms because reorganizing firms have to be viable when filing for reorganization whereas bankruptcy firms are non-viable.

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2.2.1 Financial variables in failure prediction

Traditionally failure prediction literature is concentrated on financial variables, as they are hard objective measures based on publicly available information (see e.g., Micha, 1984; Laitinen, 1992; Dirickx and Van Landeghem, 1994). The most commonly used variables represent profitability, liquidity, leverage, cash flow, and efficiency of firms (Dimitras et al.1996). The variables are based on statistical or empirical considerations as the existing failure prediction literature suffers from a generally accepted theory of failure (Scott, 1981; Balcaen and Ooghe, 2006). However, it is stated that financial information may be problematic in smaller firms because the smaller firms may not have internal control systems (Keasey and Watson 1986; 1987) or the annual accounts may be adjusted by the auditor (Charitou and Lambertides 2003). Moreover, financial information is claimed to be more instable in failing firms (Dambolena and Khoury, 1980).

Several reorganization studies are based on the coalition behavior theory first adopted by Bulow and Shoven (1978), who used the theory to examine whether a firm would liquidate or continue under the US bankruptcy regime. Later, White (1980, 1984, 1989) applied coalition theory to reorganizations under the reorganization regime in the United States and claimed that the coalition of equity holders, secured creditors, and unsecured creditors affects the liquidation risk of a firm. The factors affecting the decision-making of coalitions are equity commitments, leverage, future profitability, secured debt in the capital structure and pay-off rate in reorganization compared to liquidation. Even though coalition theory is originally used to determine whether a firm would liquidate or continue under the reorganization procedure, it is also widely adopted in studies predicting reorganization success or failure. These studies have found that size, capital structure, liquidity, and profitability are important when examining which kind of firms should be selected into reorganization and which kind of firms will successfully implement their reorganization plans predicting firm failure (Fisher & Martel, 1995; Campbell, 1996; Frost-Drury, Greinke & Shailer, 1998; Routledge & Gadenne, 2000). However, when predicting success or failure during a reorganization program, financial restructuring used as a reorganization action should be taken into account. For instance, the findings of Routledge and Gadenne (2000) suggest that firms that are more profitable, more highly leveraged, and have higher short-term liquidity prior to reorganization, reorganize more successfully. Hence, pre-filing leverage appears to positively affect success during the reorganization program. These conflicting results may be due to debt restructuring (see also

Laitinen, 2013). Based on this discussion about failure paths and importance of financial variables, we propose the following hypotheses:

H1: There are different financial paths within firms filling for reorganization

H2: Pre-filing financial information is connected to survival time in reorganization

2.2.2 Non-financial variables in failure prediction

Although previous failure prediction studies primarily concentrate on financial variables, several studies suggest that non-financial variables may provide additional information to models based on financial variables (see e.g., Keasey and Watson, 1987, 1988; Peel and Peel, 1987; Poston et al., 1994; Shumway, 2001; Barniv et al., 2002; Fisher and Martel, 2004; Back, 2005). Non-financial information may not be exposed to manipulation, which is often the case with financial information. Especially in the case of very small firms, this can be critical (Balcaen and Ooghe, 2006). However, the number of reorganization studies focusing on non-financial variables is minimal and the results of the studies are mixed (see e.g., Routledge and Gadenne, 2000; Barniv et al., 2002; LoPucki and Doherty, 2002; Laitinen, 2013). The non-financial variables used in this paper are presented in more detail in the following sections.

A company's industry reflects the environment of a firm's business and the complexity of its business processes. However, evidence related to industry is mixed among the studies on reorganizations (Smith and Liou, 2007; Laitinen, 2013). While several studies claim that industry has a significant effect on failure (LoPucki, 1983; Hotchkiss, 1995; Campbell, 1996; Routledge and Gadenne, 2000; LoPucki and Kalin, 2001), LoPucki and Doherty (2002) did not find any industry effect.

In general, younger firms demonstrate higher failure rates (Laitinen, 2013). However, while bankruptcy studies have examined the age affect (see e.g., Argenti, 1976; Keasey and Watson, 1987; Shumway, 2001; Laitinen, 2005), prior studies on reorganization have rarely done so. The pioneering work by Argenti (1976) found that failure rates of newly founded firms and old firms without adequate ability to renew are high. Age was also found to be significant in research conducted by Laitinen (2005) and Altman, Sabato, and Wilson (2010). However,

studies by Keasey and Watson (1987) and Shumway (2001) did not find any significant age effect. In addition, the size of the firm affects the success of reorganization, as large firms are more likely to reorganize successfully (LoPucki, 1983; Eisenberg and Tagashira, 1994; Campbell, 1996).

Researchers such as Sundgren (1998) and LoPucki and Doherty (2002) have stated that there are differences in confirmation rates of reorganization plans among courts. Sundgren (1998) examined Finnish firms reorganizing under the FCRA and claimed that some courts might be more restrictive than others, which may affect the likelihood of reorganization in that particular court district. Similarly, LoPucki and Doherty (2002) examined reorganization in the bankruptcy courts of United States and found that failure rate in one particular court district is higher, which may be caused by the reorganization process itself, not the characteristics of firms.

In addition to examining the effect of non-financial variables separately, failure prediction studies have also explored the combination effect of non-financial and financial variables. Studies by Peel and Peel (1987), Keasey and Watson (1987; 1988), Shumway (2001), Back (2005), and Laitinen (2013) have found evidence that the best failure prediction model may be built upon a combination of financial and non-financial information. Based on the discussion above, we propose the following hypotheses:

H3: Non-financial variables are connected to survival time in reorganization

H4: Non-financial variables provide additional information to models related to financial variables when assessing survival time in reorganization

3. Research design and method

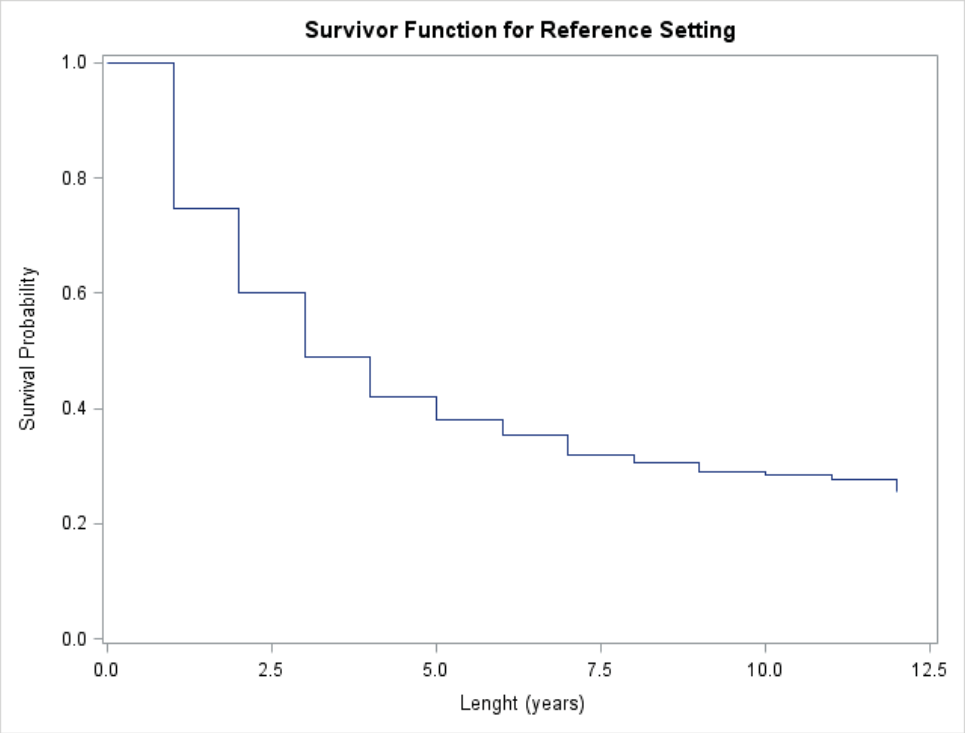
3.1 Data

The original sample used in this study consists of all limited companies (n=552) that filed for reorganization in 2001–2002 under the FCRA. This is about 91 percent of the cohort, which filed for reorganization in 2001 and 2002. However, the firms with insufficient financial information are excluded, leaving 167 firms. The status (survival or failure) of the firms is examined at the end of 2013 because the length of the reorganization programs varies between 5–10 years. The firms that exist at the end of 2013 are defined as successful; otherwise, reorganization is considered as failed.

The financial and non-financial information about the firms are obtained from the largest Finnish credit information company, *Suomen Asiakastieto Oy* (http://www.asiakastieto.fi). The data include published annual financial statements and background information about the firms relating to the research period, the accounting years 2000–2012. These firms are considered small because the median number of employees is 15 and the pre-filing net (annual) sales are 629,000 Euros. The sample includes only limited companies that are not publicly traded and that have published their financial statements.

In Figure 1, the actual cumulative survival function for the sample firms is presented. The function shows that the number of failures declines linearly in the first seven years after reorganization application. After the first seven years, about 30 percent of the firms survived. At the end of the research period, only 23.36 percent of reorganizing firms survived.

Figure 1. Actual survival function for the sample firms (N = 167)



3.2 Variables

The hypotheses of this study incorporate both financial and non-financial variables. Financial variables are used to examine whether the financial paths within the firms filing a petition for reorganization are different (H1) as well as to test the connection between pre-filing financial information and survival time in reorganization (H2). Non-financial variables are used to determine whether they alone (H3) or in conjunction with financial information (H4) are connected to survival time in reorganization.

The financial variables included in the study are profitability (EBIT to total assets, EBIT), liquidity (financial assets to total assets, FATA), solvency (equity to total assets, ETA), size (logarithmic assets, LN ASSETS), and cash flow (operating cash flow to total assets, OPCF). The financial data used consists of financial statements for the pre-filing year (-1), for the year

of filing (0), and for the subsequent years. To test Hypothesis 1, all financial variables are used, while only pre-filing values of variables are used to test Hypothesis 2, as the values of subsequent years are highly correlated. Only OPCF could not be presented for the pre-filing year, because the changes related to OPCF could not be calculated due to lack of data from the previous year. The distributions of variables are winsorized 5 percent from upwards and downwards (this cut-off point was the best of several alternatives compared). Moreover, logarithmic transformation is used for the size variable because its distribution is skewed. Because a large percentage of firms fail during the first years of reorganization, the financial statements are not available for all 12 years for all firms. The financial variables and LN ASSETS measuring the size of the firm are selected because they have been found to be important factors in prior bankruptcy theory and related empirical evidence (see e.g., Scott, 1981; Jones, 1987; Laitinen, 1991; Dimitras et al., 1996; Altman and Narayanan, 1997; Balcaen and Ooghe, 2006).

The non-financial variables reflect background information about the firm, its industry, and its reorganization process. To determine their effect on survival time (H3 and H4), we selected the following variables: industry (dummies: manufacturing and service), age of the firm, court in which the reorganization plan is confirmed (metropolis dummy: Helsinki, Espoo, or Vantaa), and number of employees. Industry is measured by two dummy variables referring to the service and manufacturing industries. The dummy variable is equal to 1 if the firm is operating in the particular industry and 0 otherwise. The age of the firm is calculated in months, from its founding year to the year of filing a reorganization petition. The court dummy (Helsinki, Espoo, or Vantaa) is 1 if the reorganization is processed in the courts of Helsinki, Espoo, or Vantaa, and 0 otherwise. The number of employees is calculated as the total number of employees at the time of filing. The variables that provide information about the stages of reorganization are reorganization proceedings, reorganization plan, reorganization plan interrupted, and reorganization finished. The dummies reflecting the stage in the reorganization process (dummies 6–9) are assigned a value of 1 if the firm has reached that particular stage in reorganization. The non-financial variables used in this paper are selected based on prior failure prediction studies, however, such studies using these variables are scarce (see e.g., Poston et al., 1994; Barniv et al., 2002; Fisher and Martel, 2004; Laitinen, 2013).

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3.3 Statistical methods

The financial paths of firms and the connection between the variables and survival time are examined with factor, cluster, and survival analyses. As a first step, the pre-filing financial variables are reduced to a small number of independent latent dimensions of the financial variables by using factor analysis. The number of factors is selected by using the eigenvalue-greater-than-one rule (K1 or Kaiser criterion, see Kaiser, 1960) indicating that the factors with eigenvalues greater than one are retained for interpretation. Moreover, orthogonal Varimax rotation is used as it leads to factors that are statistically linearly independent of each other. The Varimax solution refers to situations in which the variables have high loadings on the factor in question and low loadings on other factors. Therefore, the coefficient of correlation between the factors is zero and there is no multicollinearity. (Fabrigar, Wegener, MacCallum and Strahan, 1999.) Next, the rotated factor scores are used in cluster analysis to extract a taxonomy of firms and illustrate the differences between the clusters of firms. The rotated factor scores are chosen for the analysis because they are standardized and uncorrelated. The clustering method applied is hierarchical cluster analysis, in which the dissimilarities or distances between the objects are used when formulating the clusters. The distance method used in this study is Ward's (1963) minimum variance method, which minimizes the variance within the clusters at each stage of grouping. Thus, the clusters formed are as homogeneous as possible (Statsoft, 2001.) After the formulation of the clusters, the financial paths of firms are examined via the Kruskal-Wallis test. Similarly, the non-financial characteristics between the clusters of firms are tested via Kruskal-Wallis test.

Next, the connection between pre-filing financial information and survival time (H2) is examined by survival analysis using the Cox proportional hazards model. The factor scores representing the latent dimensions of pre-filing financial variables are used in the analysis. In this study, survival time is measured as the time from the filing of a petition for reorganization to the time of failure (bankruptcy) or successful implementation of the plan. The assumption is that the longer the survival time, the better the chance of success. The hazard function is estimated by using a method of maximizing the log likelihood function. We also use the Cox proportional hazards model to examine whether the non-financial variables either alone (H3) or in conjunction with the pre-filing financial variables (H4) are connected to survival time in reorganization.

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The hypotheses are assessed using various statistical tests. First, the significance of the coefficients is determined using the Wald test statistic. Goodness-of-fit is evaluated using the -2log likelihood function, the likelihood-ratio statistic, and the overall chi-square. The p-value of the test demonstrates whether the covariate effect is assumed to be different from zero when the p-value of the test is less than a conventional significance level. When these circumstances are met, at least one of the covariates is significant. The accuracy ratio (AR) is used to measure the accuracy of the estimated model in relation to the perfect model. The closer the AR is to 1, the higher the discriminative power of the model. (Sobehart et al., 2000).

To assess the sample-sensitivity of the hold-in classification results, a bootstrapping procedure is applied. 200 sub-samples are randomly chosen from the original sample and the Cox proportional models are estimated for each. The binary classification accuracy in each sub-sample is then calculated. However, due to lack of validation data, the statistical models used in this study should be considered explanatory rather than predictive models.

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4. Results

4.1 Descriptive statistics

The descriptive statistics for the sample firms are reported in Table 1. The table shows that 80 percent of the firms that file for reorganization are accepted to start reorganization proceedings and approximately 60 percent of these firms have a reorganization plan confirmed. However, 77 percent of all firms that filed for reorganization fail during the reorganization process only 23 percent complete their reorganization programs.

Table 1. Descriptive Statistics

Stage in reorganization	**N**	**Mean**
Petition for reorganization denied dummy	13	0,078
Withdrawal of the petition for reorganization dummy	10	0,060
Reorganization proceedings dummy	134	0,802
Reorganization program dummy	100	0,599
Interruption during the reorganization programme dummy	61	0,365
Interruption during the whole process dummy	128	0,767
Reorganization program completed dummy	39	0,234

Table 2 depicts firms' survival time in reorganization proceedings. According to the table, most of the firms fail during the first three years of reorganization and approximately 40 percent fail before the first year is over. The non-failed firms typically complete their reorganization programs 3–6 years after application. The program completion date is not available for 16 firms and therefore they are not included in the table.

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Table 2. Survival time in reorganization

	Non-failed firms		**Failed firms**	
Years	**Frequency**	**Percent**	**Frequency**	**Percent**
<1	0	0,00	51	39,84
1	1	2,56	25	19,53
2	1	2,56	19	14,84
3	5	12,82	11	8,59
4	1	2,56	6	4,69
5	5	12,82	4	3,13
6	3	7,69	5	3,91
7	1	2,56	2	1,56
8	1	2,56	2	1,56
9	3	7,69	1	0,78
10	2	5,13	1	0,78
11	0	0,00	1	0,78

The descriptive statistics of the financial variables for the years -1 and 0 are provided in Appendix 1. As shown, the failed firms are smaller than the non-failed firms, and most of the mean values of financial variables are slightly higher among the failed firms. According to the table, both the mean values of pre-filing liquidity as measured by FATA and pre-filing solvency as measured by ETA are slightly higher among the failed firms. Similarly, mean values of cash flow as measured by OPCF for the year of filing and profitability for the year of filing as measured by EBIT are higher among the failed firms. On the other hand, mean values of pre-filing profitability as measured by EBIT and ETA for the year of filing (year 0) are lower among the failed firms. However, the results of the Kruskal-Wallis test show no statistically significant differences between the groups of failed and non-failed firms. This may indicate that firms filing a petition for reorganization may be similar in terms of financial characteristics (see Barniv et al., 2002, p. 497). Therefore, pre-filing financial variables may not be useful when trying to distinguish potential failures from non-failures in terms of pre-filing financial figures.

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Appendix 2 presents the correlation matrix for the financial and non-financial variables for the year -1. Overall, correlations between the variables are modest. The highest correlation (0.576) occurs between the size of the firm (LN ASSETS) and number of employees. Thus, it is obvious that there are not any significant multicollinearity problems with the independent variables.

4.2 Testing hypothesis 1 to identify financial paths of firms

To examine the financial paths of firms, factor and cluster analyses are first used. The factor analysis technique is applied to condense the pre-filing financial variables into a small number of independent latent dimensions. The obtained factor scores are used in cluster analysis to extract a taxonomy of firms. Finally, the financial variables for the years -1, 0, and the subsequent years are examined to demonstrate the financial paths of firms. The differences between the financial variables in clusters of firms are examined using the Kruskal-Wallis test.

Table 3 shows the Varimax rotated factor loadings for the factors of financial variables. These factors represent latent financial paths. The number of factors is restricted to three, since using Kaiser criterion, the factors that have eigenvalues greater than one are retained for interpretation (Kaiser, 1960). According to the table, the three factors account for about 85 percent of the total variation of the initial variables for the firms. The highest loadings, noted in bold in the table, show that each factor has special characteristics of its own. Factor 1 is strongly associated to ETA while Factor 2 is connected to the liquidity of the company (FATA). Factor 3 links the size of the firm (ln assets) and EBIT. The loading of EBIT is negative.

Table 3. Rotated factor loadings

	Factor 1	Factor 2	Factor 3
FATA	-0,070	**0,898**	-0,178
LN ASSETS	0,002	-0,371	**0,839**
EBIT	-0,551	-0,369	**-0,588**
ETA	**0,946**	-0,125	0,031
Variance explained by the factor:	39,267	28,771	16,546
Cumulative proportion of total variance:	39,267	68,039	84,585

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After the factor analysis, the factor scores are used as inputs in cluster analysis to group the firms together. The cluster analysis method used here is hierarchical clustering, represented by a two-dimensional diagram known as a dendogram (Appendix 3). The horizontal axis of the dendogram shows the linkage distance, and each node in the graph (a new cluster formed) represents the distance at which the elements are linked together into a new single cluster. The dendogram shows that the number of six clusters is a good discriminator and any additional cluster would focus on marginal information that cannot be integrated into the other clusters (Greenacre, 1984; Lebart, Morineau and Warwick, 1984). Hence, six clusters are retained at a linkage distance of 0.10. The first cluster of failed firms contains 22 firms, while the second cluster includes 38 firms, the third 24, the fourth 33, the fifth 23, and the sixth cluster 17 firms. Thus, the Hypothesis 1 is supported due to a finding of six distinct independent clusters.

To examine the financial paths of firms, the median values of financial variables for the clusters of firms are presented in Appendix 4. The values are presented for the pre-filing year, for the year of filing, and the subsequent years. However, due to interruptions during the reorganization process, the number of firms is not the same for all years and therefore the financial paths only encompass firms continuing their reorganization processes. The Kruskal-Wallis test is applied to interpret the differences between the financial paths. The results of the test reveal significant differences in financial paths. More precisely, LN ASSETS is statistically significantly different between the financial paths every year, while ETA, EBIT, FATA, and OPCF are statistically significantly different between the paths during several years. The differences are particularly evident during the pre-filing year.

As stated earlier, the financial paths presented in Appendix 4 demonstrate the values of financial variables for the remaining firms, or the ones that did not fail during the reorganization process. As can be seen in the appendix, the first type of financial path characterizes large firms (n=22) with relatively stable financial variables. More precisely, LN ASSETS, EBIT, and FATA do not fluctuate much over the years. While ETATA is higher in year 10 in comparison to year -1, OPCF is lower in year 10 than in year -1. The second type of path represents relatively small firms (n=38) that have problems with solvency and profitability as well as sudden changes in liquidity and cash flow. ETATA is extremely low in year 10 (-45.19) and the lowest among the clusters of firms. The third type of financial path encompasses firms (n=34) with increasing liquidity and solvency but decreasing profitability. The cash flow increases through the years but in year 10, it collapses. The firms are relatively stable in terms

of LN ASSETS. The firms (n=33) following the fourth path show positive development through the years, and are relatively stable in terms of size and liquidity. While solvency and cash flow increase through the years, profitability decreases. Similarly, the fifth type of path characterizes firms (n=23) whose financial variables are stable or developing positively. Moreover, their cash flow and liquidity are the highest among the clusters of firms. However, the firms in Cluster 5 interrupt their reorganization process earlier than the other firms, evidenced by the fact that only five firms continued under the reorganization process after the first year. The sixth path represents firms (n=17) with drastically changing liquidity, cash flows, and size. Their solvency is increasing from extremely low to higher values, but profitability is decreasing through the years. The amount of interruptions during the first years is also high in this group, and after the second year in reorganization, only six firms continued their proceedings. The development of financial variables is summarized in Table 4. In table 4 it is shown that the financial paths of the firms in clusters are different.

Table 4. The development of values of financial variables

	Ln assets	**EBIT/TA**	**FATA**	**ETA**	**OPCF/TA**
Cluster 1	Increasing	Stable	Stable	Increasing	Decreasing
Cluster 2	Decreasing	Decreasing	Varying	Decreasing	Varying
Cluster 3	Stable	Decreasing	Increasing	Increasing	Varying
Cluster 4	Stable	Decreasing	Stable	Increasing	Increasing
Cluster 5	Stable	Stable	Stable	Increasing	Increasing
Cluster 6	Varying	Decreasing	Varying	Increasing	Varying

4.3 Additional tests

The analyses in the previous sections indicate that the financial paths are different within the firms. Next, the differences in non-financial information between all clusters are examined by using a Kruskal-Wallis test. The results of the test, reported in Appendix 5, show that the only statistically significant differences between all clusters of firms are age of the firm, number of employees, and number of reorganization programs confirmed. However, several critical observations should be noted. The firms following Path 5 (Cluster 5) seem to differ from other

firms in terms of several variables. With a mean age of only 20 months, they are the youngest. The number of employees is high as well. Moreover, the number of reorganizations started is lowest in this cluster (70 percent) and only 26 percent of those that file a petition for reorganization receive a confirmed reorganization plan. In contrast, in Cluster 2, 71 percent of the firms have their reorganization programs confirmed. In Cluster 5, only 13 percent of firms complete their reorganization programs. Furthermore, only 13 percent of the firms in this cluster are reorganized under the courts of Helsinki, Espoo, or Vantaa, which are the largest courts in Finland. In contrast, in Cluster 3 almost 40 percent of the firms are reorganized under these courts. Appendix 5 also shows that the oldest firms are in Cluster 1, where 32 percent of the firms complete their reorganization programs. The firms in Clusters 4 and 6 seem to be most similar in terms of non-financial variables.

4.4 Summary

The findings reported in the previous sections demonstrate that there are several differences among the firms following the six financial paths. The firms following Path 1 (Cluster 1) are more successful, as 32 percent have completed their reorganization programs. This may be because these firms are older, larger, and have relatively stable financial variables. For those firms following Path 2, the confirmation rate of reorganization plans is high (71 percent), but 76 percent have interrupted the reorganization process. One reason for the interruptions may be the larger number of confirmed reorganization plans. The characteristics of the firms may also be a factor, as the firms are smaller, have problems with solvency and profitability, and show varying liquidity and cash flows during the years. Meanwhile, the firms following Path 5 differ from other firms in terms of the age of the firm, number of employees, and courts. These firms interrupt the reorganization process earlier than other firms, and fully 87 percent of the firms interrupt the process. However, the firms following Path 5 have financial variables that are stable or developing positively.

4.5 Testing hypotheses 2, 3, and 4 to determine survival prospects of firms

In the current study, the Cox proportional hazards model is used to explain the survival prospects of firms. The factor scores obtained in factor analysis of pre-filing financial variables, as well as non-financial variables, are used in the analyses. Therefore, three different types of models are used. The first model uses the factor scores obtained in factor analysis of financial variables, the second includes non-financial information, and the third examines the combination effect of factor scores and non-financial information. The results of the statistical tests are presented in Tables 5–7.

Table 5. Statistical model based on the pre-filing financial information

Panel 1. Goodness-of-fit tests of the Cox regression model

- 2 Log Likelihood functions		Overall (score)		Change from previous block	
Model	Initial	Chi-square	p-value	Chi-square	p-value
1191,08	1197,463	6,481	0,09	6,387	0,094

Panel 2. Parameters of the model 1

	Coefficient	Wald-statistic	p-value
Factor 1	0,135	1,806	0,179
Factor 2	0,198	4,551	0,033**
Factor 3	-0,074	0,549	0,459

Panel 2 of Table 5 reveals that Factor 2 is highly significant. The significant positive relationship between Factor 2 and survival time indicates that the higher the value of this factor, the longer the survival time in reorganization. Factor 2 is especially linked to pre-filing liquidity, suggesting pre-filing liquidity may be connected to survival time. Thus, this result partially supports Hypothesis 2. In prior studies, similar results regarding the importance of pre-filing liquidity have been found (see Routledge and Gadenne, 2000; Laitinen, 2013). The goodness-of-fit tests of the model 1 imply that the Cox regression model differs only slightly from zero (Panel 1).

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Table 6. Statistical model based on the non-financial information

Panel 1. Goodness-of-fit tests of the Cox regression model					
- 2 Log Likelihood functions		Overall (score)		Change from previous block	
Model	Initial	Chi-square	p-value	Chi-square	p-value
1182,484	1197,463	14,684	,197	14,979	0,183

Panel 2. Parameters of the model 2			
Variable	Coefficient	Wald	p-value
Court	0,276	1,722	0,189
Age of the firm	-,013	1,404	,236
Number of employees	0,064	1,066	0,3083
Industry service	,000	,000	,999
Industry manufacturing	-,424	4,251	0,039**

Panel 2 of Table 6 shows a significant negative relationship between industry (dummy: manufacturing) and survival time, indicating that the likelihood of survival is higher when the industry is not manufacturing. Such a result partially supports Hypothesis 3. Previous research demonstrates that industry classification has been found to be a significant predictor of the reorganization outcome (see e.g., LoPucki, 1983; Hotchkiss, 1995; Campbell, 1996). However, goodness-of-fit tests of the model 2 imply that the Cox regression model does not differ from zero (Panel 1).

Table 7. Statistical model based on financial and non-financial information

Panel 1. Goodness-of-fit tests of the Cox regression model

- 2 Log Likelihood functions		Overall (score)		Change from previous block	
Model	Initial	Chi-square	p-value	Chi-square	p-value
1178,174	1197,463	19,348	0,152	19,289	0,154

Panel 2. Parameters of the model 3.

Variable	Coefficient	Wald	p-value
Court	0,280	1,737	0,188
Age	-0,011	0,937	0,333
Number of employees	0,072	1,075	0,2844
Manufacturing	-0,361	2,985	0,084*
Service	0,079	0,089	0,765
Factor 1	0,096	0,862	0,353
Factor 2	0,184	3,516	0,061*
Factor 3	-0,058	0,241	0,624

Panel 2 of Table 7 indicates that the results of the combined model do not outperform the financial and non-financial models, because the only statistically significant variables are Factor 2 and industry (dummy: manufacturing). These are the same variables as in models 1 and 2. Moreover, industry (dummy:manufacturing) is only marginally significant. Thus, the empirical evidence does not support the hypothesis 4. This result is not consistent with prior literature emphasizing the combination effect of financial and non-financial variables in failure prediction models (see e.g., Peel and Peel, 1987; Keasey and Watson, 1987, 1988; Shumway, 2001; Back, 2005). The goodness-of-fit tests of the model 3 imply that the Cox regression model does not differ from zero (Panel 1).

4.6 Classification accuracy of the models

Table 8 shows the classification accuracies for the three types of models. Model 1 contains pre-filing financial information, model 2 non-financial information and model 3 is a combined model. The classification accuracies for the 200 bootstrapping samples and the estimation sample are presented in Panels 1–3. The bootstrapping samples are randomly selected so that

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the proportion of failed firms varies across the samples, reflecting real-world conditions, where the proportion of failed firms is not constant or known. Panel 4 shows more general classification accuracy in terms of the accuracy ratio (AR).

Table 8. Classification accuracy of the models

	Model 1	Model 2	Model 3
Panel 1. Correctly classified non-failed firms (n=28)			
Estimation sample	1,000	1,000	1,000
Lower quartile	0,922	0,922	0,922
Median	0,945	0,945	0,945
Upper quartile	0,964	0,964	0,964
Panel 2. Correctly classified failed firms (n=139)			
Estimation sample	0,796	0,796	0,796
Lower quartile	0,439	0,439	0,441
Median	0,468	0,470	0,473
Upper quartile	0,571	0,571	0,587
Panel 3. Overall classification accuracy (%)			
Estimation sample	0,873	0,873	0,873
Lower quartile	0,689	0,689	0,689
Median	0,708	0,708	0,719
Upper quartile	0,755	0,755	0,762
Panel 4. Accuracy ratio (AR) in the estimation sample	0,990	0,978	0,968

In bootstrapping samples the firms are first divided into two groups in terms of cut-off value to test the classification accuracy of the models. The cut-off value is calculated from the survival function representing the survival time, denoting which firms are expected to fail and which are expected to survive. The cut-off value is chosen to be 0.77, which is the cut off point for failed and non-failed firms in the estimation sample. Therefore, firms with a probability of survival greater than 0.77 are expected to survive and the firms with a probability of survival equal or lower to 0.77 are expected to fail.

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According to the results presented in Table 8, the financial, non-financial, and combined models perform equally in the estimation sample. All models correctly classify all non-failed firms and approximately 80 percent of failed firms. Overall classification accuracy is 87 percent. In the bootstrapping samples, the financial and non-financial models are only slightly outperformed by the combined model when the overall classification accuracy and the classification accuracy of failed firms are compared. The classification accuracies are very low in bootstrapping samples, especially among failed firms (0.439-0,587). However, ARs in the estimation sample are very high for all models, although it is highest for the model 1, approximately 99 percent.

5. Summary and discussion

In this paper we examine Finnish small firms (n=167) filing a petition for reorganization under the FCRA. More precisely, the financial paths of reorganizing firms and the connection between pre-filing financial and non-financial variables and survival time in reorganization are examined. This pre-filing information reflects the financial position of the firm before filing for reorganization. Our empirical analysis is motivated by the documented differences between failure processes of bankruptcy firms. Moreover, the existing accounting literature suggests that non-financial information should be taken into account when predicting reorganization outcome.

Our empirical findings indicate that six financial paths can be found in terms of pre-filing profitability, solvency, liquidity, size, and cash flow. This indicates that financial paths, rather than a single annual account, should be considered when predicting failure in reorganization. Thus, the Hypothesis 1 is supported. The findings further imply that the pre-filing financial information is at least partially connected to survival time since a pre-filing liquidity variable is statistically significant. This evidence supports hypothesis 2 partially. Similarly, one non-financial variable, industry (dummy: manufacturing), is statistically significant in model 3, indicating that the likelihood of survival is higher when the industry is not manufacturing. Thus, the hypothesis 3 is as well partially supported. The hypothesis 4, combining pre-filing financial information and non-financial information, is not supported, as there are two marginally statistically significant variables in the model. These variables are industry (dummy: manufacturing) and a pre-filing liquidity variable. Therefore, the combined model does not outperform the financial model. These findings can be used by courts when examining which types of firms would be able to successfully reorganize and by stakeholders when preparing a reorganization plan. The goodness-of-fit tests show that in terms of chi-square statistics, the model related to financial information outperforms the non-financial and combined models.

We acknowledge several limitations in our empirical analysis. First, our sample consists of small limited companies. Therefore, our findings may not be applicable to larger firms or proprietorships and partnerships. Second, the sample of the study was small and we

concentrated only on firms filing for reorganization during two years. Therefore this study is more exploratory in nature and aims to help building theory. In further research, larger sample size could be applied by using cohorts from several years. Third, the samples for the post-filing years were unequal due to interrupted reorganizations. Hence, the financial variables demonstrated the financial paths of the remaining firms only. Finally, the study focused only on Finnish firms, and therefore, it is uncertain to which extent our results apply in other settings.

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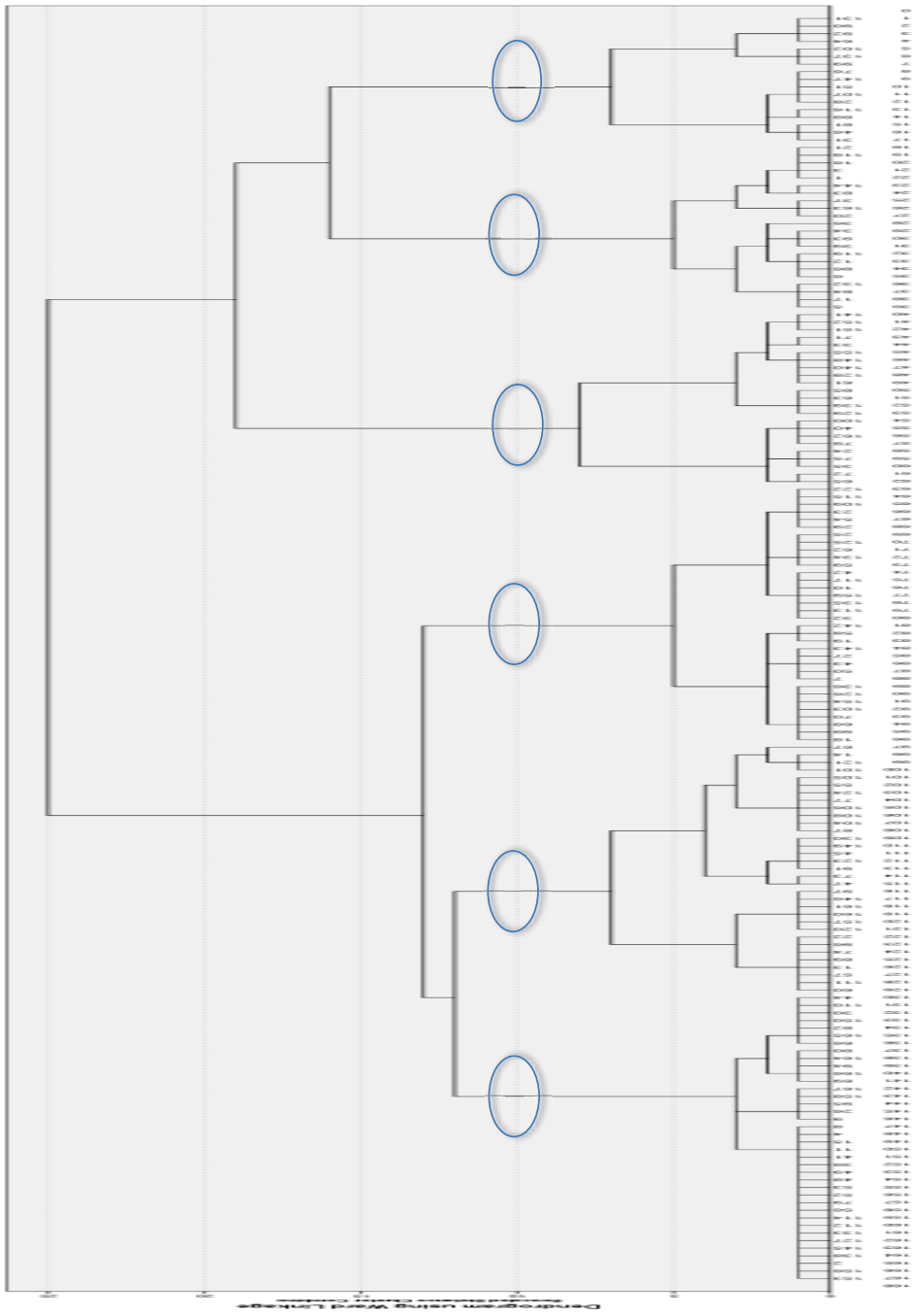
Appendix 1.

	Failed						Non-failed						
Variable	**Mean**	**Std Dev**	**Minimum**	**Maximum**	**N**	**Median**	**Mean**	**Std Dev**	**Minimum**	**Maximum**	**N**	**Median**	**KW test results**
FATA -1	30,078	22,585	2,490	77,394	113	23,153	24,598	19,074	2,490	77,394	33	20,504	0,2506
FATA 0	27,537	21,249	2,782	80,736	75	23,019	29,563	20,656	2,782	80,736	37	23,314	0,4673
OPCF 0	88,356	67,905	3,743	286,274	74	78,032	95,013	81,320	3,743	286,274	37	75,472	0,8708
LN ASSETS -1	13,073	1,193	11,198	15,623	113	12,918	13,409	1,343	11,198	15,623	33	13,445	0,1949
LN ASSETS 0	12,961	1,281	10,895	15,616	76	12,857	13,323	1,276	10,895	15,616	37	13,175	0,1763
EBIT -1	6,090	3,759	1,662	17,136	113	4,944	6,977	4,396	1,662	17,136	33	6,158	0,3246
EBIT 0	7,365	4,349	1,156	15,218	76	6,572	7,046	3,795	1,156	15,218	37	6,424	0,8881
ETA -1	-10,927	28,085	-79,514	27,910	113	-0,853	-16,352	30,820	-79,514	27,910	33	-9,015	0,3603
ETA 0	-49,944	61,162	-226,049	27,823	76	-30,583	-43,704	73,650	-226,049	27,823	37	-21,410	0,2142

Appendix 2.

	Court	Age	Number of employees	Manufacturing	Service	ETATA	EBITTA	LN ASSETS	FATA
Court	1	0,30079	0,01342	0,1144	0,04283	0,01963	0,01962	0,02569	-0,19063
		<.0001	0,8633	0,141	0,5826	0,814	0,8142	0,7582	0,0212
Age	0,30079	1	0,43686	0,19838	-0,07799	0,00229	0,00322	0,38561	-0,07726
	<.0001		<.0001	0,0102	0,3164	0,9781	0,9692	<.0001	0,354
Number of employees	0,01342	0,43686	1	0,25195	-0,15566	0,06606	-0,07912	0,57567	0,00013
	0,8633	<.0001		0,001	0,0446	0,4283	0,3425	<.0001	0,9988
Manufacturing	0,1144	0,19838	0,25195	1	-0,3071	-0,09054	0,11671	0,24624	-0,07062
	0,141	0,0102	0,001		<.0001	0,2771	0,1607	0,0027	0,397
Service	0,04283	-0,07799	-0,15566	-0,3071	1	0,06589	0,16073	-0,13127	-0,10352
	0,5826	0,3164	0,0446	<.0001		0,4294	0,0526	0,1143	0,2137
ETATA	0,01963	0,00229	0,06606	-0,09054	0,06589	1	-0,35574	0,1927	-0,06635
	0,814	0,9781	0,4283	0,2771	0,4294		<.0001	0,0198	0,4262
EBITTA	0,01962	0,00322	-0,07912	0,11671	0,16073	-0,35574	1	-0,17445	-0,00514
	0,8142	0,9692	0,3425	0,1607	0,0526	<.0001		0,0352	0,9509
LN ASSETS	0,02569	0,38561	0,57567	0,24624	-0,13127	0,1927	-0,17445	1	-0,32611
	0,7582	<.0001	<.0001	0,0027	0,1143	0,0198	0,0352		<.0001
FATA	-0,19063	-0,07726	0,00013	-0,07062	-0,10352	-0,06635	-0,00514	-0,32611	1
	0,0212	0,354	0,9988	0,397	0,2137	0,4262	0,9509	<.0001	

Appendix 3.



Appendix 4.

Variable	N	Cluster 1	N	Cluster 2	N	Cluster 3	N	Cluster 4	N	Cluster 5	N	Cluster 6	K-W probability level
ETATA -1	22	-6,14	17	-12,91	34	6,73	33	0,30	23	-7,10	17	-55,62	0,0001***
ETATA 0	16	-33,06	34	-34,55	22	-2,62	22	-41,20	10	-18,91	9	-115,88	0,0012**
ETATA 1	14	-13,93	26	-4,31	17	-7,25	19	6,19	5	-57,93	7	-20,90	0,0326**
ETATA 2	11	-8,91	17	-6,17	12	7,49	12	6,28	5	-75,42	5	-8,01	0,107
ETATA 3	9	-9,96	13	10,02	10	3,45	13	7,63	4	-83,78	6	-16,56	0,0386**
ETATA 4	9	-5,78	13	8,46	8	12,53	13	18,50	4	-50,90	6	-14,21	0,0724*
ETATA 5	9	5,99	12	15,77	9	12,53	10	22,68	4	-15,37	4	-1,15	0,4013
ETATA 6	9	8,94	14	11,53	10	19,04	11	22,18	4	8,04	4	29,90	0,6078
ETATA 7	9	0,25	12	3,14	7	32,40	10	16,61	3	43,97	4	37,59	0,4065
ETATA 8	9	-10,09	9	-4,38	6	25,50	10	17,45	4	16,92	3	83,97	0,1705
ETATA 9	8	6,31	10	12,36	5	31,87	8	21,49	3	35,14	2	59,32	0,1867
ETATA 10	6	10,90	4	-45,19	5	38,78	3	15,34	2	38,27	1	52,73	0,3187
EBITTA -1	22	3,53	17	5,39	34	4,62	33	6,15	23	4,48	17	12,34	0,0001***
EBITTA 0	16	6,23	34	6,25	22	5,34	22	8,37	10	3,93	9	11,82	0,0089***
EBITTA 1	14	4,42	26	2,82	17	3,91	19	4,19	5	0,83	7	4,28	0,2973
EBITTA 2	11	4,07	17	2,76	12	2,28	12	2,14	5	1,01	5	2,01	0,0533*
EBITTA 3	9	2,85	13	3,17	10	3,26	13	2,22	4	1,19	5	1,65	0,6456
EBITTA 4	9	3,96	13	3,39	8	2,62	13	2,63	4	0,64	5	3,18	0,4344

EBITTA 5	9	2,73	12	3,61	9	2,34	10	5,41	4	0,18	4	1,34	0,0593*
EBITTA 6	9	4,51	14	3,02	10	3,19	11	4,30	4	2,34	4	2,28	0,5021
EBITTA 7	9	3,65	12	1,93	7	5,28	10	3,30	3	8,51	4	0,71	0,1238
EBITTA 8	9	2,73	9	2,81	6	1,90	10	2,52	3	1,70	3	0,83	0,9005
EBITTA 9	8	2,88	10	1,62	5	3,14	8	2,66	3	9,24	2	3,38	0,9795
EBITTA 10	6	3,33	4	2,76	5	2,99	3	3,48	2	3,93	1	1,83	0,9662
FATA -1	22	0,25	17	0,26	34	0,09	33	0,28	23	0,68	17	0,14	0,0001***
FATA 0	16	0,30	34	0,23	21	0,09	22	0,30	10	0,77	9	0,23	0,0001***
FATA 1	14	0,15	26	0,31	17	0,16	19	0,36	5	0,56	7	0,13	0,0001***
FATA 2	11	0,24	17	0,30	12	0,18	12	0,39	5	0,67	5	0,22	0,0046***
FATA 3	9	0,39	13	0,25	10	0,24	13	0,33	4	0,68	6	0,66	0,0790*
FATA 4	9	0,27	13	0,35	8	0,36	13	0,30	4	0,75	6	0,68	0,1348
FATA 5	9	0,33	12	0,34	9	0,29	10	0,25	4	0,82	4	0,28	0,0879*
FATA 6	9	0,19	14	0,28	10	0,21	11	0,27	4	0,75	4	0,32	0,0639*
FATA 7	9	0,17	12	0,26	7	0,29	10	0,26	3	0,79	4	0,29	0,2021
FATA 8	9	0,22	9	0,35	6	0,20	10	0,24	4	0,76	3	0,12	0,0621*
FATA 9	8	0,23	10	0,48	5	0,27	8	0,31	3	0,83	2	0,14	0,1601
FATA 10	6	0,24	4	0,39	5	0,27	3	0,23	2	0,76	1	0,47	0,1659
OPCF 0	16	91,60	32	63,49	22	35,33	22	64,05	10	138,09	9	76,33	0,0026*
OPCFTA 1	14	30,99	26	48,63	17	35,05	19	18,73	5	283,15	7	12,95	0,0698*
OPCFTA 2	11	40,13	17	58,71	12	72,54	12	63,75	5	117,08	5	34,98	0,181

OPCFTA 3	9	53,56	13	71,24	10	80,32	13	60,44	4	189,24	6	61,84	0,0594*
OPCFTA 4	9	47,01	21	34,62	12	56,56	17	33,11	5	283,15	7	0,00	0,0062***
OPCFTA 5	12	49,69	14	90,78	12	50,15	11	75,14	4	190,57	6	99,88	0,1015
OPCF 6	9	102,47	14	64,69	10	63,66	11	59,10	4	250,88	4	20,55	0,0687*
OPCFTA 7	9	63,41	12	60,24	7	46,74	10	81,87	3	127,48	4	5,28	0,2818
OPCFTA 8	9	98,16	9	82,26	6	47,09	10	70,82	4	340,00	3	11,84	0,7237
OPCFTA 9	9	103,10	9	82,26	6	37,52	9	65,93	4	348,50	3	11,84	0,5341
OPCFTA 10	7	64,18	4	63,54	5	22,57	4	91,83	2	348,50	1	158,18	0,5484
LN ASSETS -1	22	15,13	17	13,39	34	13,57	33	12,10	23	12,38	17	12,95	0,0001***
LNASSETS 0	16	15,18	34	12,99	22	13,58	22	11,80	10	11,40	9	13,45	0,0001***
LNASSETS 1	14	14,82	26	13,04	17	13,28	19	11,93	5	12,75	7	13,28	0,0001***
LNASSETS 2	11	14,81	17	12,98	12	13,26	12	11,99	5	12,62	5	13,71	0,0001***
LNASSETS 3	9	14,88	13	13,09	10	12,97	13	12,39	4	11,89	6	13,97	0,0002***
LNASSETS 4	9	14,79	13	13,31	8	12,99	13	12,48	4	11,80	6	14,09	0,0003***
LNASSETS 5	9	15,06	12	13,33	9	13,50	10	12,45	4	12,04	4	14,00	0,0003***
LNASSETS 6	9	15,32	14	12,79	10	13,31	11	12,35	4	12,03	4	13,87	0,0005***
LNASSETS 7	9	14,95	12	12,76	7	13,39	10	12,26	3	11,86	4	13,52	0,0015**
LNASSETS 8	9	14,96	9	12,28	6	13,22	10	12,38	4	11,64	3	13,59	0,0249**
LNASSETS 9	8	15,24	10	12,29	5	13,36	8	12,40	3	11,83	2	12,86	0,0057***
LNASSETS 10	6	15,34	4	11,12	5	13,47	3	12,24	2	12,59	1	10,92	0,0042***

Appendix 5

	Cluster 1	**Cluster 2**	**Cluster 3**	**Cluster 4**	**Cluster 5**	**Cluster 6**	
Variable	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**	**Mean**	**K-W probability test**
Court	0,273	0,211	0,382	0,273	0,130	0,235	0,3882
Reorganization program finished	0,318	0,237	0,235	0,212	0,130	0,294	0,7512
Reorganization program	0,636	0,711	0,647	0,606	0,261	0,647	0,0195**
Age of the firm (months)	33,227	24,658	23,559	20,545	20,000	20,765	0,0816*
Reorganization proceedings	0,727	0,868	0,794	0,848	0,696	0,824	0,5550
Reorganization interrupted	0,682	0,763	0,765	0,788	0,870	0,706	0,7512
Number of employees	35,25	8,35	7,50	3,00	35,00	7,65	0,001***