

TURNAROUND STRATEGIES AND POST-DISTRESS PERFORMANCE

AN EMPIRICAL STUDY OF EUROZONE

YIYOU WANG

YUN ZHU

Master Thesis

Stockholm School of Economics

2019



Turnaround Strategies and Post-distress Performance¹:

An Empirical Study of Eurozone

Abstract:

We extend the study of turnaround plans and distressed securities into the eurozone markets and perform an empirical analysis on relationships between turnaround plans and post-distress performance of distressed firms, using 88 distress cases picked based on Altman (1983)'s Z''-score. We find that in spite of industry growth influence, the financial restructuring is negatively related to the possibilities of the firm's recovery of Z''-score, operating margin and EBITDA, for which financial contract reconstructing and new financing resource are more responsible. Portfolio restructuring shows an adverse relationship with the Z''-score recovery but no significant association with operating margin and EBITDA recovery. We use stock price resurgence to assess the post-distress market performance, where our results suggest organizational restructuring has a negative relationship with the firm's post-distress positive return. Management turnover and blockholder change display little evidence of saving the distressed firms.

Keywords:

Distressed firms, Z''-score, Turnaround strategies, Corporate restructuring, Post-distress performance

Authors:

Yiyu Wang (41261)

Yun Zhu (41247)

Tutors:

Michael Halling, Associate Professor, Department of Finance

Examiner:

Jungsuk Han, Associate Professor, Department of Finance

Master Thesis

MSc Program in Finance

Stockholm School of Economics

© Yiyu Wang and Yun Zhu, 2019

¹ Acknowledgement:

We would like to thank Michael Halling for providing continuous guidance and advices on this thesis, especially for his detailed and quick response. Mental support from Daniel Kang, other friends and family is appreciated as well.

Contents

Section 1. Introduction	1
Section 2. Literature Review	4
2.1 Predicting Financial Distress Condition	4
2.2 Turnover Strategies and Actions	5
2.3 Restructuring and Performance	5
Section 3. Hypotheses.....	7
Section 4. Methods and Data	10
4.1 Sample Selection	10
4.2 Variables	12
4.3 Model Review.....	13
Section 5. Empirical Analysis.....	16
5.1 Sample Descriptive Statistics	16
5.2 Results and Analysis	20
5.2.1 Recovery and Different Restructuring Plans	21
5.2.2 Recovery and Different Financial Restructuring Plans	25
5.2.3 Market Performance and Different Recovery Plans	27
Section 6 Robustness Check.....	32
6.1 Different Industries.....	32
6.2 Alternative Specifications.....	33
6.3 Sample Adjustment.....	34
6.4 Revised Regression Method – Logit Regression with PML	34
6.5 Summary.....	34
Section 7. Conclusion.....	39
References	41
Appendix	45

Section 1. Introduction

Financial distress condition of firms has been a critical issue to investors and the other stakeholders, especially under the financial crisis, which helps to draw more attention to distressed securities in the financial market. The securities are labeled as distressed when the issuer is going through a deteriorated financial condition or bears high possibilities of default on debt payments, which can be shown by credit rating downgrade (BarclayHedge, 2012). Firms bearing too high distress risk would usually be delisted from the exchange markets or even go into liquidation, while some firms manage to recover through various kinds of restructuring measures or a sound insolvency plan. An increasing number of funds, especially the vulture investors, follow strategies of buying distressed securities at relatively low prices in order to obtain extra profit when those distressed firms turn around. Research on the post-bankruptcy performance and mechanism of restructuring during the distress period has been gaining its popularity, which could be of great help to support the development and enhancement of investment strategies.

It remains unsettled whether re-emerged firms outperform themselves before turnaround measures are taken. Eberhart, Altman, and Aggarwal (1999) investigate the equity performance of re-emerged firms between 1990 and 1993, proving the significance of excess return over the first 200 days after re-emergence in the US markets. However, Ahmad, Kadir, and Hamzah (2008) find negative returns after re-emergence in the Malaysia market. In terms of accounting performance, Hotchkiss (1995) concludes that restructuring actions during bankruptcy do not benefit post-bankruptcy performance regarding operating margin and operating income. And findings regarding determinants on post-bankruptcy performance also vary to a great extent. Vulture investors' involvement in a firm's management is proved to spur its re-emergence (E. Hotchkiss & Mooradian, 1997), while CEO retainment is proved to be positively related to inferior performance (Hotchkiss, 1995). Other restructuring actions like debt restructuring have substantial effects based on different results from most literature².

A large proportion of research on post-bankruptcy performance exclusively focuses on the US market with the assistance of complete databases, while research on other markets is relatively rare. Most current research on European markets is focused on the comparison of bankruptcy codes. E. Hotchkiss, John, Thorburn, and Mooradian (2008) compare bankruptcy codes of UK, France, Germany, Sweden, and Japan apart from the study of the US' bankruptcy code, followed by Lücke and Rudolf (2010)³. However, not much effort has been put on the post-distress performance of the firms in the European markets. Enlightened by the trends and the gaps above, we raise our main research topic

² Further details are provided in Section 2.

³ Lücke and Rudolf ((2010)) studies differences between the bankruptcy codes of the UK and the US and concluded that later restructuring leads to lower recovery rate for creditors in UK.

on whether the turnaround methods could help the European firms recover from their financial distress condition.

We focus on non-financial firms listed on the Euronext exchange and Deutsche Börse from 2004 to 2018, ensuring all the firms are from eurozone areas and use the euro as their currency. Based on the financial condition measured by Altman's Z'' -score, we obtain 196 distress cases after dropping the firms with invalid data. However, since the annual reports and company news of part of the distressed firms, which are necessary for restructuring plan analysis, are not available due to their mergers to other firms, privatization or bankruptcy, we could get only 88 distress cases for our study in the end.

All the financial data and stock prices for Z'' -score calculation and regressions are grabbed from Thomson Reuters Datastream. The restructuring plans and management information are collected manually from firms' annual reports, announcements and release news. We first gather the important company events for each firm from its annual report and disclosure and classify those events into management change, blockholder change, financial restructuring, portfolio restructuring and organizational restructuring plans based on the established framework, which is explained in detail in Section 3 and Section 4.

We run a logit regression with maximum log likelihood to figure out what specific factor influences the performance after distress. In the regression model, Z'' -score, operating margin and EBITDA are proxies for post-distress accounting performance, while the latter two are used for robustness check as alternative specifications. Furthermore, the recovery of market performance measured by positive stock return is taken into consideration as well to draw a comparison of recovery from different dimensions. To further verify our results, extra robustness checks using logit regression with penalized log likelihood and industrial market performance are applied to all the tests conducted.

Our main results suggest that there is no evidence that management change, blockholder turnover, portfolio restructuring plan and organizational restructuring plan contribute to the firms' post-distress performance consistently on all three dimensions. However, the financial restructuring plan is proved to have a statistically significant negative relationship with the recovery, which is contradictory to most previous research. To look deeper into the effects of different financial restructuring, we split it into three specific subcategories: financial contract restructuring, new refinancing resource and asset sale for debt repayments, and subsequently run logit regressions on those three variables with other factors. We try to explain the various effects of those factors with discussion with other researcher's work and two brief failure case studies of YOC AG and Solocal SA. Our results argue that financial contract restructuring, which in our cases significantly helps with the debt reduction, relates adversely to on the Z'' -score recovery, which might

be due to the mechanism of Z''-score calculation. And new financing also has a negative relationship with the firm's recovery, which could be explained by the insufficient improvement of earnings and EBITDA. Asset sale for debt repayments, however, does not display any credible evidence of having obvious effects on the firm's post-distress performance.

In our brief study on the firms' post-distress market performance, the results suggest that organizational restructuring, which could be a risky signal to the investors, makes the distressed firms less likely to experience stock appreciation, supporting previous findings to some extent (Capelle-Blancard & Couderc, 2006).

Our paper is structured as follows. Following this introduction, we briefly summarize other researchers' work on how to forecast distress risk and the determinants of post-bankruptcy performance in Section 2, and then develop our hypotheses in Section 3. Section 4 covers our methodology of sample selection and modeling process. Section 5 includes our analysis and empirical results on three main tests. Section 6 provides several robustness checks to verify the results, followed by the conclusion in Section 7. All the important tables and figures are within the main text. The appendix includes the supplementary figures and tables regarding sample characteristics and regression results as well as the summary of two mini cases with supportive financial and market data.

Section 2. Literature Review

2.1 Predicting Financial Distress Condition

Various models have been applied to forecast the firm's financial distress condition since the 1960s. Altman (1968) develops the classic Z-score 5-variable model using discriminant analysis to predict the distress level for public non-manufacturing firms in the US. The factors are composed of accounting ratios regarding net liquidity, cumulative profitability, true productivity of firms' assets, leverage and capital turnover. The classic Z-score model is proved to be valid to a large extent and has been followed or revised by other researchers to predict firm distress condition across countries and industries. To have a broader application for the Z-score model, Altman (1983) revises the classic Z-score model, extending it into Z'-score model for privately held firms and Z''-score model for both publicly and privately held firms. And recently Altman, Iwanicz-Drozowska, Laitinen, and Suvas (2017) test Z''-score model using global data with particular focus on European markets, concluding that the model performs very well in the broadest scope. Similar to the Z-score model, O-score model (Ohlson, 1980) is developed mainly using accounting data to predict firms' bankruptcy. Ohlson performs the conditional logit analysis with nine variables (eight ratios using accounting data and one dummy variable) for industrial and bankruptcy firms.

Apart from accounting-based models, several market-based models are also adopted to predict financial distress. Merton's distance-to-default (DD) (Merton, 1974) forecasts the probability of default, and based on it Crosbie and Bohn (2003) develop the KMV model, which is popular as an indicator of default risk for non-financial corporations. And in terms of financial corporations like banks, Chan-Lau and Sy (2007) extend DD into distance-to-capital to deal with the banks' problems.

Shumway (2001) develops the hazard model using both market and accounting data. Firms' excess returns and sigma are added as new independent variables into the logit regression. The hazard model features the incorporation of time-varying covariates and explanatory variables and thus helps to evaluate a firm's default risk in a dynamic way, which has advantages over other previous static models (Shumway, 2001). Campbell, Hilscher, and Szilagyi (2008) extend Shumway's model, adding ten main explanatory variables to evaluate the distress risk, which is also followed by Anginer and Yıldızhan (2016) to predict physical probabilities of default. Altman et al. (2017) prove that the Shumway model outperforms the classic Z-score model in terms of short-horizon forecasts.

Various kinds of models make up of a comprehensive system to predict financial distress condition, while relatively less research has focused on the post-distress performance and firms' turnaround strategies, such as debt restructuring or solvency plan.

2.2 Turnover Strategies and Actions

The topic of turnaround strategies and actions to save a distressed firm has always been popular amongst scholars. Schendel, Patton, and Riggs (1976) define corporate turnaround as the recovery of the performance after the decline, with the downturn phase and upturn phase specified. The paper analyzes the effectiveness and efficiency of the turnaround actions and events, including organization and management changes, marketing program changes, major plant expenditure, product diversification, geographic diversification divestiture, and vertical integration (Schendel et al., 1976). A later paper states that situations involving deterioration in operating performance, financial ratios, market performance and so on demand effective turnaround strategies, before which careful investigations should be conducted to decide on the appropriate strategy (Hofer, 1980).

Restructuring is defined as measures of reorganization in respect of the legal, ownership, operational and other structures and frameworks of a company, aiming to enhance its profitability and satisfy its present needs with a better-organized status (Norley, Marshall, & Swanson, 2008). Moreover, the restructuring is theoretically beneficial for the companies Norley et al. (2008). Later, Bowman and Singh (1993) and Sudarsanam and Lai (2001) analyze the effectiveness of different turnover strategies under the restructuring framework in an empirical way. In recent studies, Schoenberg, Collier, and Bowman (2013) summarize the core strategies and actions for a business turnaround by reviewing the studies before. The review paper divides the most commonly used strategies into two main categories, content-oriented strategies, and process-oriented strategies, with the former one including cost efficiencies, asset retrenchment, and the latter one containing such actions associated with the reinvigoration of firm leadership as CEO change and culture change. It is also pointed out that only strategies of cost efficiencies, asset retrenchment, focus on core activities and building for the future could help the firm recover from a period of performance decline (Schoenberg et al., 2013). Sudarsanam and Lai (2001) and Schoenberg et al. (2013) are of the very few that link the financial recovery to the effectiveness of different restructurings.

2.3 Restructuring and Performance

Bowman and Singh (1993) categorize the acts of restructuring by three types, financial restructuring, portfolio restructuring, and organizational restructuring. Based on Bowman's three-fold distinction definition of restructuring, scholars develop some studies regarding the motivations, the subcategories and the effectiveness of these three types of restructuring, linking the actions to such topics as corporate governance and corporate performance. Amongst these papers, some focus on how the specific restricting plans affect the performance of a firm, with the performance usually measured in forms of accounting performance and market performance (Bowman, Singh, Useem, & Bhadury,

1999). And the papers reviewed by Bowman set the scope exclusively within the companies in the US from 1986 to 1999.

Apart from the US market, a few scholars explore other specific countries or industries. For example, Sudarsanam and Lai (2001) investigate the firms in the UK while Riany (2012) studies the mobile providers in Australia. Moreover, L.A. (2012) examines the restructuring's significant influence on the profitability, liquidity and solvency risk of the Nigerian firms within the Oil & Gas sector.

Regarding the approaches used, some scholars like Clark and Ofek (1994) make assessments on both accounting and market performance, while most others concentrate on one dimension or the other. Similarly, most studies focus on one restructuring category or specific action like layoffs, but a few would examine several, such as Sudarsanam and Lai (2001) and Riany (2012).

Bowman et al. (1999) mention the diversified results across the papers and different potential reasons attributed to them. In aggregate, financial restructuring dominates the other two in benefiting the performance in terms of accounting and market aspects, while the organizational restructuring plans display the weakest power in the performance improvement (Bowman et al., 1999). When specific to the three types of restructuring, Bergh (1998) discusses the influence of different actions of portfolio restructuring on the financial performance of 168 Fortune 500 firms using a model that integrates information-processing and resource-based theories. Also, M&A as a common approach has enjoyed great popularity in the topic of portfolio restructuring. King, Dalton, Daily, and Covin (2004) use meta-analysis method to study how M&As affect the financial performance of the firms in the US, partly supporting the study of Yeh and Hoshino (2002), who suggests a negative relationship between M&A and the efficiency, profitability and growth rate of Japanese companies. Another study assesses the M&A's effect on the performance of firms in India, concluding that although M&A improves the liquidity, it deteriorates the operating performance (Saboo & Gopi, 2009).

In terms of organizational restructuring, some ⁴ believe that most organizational restructuring is initiated to adapt to the environment instead of solving distress to achieve the potential benefits (Eby & Buch, 1998). Many studies tend to link the stock performance to the organizational restructuring announcements, assuming the share prices depends on the shareholders' understanding of the initiatives behind and expectation of the effectiveness in the future, with a few others like D. Denis (2000) linking the actions with operating performance. For example, Brickley and van Drunen (1990) study the relationship between shareholders' health and the announcements of organizational restructuring, which excludes mergers and spin-offs. Papers are more

⁴ Riany (2012), Richard, Devinney, Yip, and Johnson (2009) and Hane P L. (2012)

likely to focus on specific actions like downsizing (Muñoz-Bullon & Sanchez-Bueno, 2010), layoffs (Capelle-Blancard & Couderc, 2006) and cost-cutting (D. Denis, 2000).

Bowman et al. (1999) and Riany (2012) suggest a strong and positive difference made by financial restructuring. As a commonly used method of financial restructuring, LBOs are claimed to be beneficial to the performance of US companies, but a considerable proportion of firms with LBOs go private afterwards (Bowman et al., 1999). However, limited papers discuss much the effect caused by specific actions other than LBOs of financial restructuring. For instance, debt restructuring like the renegotiation of debt contracts is one of the financial restructuring approaches to improve liquidity (Cascio, 2002). E. Hotchkiss et al. (2008) subcategorize financial restructuring into three main distinctions related to contracts, financing resources, and asset disposals, based on which few researchers discuss the respective effect.

Section 3. Hypotheses

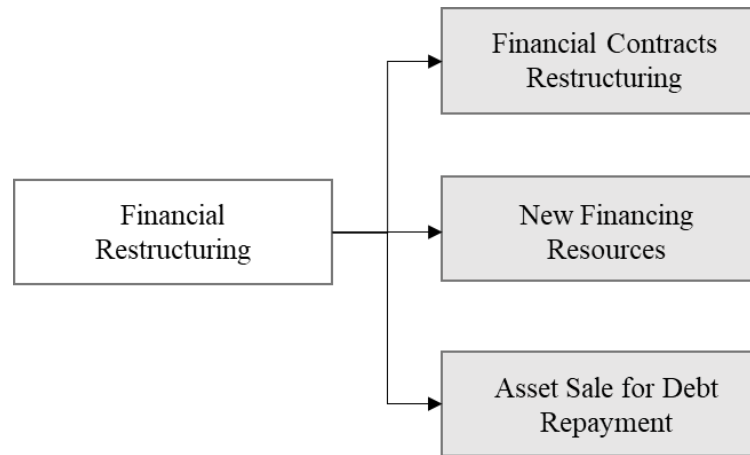
We take several factors into account with particular focus on the restructuring process to figure out how the distressed firms turn around. Following Bowman and Singh (1993)'s classification on corporate restructuring, we classify three main kinds of restructuring plans under the distress condition: financial, portfolio and organizational restructuring. And following Bowman et al. (1999)'s work on when restructuring improves the firm's accounting and market performance, we develop our first three hypotheses regarding restructuring plans.

Financial restructuring mainly deals with financial condition improvement using refinancing, waiver of claims, debt conversion, asset sale for debt payments, which usually are short-term resolutions to a firm's financial difficulties. Bowman et al. (1999)'s work suggests that large proportion of management buyouts is more responsible for the substantial returns when a firm restructures financially. However, he also points out that other financial restructuring acts, such as debt for equity swaps, demonstrates modest or occasionally negative effects on the returns. Based on Bowman et al. (1999)'s main results, we develop our first hypothesis:

Hypothesis 1: Financial restructuring actions could increase the possibility of a distressed firm's recovery.

To dig into the financial restructuring plans, we separate different forms of the plans, involving three main subcategories: financial contract restructuring, new financing resource and asset sale for debt repayments based on E. Hotchkiss et al. (2008)'s work.

Figure 1 The Subcategories of Financial Restructuring



Financial contract restructuring mainly involves negotiating with creditors to reconstruct debt contract terms, converting debt to equity or even waiving the claim, which could significantly reduce the firm's debt and thus help with the financial distress condition. New financing resource is defined as substantial capital increase through private placements, bank loans, issuance of shares or bonds and so on, which could support its debt repayment or strategic decisions. And asset sale for debt repayments usually indicates that the firm is under fierce financial distress condition and even is going through the liquidation process, forcing it to dispose of part of its assets like subsidiaries or line of business to repay the debt by cash.

We intend to figure out how different forms of financial restructuring relate to the distressed firm's performance, for which we develop the following sub-hypotheses under hypothesis 1 above:

Hypothesis 1.1: Financial contract reconstructing could increase the possibility of a distressed firm's recovery.

Hypothesis 1.2: New financing resource could increase the possibility of a distressed firm's recovery.

Hypothesis 1.3: Asset sale for debt repayment could increase the possibility of a distressed firm's recovery.

Moreover, portfolio restructuring involves merger and acquisition of lines of business or assets, business model change, strategic redirection and so on, which could also help with the company's turnaround. There is some evidence from Bowman et al. (1999)'s work that portfolio restructuring helps with the improvement of higher earnings for the US

firms, leading to our second hypothesis:

Hypothesis 2: Portfolio restructuring action could increase the possibility of a distressed firm's recovery.

Organizational restructuring aims at improving the firm's efficiency and cutting costs, usually including downsizing the firm and involving measures like laying off employees and closing branches. It is a common way for firms to survive under the distress condition, which should be positively related to firms' recovery. However, in normal cases of healthy firms, Bowman et al. (1999)'s work implies that organizational restructuring has little effect on the firm's performance and sometimes even has negative impacts, leading to our third hypothesis:

Hypothesis 3: Organizational restructuring action is negatively related to the possibility of a distressed firm's recovery.

Apart from the restructuring plans, managerial change is also another important method of helping firms to turn around. A new management board helps with the restructuring process and deals with the damage that the former management left. Hotchkiss developed the hypothesis that "post-bankruptcy performance is related to management changes" and she concluded that keeping the CEO is positively related to lower post-bankruptcy performance (Hotchkiss, 1995). We develop our hypothesis 4 to examine this argument based on her research.

Hypothesis 4: Management board change could increase the possibility of a distressed firm's recovery.

The new blockholder, the most influential shareholder in our definition, could force the existing management to alter plans or other company settings, thus influencing the distressed firms. In our case, we use the shareholder with the most voting rights as the proxy for the blockholder. We develop hypothesis 5 based on our assumption:

Hypothesis 5: Blockholder change could improve the possibility of a distressed firm's recovery.

Section 4. Methods and Data

4.1 Sample Selection

To cover core eurozone markets, equities listed on Euronext and Deutsche Börse AG are selected from Datastream based on the following criteria:

- 1) Only primarily and major listed firms are selected;
- 2) Only firms from European countries are selected;
- 3) Only non-financial firms are selected, i.e., firms which are classified as Banks, Financial Services, Life Insurance, Non-life Insurance, Real Estate Investments or Real Estate Investments Trust are excluded.

In total 2056 firms are selected. As bankruptcy data are not available from Datastream and part of the 2056 firms are not rated, we introduce Altman's four-variable Z'' -score model (Altman, 1983) to identify distressed firms. Among all the models evaluating distress levels, such as Ohlson's O-score model (Ohlson, 1980) and Shumway's Hazard model (Shumway, 2001), Hazard model and Z-score model outperform other alternatives. Altman et al. (2017) summarize from 31 articles regarding model performance evaluation that the classic Z-score model performs well for the forecast in short horizons. Hazard model is proved to perform better for listed firms in the US with the improvement by adding market information (Chava & Jarrow, 2004).⁵ However, part of the data for the Hazard model calculation is not available. The market value of the benchmark Euronext Eurozone 300, which we initially choose based on our sample scope, is not available in Datastream, raising problems in calculating the relative size variable for Hazard model. Therefore, we finally adopt the revised version of Z-score model, i.e., Z'' -score model rather than the Hazard model considering a trade-off between data availability and model accuracy. The following equation is directly introduced for the Z'' -score calculation for each firm:

$$Z'' = 3.25 + 6.56 X_1 + 3.26 X_2 + 6.72 X_3 + 1.05 X_4 \quad (1)$$

where X_1 is Working capital/Total assets, X_2 is Retained earnings/Total assets, X_3 is EBIT/Total assets, X_4 is Book value of equity/Total debt. Equation (1) is a revised version of Altman's classic Z-score model. Altman has demonstrated that Z'' -score model performs well in European markets and the coefficients are not obsolete (Altman et al., 2017), which further supports our adoption of the Z'' -score model in evaluating our sample firms' distress level.

We study the period of the most recent 15 years from 2004 to 2018 to focus on newer

⁵ Chava and Jarrow (2004) compare Shumway's Hazard model, Altman's model and Zmijewski's model in predicting bankruptcy for US listed firms, concluding that Hazard model performs best regarding ROC and the percentage of correctly predicted cases.

firms with more updated data compared to the previous work on post-distress performance. All the yearly data of the listed firms during the 15 years are grabbed from Datastream for Z'' -score calculations, after which we obtain the firms' Z'' -scores from 2004 to 2018 in the format of time series. Firms with negative Z'' -score at year t is identified as distressed at year t in our paper based on Altman's theory (Altman, 1983).

For each case, we define a distress period⁶ from Year 0_i to Year N_i ⁷. Year 0_i is defined as the first year when the firm in case i become distressed and Year 1_i is defined as the second year of distress. Year N_i refers to the year when case i displays a positive Z'' -score again or the most recent year with a valid Z'' -score if case i has no positive Z'' -score since Year 0_i . Table 1 shows two examples of how we define the distress period for each case.

Based on the 2056 firms obtained before, 196 distressed firms⁸ are selected using the following criteria:

- 1) Firms that are identified as distressed for at least one year are selected (i.e. The firms with positive Z'' -scores all through year 2004 to 2018 are dropped from the sample);
- 2) Firms with valid Z'' -scores for at least 4 years since Year 0 are selected (i.e. Firms with invalid Z'' -score during Year 1 and Year 4 are dropped from the sample). The original data sample sometimes includes error or NA terms between years, and this inconsistency results in invalid Z'' -score series. To ensure we can observe a firm's performance for a longer time, we exclude the firms with unstable data availability.

And among the 196 firms, 108 firms cannot be studied because their annual reports are not available due to the merger into another company, delisting, privatization and other reasons. Therefore, only 88 cases compose of our final sample. Table 1 below shows two examples of our cases for illustration.

⁶ We use the term "distress period" for convenience of explanation in the whole paper. The final year (Year N) of the distress period could be identified as "distressed" or "recovered".

⁷ The terms would be simplified as Year 0 and Year N in the following text for convenience.

⁸ It should be noted that the sample is selected in a strict way. Preferred stock and intangible assets are mostly unavailable in Datastream so we neglect these two variables in calculating the book value of equity for X_4 , leading to a stricter sample than it should be.

Table 1: Two example cases of our sample

- (i) Panel A represents the Z"-score series and distress period for Getlink SE. Panel B represents the Z"-score series and distress period for Solocal SA.
- (ii) For Getlink SE, Year 0 (t_0) is 2005 when its Z''-score turns negative, and the Year N (t_N) is 2007 when its Z''-score turns positive. Thus the distress period we study for this case is 2005 to 2007. Following the same logic, for Solocal SA Year 0 (t_0) is 2012 while Year N (t_N) is 2018 since it failed to recover and its Z''-score kept negative since t_0 .
- (iii) Code represents the firm code in Datastream.

Panel A				Panel B			
Code	Year	Z"-score	t	Code	Year	Z"-score	T
F:GET	2004	2.1871					
F:GET	2005	-1.7592	0	F:LOCA	2005	38.6059	
F:GET	2006	-7.4494	1	F:LOCA	2006	4.7468	
F:GET	2007	8.5273	N	F:LOCA	2007	4.3309	
F:GET	2008	4.6152		F:LOCA	2008	3.7175	
F:GET	2009	4.5362		F:LOCA	2009	4.4992	
F:GET	2010	4.3524		F:LOCA	2010	4.1017	
F:GET	2011	4.2791		F:LOCA	2011	3.7844	
F:GET	2012	4.2111		F:LOCA	2012	-6.6059	0
F:GET	2013	4.4440		F:LOCA	2013	-7.6921	1
F:GET	2014	4.0731		F:LOCA	2014	-6.7282	2
F:GET	2015	4.1565		F:LOCA	2015	-7.8938	3
F:GET	2016	4.1966		F:LOCA	2016	-16.5357	4
F:GET	2017	4.2180		F:LOCA	2017	-1.8297	5
				F:LOCA	2018	-6.6624	N

4.2 Variables

As for dependent variables, we mainly follow Hotchkiss's research (Hotchkiss, 1995), where she uses workout or 2nd Bankruptcy, operating income and industry-adjusted operating margin as dependent variables. We replace "workout or 2nd bankruptcy" by **Z"-score's recovery** ("Z_REC") as our main dependent variable. We also alternatively specify operating margin ("OM_REC"), a proxy of **profitability**, and EBITDA ("EBITDA_REC"), a proxy of **cash flow** as dependent variables for robustness check. Followed by the same methodology of (Hotchkiss, 1995)'s work, operating margin is defined as recovered if a firm's operating margin turns positive at Year N. The EBITDA's recovery is also following this logic. As for attempts on the supplementary study on how the distressed firms perform in the stock market, the **stock return resurgence**, which is abbreviated as "g_i", is added as another dependent variable. And "g_i" equals one when the annualized return of the firm during the distress period is above zero. "Z_REC" and "EBITDA_REC" equals one when the operating margin and EBITDA turn positive at Year N respectively. All the dependent variables are in dummy forms, with each variable

equaling one if defined as recovered.

And following Hotchkiss (1995)'s method, we use firms' total assets at Year 0 as a proxy of **company size**, which is abbreviated as "Size" as a control variable. In addition, we believe the firm's capital structure also should be controlled, thus having Debt to Equity ratio at Year 0 in our regression model as a proxy of distressed firms' **capital structure** ("CapStruct").

Then independent variables are set to study their relation to distressed firms' recovery based on our hypotheses above. And **management board change** ("MgmtC") equals one if there is any change in core management board members like CEO. **Blockholder change** ("BlockC") equals one if the most influential shareholder changes during the distress period. The most influential shareholder is defined as the shareholder with the biggest voting rights. **Financial restructuring** ("FinR"), **Portfolio restructuring** ("PorR") or **Organizational restructuring** ("OrgR") equals one if the firm takes financial, portfolio or organizational restructuring respectively. And for attempts on the supplementary study on the specific financial restructuring measures, we split the financial restructuring into three subcategories, **financial contract restructuring** ("FinCR"), **new financing** ("NewFin") and **asset sale for debt repayment** ("AssetS"). "FinCR" equals one if the firm reconstructs financial contracts, and "NewFin" and "AssetS" also follows the same logic.

And the **industry growth** is added for the robustness check. Industry growth ("g_sector") is defined as the annualized return of the sector price index during the distress period, and the sector categories are based on the ICB level 1 classification.

These data above except "Size" and "CapStruct" are collected manually. We gather all the important company events from **Year 1** to **Year N** for each firm from the annual reports, announcements and company news, classify them into each variable category and make up our variable table. Other financial data and market data for Z"-score and stock return calculation are grabbed from Datastream. Table 2 show a summary of all the variables.

4.3 Model Review

Following our main reference (Hotchkiss, 1995), we apply the logit regression with the maximum likelihood in our study because of binary dependent variables. A basic model for our main regression is established as below:

$$Z_REC_i = \alpha + \beta_1 FinR_i + \beta_2 PorR_i + \beta_3 OrgR_i + \beta_4 BlockC_i + \beta_5 MgmtC_i + \beta_6 Size_i + \beta_7 CapStruct_i \quad (2)$$

The main research question of our study refers to whether the restructuring plans affect the turnover of financially distressed firms, for which “FinR”, “PorR” and “OrgR” are the primary independent variables, with the rest set based on previously established knowledge.

In terms of robustness check, another two models are established respectively by replacing “Z_REC” with “OM_REC” and “EBITDA_REC” as below:

$$OM_REC_i = \alpha + \beta_1 FinR_i + \beta_2 PorR_i + \beta_3 OrgR_i + \beta_4 BlockC_i + \beta_5 MgmtC_i + \beta_6 Size_i + \beta_7 CapStruct_i \quad (3)$$

$$EBITDA_REC_i = \alpha + \beta_1 FinR_i + \beta_2 PorR_i + \beta_3 OrgR_i + \beta_4 BlockC_i + \beta_5 MgmtC_i + \beta_6 Size_i + \beta_7 CapStruct_i \quad (4)$$

To get the coefficient estimates, we maximize the log-likelihood function as below:

$$\log L(\theta) = \sum_{i=1}^n (y_i \log(\pi_i) + (1 - y_i) \log(1 - \pi_i)) \quad (5)$$

where θ is unknown coefficients, π_i is the probability function, y_i is the outcome variable.

i.e. take the partial derivative of (5), and a score function is given:

$$\frac{\partial \log \mathcal{L}(\theta)}{\partial \theta} = U(\theta) = \sum_{i=1}^n (y_i - \pi_i) x_i \quad (6)$$

$U(\theta) = 0$ gives us the coefficient estimates. However, our sample size (88 cases) and many independent variables may cause small sample bias on coefficient estimates using logit regression with maximum likelihood. To verify our results, logit regression with penalized maximum likelihood (PML) is introduced as another robustness check.

PML reduces this bias on coefficients by adding a penalty term in the log-likelihood function (Firth, 1993):

$$\log L(\theta)^* = \log L(\theta) + \frac{1}{2} \log |I(\theta)| \quad (7)$$

By maximizing (7), a new score function is given:

$$\frac{\partial \ell^*(\theta)}{\partial \theta} = U^*(\theta) = \sum_{i=1}^n \left(y_i - \pi_i + h_i \left(\frac{1}{2} - \pi_i \right) \right) x_i \quad (8)$$

Table 2.1: Variables for Test 1 and Robustness Check

	Variables	Abbr.	Type	Brief Explanation
Dependent Variable	Z Recovery	Z_REC	Dummy	1 if the Z-score of the firms recovers, i.e. above 0.
	Operating Margin Recovery	OM_REC	Dummy	1 if the operating margin at the first recovery year is above 0
	EBITDA Recovery	EBITDA_REC	Dummy	1 if the EBITDA at the first recovery year is above 0
Controlled Variable	Capital Structure	CapStruct	Numeric	D/E ratio at the first distress year
	Company size	Size	Numeric	The firms' total assets at the first distress year
Independent Variable	Management change	MgmtC	Dummy	1 if the member of management board changes during the distress period
	Blockholder Change	BlockC	Dummy	1 if the most influential shareholder changes during the distress period
	Financial Restructuring	FinR	Dummy	1 if the firm takes financial restructuring during the distress period
	Portfolio Restructuring	PorR	Dummy	1 if the firm takes portfolio restructuring during the distress period
	Organizational Restructuring	OrgR	Dummy	1 if the firm takes organizational restructuring during the distress period
Variable for Robustness	Industry Growth	g_sector	Numeric	Annualized return of the sector price index during the distress period

Table 2.2 Variables for Test 2 and Test 3

	Variables	Abbr.	Type	Brief Explanation
Dependent Variable	Stock Return Recovery	g_i	Dummy	1 if the firm's annualized return of stock price during the distress period is above 0
Independent Variable	Financial Contract Restructuring	FinCR	Dummy	1 if the firm takes financial contract restructuring during the distress period
	New Financing Resources	NewFin	Dummy	1 if the firm gets new refinancing during the distress period
	Asset Sale for Debt Repayment	AssetS	Dummy	1 if the firm sells assets for debt repayment during the distress period

where h_i is the i^{th} diagonal element of the penalized version of $I(\hat{\theta})$.

⑧ shrinks the coefficients and lower the small-sample bias.

In the end, AUC is introduced for model fitness evaluation. AUC is the area under the ROC curve (Receiver Operating Characteristic curve), which evaluates the model's performance in differentiating binary variables (Narkhede, 2018). A model with 0.5 AUC is indifferent in telling the positive and negative classes while higher AUC indicates better model fitness.

Section 5. Empirical Analysis

5.1 Sample Descriptive Statistics

Among the whole sample, 51 cases are listed on Euronext and 37 cases are listed on Deutsche Börse AG. Based on Table 3, 71.59% of the firms belong to Technology, Health care and Consumer Services sector while the rest distributes across Oil&Gas, Telecom, Utilities and so on. And about 40.91% of the distressed firms come from the German market, followed by 35.23% from the French market.

From Table 4, the right skewness of the “Size” indicates there are a few firms with larger asset size in our sample. And capital structures vary across distressed firms with large standard deviation. The right skewness of “CapStruct” suggests that a few firms have very high debt to equity ratios, i.e. high leverages. As for the industry performance during the distress period, most sectors have positive annualized returns in the stock market, with 2.31% growth maximum, which could have impacts on the firms' recovery.

Table 3 Industry Distribution

The table shows the industry distribution of the 88 cases. Obs means the number of cases falls into each specific industry category. For example, 1 case is from the Oil & Gas industry, 6 cases are from Basic Materials.

Industry	Obs
Oil & Gas	1
Telecom	1
Industrials	10
Consumer Services	18
Utilities	2
Health Care	21
Technology	24
Consumer Goods	5
Basic Materials	6

Table 4 Descriptive Statistics for Control Variables

- (i) Obs represents the number of cases, i.e. sample size. 88 indicates this is the full sample.
(ii) “CapStruct” represents the firm’s capital structure, which is proxied by Debt to Equity ratio. “Size” represents the firm’s size, which is proxied by total assets in thousands EUR. “g_sector” represents the industry growth, which is proxied by the annualized return of the sector index ((Industrial Price Index at Year N / Industrial Price Index at Year 0) ^ (1/N)-1) during the distress period for each case.

	CapStruct	Size	g_sector
Obs	88	88	88
Minimum	-22.6750	0.8460	-1.15%
Maximum	74.0200	7740.2280	2.31%
Mean	2.0779	135.62	1.07%
Median	0.4449	21.9555	1.16%
Stdev	11.5012	825.9450	0.0069
Skewness	3.8225	8.8741	-1.0013
Kurtosis	20.2145	78.6684	1.2575

Based on table 5.1 and 5.2, during the firms’ distress period, 36 cases change their management board members and 13 cases change their blockholders. 64 cases take financial restructuring plans, 59 cases take portfolio restructuring plans and only 27 cases take organizational restructuring plans. 69 cases recover to positive Z”-score at Year N, of which 43.48% changes key management members, 15.94% changes blockholders, 68.12% implements financial restructuring measures, 62.32% takes portfolio acts and 27.54% restructures on an organizational basis. Among the rest 19 cases that fail to recover, 31.58% changes management board, 10.53% changes blockholders, 89.47% restructures financially, 84.21% takes portfolio restructuring acts, and 42.11% takes organizational restructuring.

From an overview of the sample characteristics, financial and portfolio restructuring measures show a roughly stronger correlation with the post-distress performance than other factors, though the implied negative relationships here are not consistent with our hypotheses before. In terms of organizational, no apparent correlations with firms’ recover or not could be observed from the sample.

Table 5.1 Descriptive Statistics for the Full Sample Based on Z''-score

- (i) Obs represents the number of cases, i.e. the sample size.
(ii) "Z_REC", the dependent variable, equals one if the Z''-score of the company is positive at Year N.
(iii) In terms of independent variables, "MgmtC" equals one if the firm's key management board member is changed. "BlockC" equals one if the company's biggest or major blockholder is changed. "FinR" equals one if the distressed company implements financial restructuring plans during the distress period. "PorR" equals one if the distressed company implements portfolio restructuring plans. "OrgR" equals one if the company conducts an organizational plan.

	Z_REC	MgmtC	BlockC	FinR	PorR	OrgR
Obs	88	88	88	88	88	88
Median	1	0	0	1	1	0
Sum	69	36	13	64	59	27
Skewness	-1.36	0.36	1.95	-1	-0.71	0.82
Kurtosis	-0.16	-1.89	1.83	-1	-1.51	-1.34

Table 5.2 Descriptive Statistics for the Z''-score Recovery and Failure Sample

- (i) Obs represents the number of cases, i.e. the sample size.
(ii) Panel A represents the Z''-score recovery sample, which consists of 69 cases. Panel B represents the Z''-score failure sample, which consists of 19 cases.
(iii) "MgmtC" equals one if the firm's management board member is changed. "BlockC" equals one if the company's biggest or major blockholder is changed. "FinR" equals one if the distressed company implements financial restructuring plans. "PorR" equals one if the distressed company implements portfolio restructuring plans. "OrgR" equals one if the company conducts an organizational plan.

Panel A	MgmtC	BlockC	FinR	PorR	OrgR
Obs	69	69	69	69	69
Median	0	0	1	1	0
Sum	30	11	47	43	19
Panel B	MgmtC	BlockC	FinR	PorR	OrgR
Obs	19	19	19	19	19
Median	0	0	1	1	0
Sum	6	2	17	16	8

As for the sample based on operating margin recovery, 42 cases recover at Year N, in which 40.48% changes key management board members, 19.05% changes blockholders, 64.29%, 66.67% and 26.19% take actions related to financial restructuring, portfolio restructuring and organizational restructuring respectively. The distributions of variables do not show a significant difference between the recovered group and failed group, displaying ambiguous signs for our hypotheses.

Based on EBITDA performance, 58 cases generate positive EBITDA at Year N, in which 39.66% and 15.52% change management board and blockholders, 63.79%, 70.69% and

34.48% take financial, portfolio and organizational restructuring measures respectively. Among the rest 29 failed cases, 44.83% and 13.79% changes management board and blockholders, 89.66%, 58.62% and 24.14% takes financial, portfolio and organizational restructuring measures respectively. Financial restructuring still seems to be negatively related to the firms' post-distress EBITDA performance, which is consistent with the descriptive statistics based on Z''-score recovery.

Table 6.1 Descriptive Statistics for the Full Sample Based on Operating Margin

- (i) Obs represents the number of cases, i.e. the sample size. 6 cases are dropped because of invalid operating margin at the recovery year, thus having 82 cases for the full sample for operating margin.
(ii) "OM_REC", the dependent variable, equals one if the operating margin turns positive at Year N.
(iii) In terms of independent variables, "MgmtC" equals one if the firm's management board member is changed. "BlockC" equals one if the company's biggest or major blockholder is changed. "FinR" equals one if the distressed company implements financial restructuring plans. "PorR" equals one if the distressed company implements portfolio restructuring plans. "OrgR" equals one if the company conducts an organizational plan.

	OM_REC	MgmtC	BlockC	FinR	PorR	OrgR
Obs	82	82	82	82	82	82
Median	1	0	0	1	1	0
Sum	42	35	13	59	57	27
Skewness	-0.05	0.29	1.84	-0.96	-0.83	0.71
Kurtosis	-2.02	-1.94	1.39	-1.09	-1.32	-1.51

Table 6.2 Descriptive Statistics for OM Recovery and Failure Sample

- (i) Obs represents the number of cases, i.e. the sample size.
(ii) Panel A represents the operating margin recovery sample, and Panel B represents the operating recovery failure sample.
(iii) "MgmtC" equals one if the firm's management board member is changed. "BlockC" equals one if the company's biggest or major blockholder is changed. "FinR" equals one if the distressed company implements financial restructuring plans. "PorR" equals one if the distressed company implements portfolio restructuring plans. "OrgR" equals one if the company conducts an organizational plan.

Panel A	MgmtC	BlockC	FinR	PorR	OrgR
Obs	42	42	42	42	42
Median	0	0	1	1	0
Sum	17	8	27	28	11
Panel B	MgmtC	BlockC	FinR	PorR	OrgR
Obs	40	40	40	40	40
Median	0	0	1	1	0
Sum	18	5	32	29	16

Table 7.1 Descriptive Statistics for the Full Sample Based on EBITDA

- (i) Obs represents the number of cases, i.e. the sample size. 1 case is dropped because of invalid EBITDA, thus having 87 cases for the full sample for EBITDA sample.
- (ii) "EBITDA_REC", the dependent variable, equals one if the EBITDA turns positive at Year N.
- (iii) In terms of independent variables, "MgmtC" equals one if the firm's management board member is changed. "BlockC" equals one if the company's biggest or major blockholder is changed. "FinR" equals one if the distressed company implements financial restructuring plans. "PorR" equals one if the distressed company implements portfolio restructuring plans. "OrgR" equals one if the company conducts an organizational plan.

	EBITDA_REC	MgmtC	BlockC	FinR	PorR	OrgR
Obs	87	87	87	87	87	87
Median	1	0	0	1	1	0
Sum	58	36	13	63	58	27
Skewness	-0.69	0.34	1.93	-0.99	-0.69	0.81
Kurtosis	-1.53	-1.9	1.76	-1.04	-1.53	-1.37

Table 7.2 Descriptive Statistics for the EBITDA Recovery and Failure Sample

- (i) Obs represents the number of cases, i.e. the sample size.
- (ii) Panel A represents the EBITDA recovery sample, which consists of 58 cases, and Panel B represents the EBITDA failure sample, which consists of 29 cases.
- (iii) "MgmtC" equals one if the firm's management board member is changed. "BlockC" equals one if the company's biggest or major blockholder is changed. "FinR" equals one if the distressed company implements financial restructuring plans. "PorR" equals one if the distressed company implements portfolio restructuring plan. "OrgR" equals one if the company conducts an organizational plan.

Panel A	MgmtC	BlockC	FinR	PorR	OrgR
Obs	58	58	58	58	58
Median	0	0	1	1	0
Sum	23	9	37	41	20
Panel B	MgmtC	BlockC	FinR	PorR	OrgR
Obs	29	29	29	29	29
Median	0	0	1	1	0
Sum	13	4	26	17	7

5.2 Results and Analysis

This Section contains three main empirical tests using logistic regression models, of which Test 1 is the original main model and Test 2 and Test 3 are supplementary tests. In Test 1 (Table 8), the models run regressions specified by equations ②, ③ and ④ in

Section 4.3 Model Review. Test 2 runs regressions on an adjusted version of regressions with the variable “FinR” replaced by three new subcategories of financial restructuring, which will be specified further in Section 5.2.2, to investigate how different financial restructurings affect the recovery chance. Test 3 runs similar regressions as Test 1 to test the relationships between possibilities of generating positive stock returns and the firms’ actions.

For Test 1 and Test 2, the models specified by “EBITDA_REC” and “OM_REC” are for robustness check. Also, for the models specified by these two in Test 1 and Test 2, the samples are downsized compared to the one specified by “Z_REC” due to data unavailability (Table 8. (3) & Table 8. (5)). To further control the sample across the three models, we take the intersection of the three samples as a new sample with 81 cases, of which the adjusted results are demonstrated in Table 8. (2), (4) and (6). The results of the three tests are discussed and analyzed in Section 5.2.1 to Section 5.2.3 as follows.

5.2.1 Recovery and Different Restructuring Plans

Based on the main findings in Table 8, all the three main restructuring actions demonstrate adverse or weak power on improving the firm’s performance and saving the firm from overall financial distress.

For **Hypothesis 1 (Rejected)**: The main findings in Table 8 suggest that the distressed firms implementing financial restructuring plans are more likely to experience a continuous financial distress condition from Year 0 to Year N. The indications across the three proxies evaluating the performance of the firms remain consistent.

Furthermore, the partial effect of “FinR” indicates a substantial adverse effect on the overall financial performance at the end of the distress period (Year N), while some previous studies suggest that financial restructuring improves firm’s performance in many fronts. According to the studies published between 1986 and 1999, financial restructuring, which mostly referred to specific LBOs (leveraged buy-outs) in these papers, generates economic value for the companies (Bowman et al., 1999). Take a paper with specific country and industry for example, Riany (2012) claims the financial restructuring significantly enhances the Australian mobile phone providers’ performance in terms of market share and market growth. There are various possible explanations for the vast difference here. For example, at the very ground,

(i) We use broader definitions for both financial restructuring and performance, respectively referring to three main kinds of financial restructuring (i.e., financial contract restructuring, new financing resource, and assets sale for debt repayment defined by E.

Hotchkiss et al. (2008)) and three performance proxies. The performance proxies used might be a kind of mix results from multiple dimensions including the market growth and market share chosen by Riany (2012). Compared to questionnaires method used by Riany, the information that we collect from the published media might be constrained by the limited individual assess to the core information.

(ii) When we look into the 17 cases that took actions related to financial restructuring out of the 19 failed cases, 14 out of the 17 also conducted portfolio restructuring to refocus the business, indicating the potential dilution of the positive effect of financial restructuring on increasing the cash flows. Kaplan (1989) suggests the LBOs are intended to increase the net cash flows through reducing capital expenditure and refocusing on business to benefit the operating performance. However, the capital increase from the financial restructuring might be far from enough to cover the other restructuring expenditures, which could be partly explained along with the below-expectation effectiveness of the initiatives mentioned by Bowman et al. (1999).

(iii) The mechanism behind the Z''-score model could be attributed partly to the negative signs of the coefficients. Based on the definition of X_4 , if the debt is decreasing with the lasting negative equity value, the X_4 would be more negative and worsen the Z''-scores, especially when the other factors in Z''-score model ($X_1 \sim X_3$) are not sufficiently improved. Evidence could be found in the mini case of YOC AG in the appendix, where the X_4 become sharply negative along with a huge reduction of debt (YOC AG, 2004a-2017, 2004b-2017).

(iv) Some CFOs would claim that the suppliers' pressure due to passive expectations to financial restructuring increases the working capital requirements, which worsens the sales of the companies (Solocal SA, 2004a-2017, 2004b-2017).

The paper will try to discuss a bit deeper about different effects caused by three different subcategories of financial restructuring defined by E. Hotchkiss et al. (2008) in Section 5.2.2 to better understand the nature of the relationship between the recovery and the financial restructuring.

For **Hypothesis 2 (Partially Not Supported)**: Previous findings⁹ suggest that the actions related to portfolio restructuring contribute to the likelihood of firms' continuous financial distress from Year 0, while our results show no evidence of significant effects on the possibility of generating positive earnings or operating margin during the distress period.

Previous study results vary in this topic. On the one hand, the commonly-used approach in portfolio restructuring, M&A (Mergers and Acquisitions), is claimed to result in no

⁹ For example, Bowman and Singh (1993) and D. Denis (2000).

superior financial performance and even adversely affect the long-term financial performance of the acquiring firm (King et al., 2004). On the other hand, Bowman et al. (1999) suggest that portfolio restructuring helps the firms in the United States generate significantly higher earnings and D. Denis (2000) again confirms assets restructuring's positive effect on operating performance. Our findings here are partly consistent with some papers while different from others to some degree, possibly due to a different scope of the sample (i.e., the US versus Europe and different periods) and research methods. Similarly, when we look into the 19 failed cases (measured by "Z_REC"), 14 out of the 16 portfolio-restructured firms took actions associated with the financial restructuring. Possible explanations could be:

- (i) Portfolio restructuring substantially increases the expenditure, which could worsen the overall financial performance, yet the period studied in our sample is not long enough for the positive effect to reveal itself.
- (ii) The signs of EBITDA and operating margin are not able to tell the whole story of a firm's performance, and more information is needed to assess the restructuring effect.
- (iii) The effectiveness of the actions does not align with the initiatives, for example, the synergies aimed by M&As are overestimated, and the rebuilt strategies fail to maintain or win the markets.

For ***Hypothesis 3 (Not Supported)***: It displays no evidence that organizational restructuring contributes to the possibility of the firms' recovery from overall distress, negative earnings or profitability performance.

Eby and Buch (1998) believe organizational restructuring could benefit the firms by reducing the operating costs and enhanced strategies implementation. However, in the study of Bowman et al. (1999), the results of organizational restructuring are mixed when linked to the economic performance of the firms between 1986 and 1999. In aggregation, the paper demonstrates no affirmative proof of consistent effect generated by organizational restructuring. The research of Brickley and van Drunen (1990) attributes the decline of the firm's earnings to the increased expenditure on organizational restructuring and Muñoz - Bullon and Sanchez - Bueno (2010) prove that the size of downsizing, which is the main product of organizational restructuring, is positively linked to the negative growth of return on assets in the year following downsizing. Furthermore, D. Denis (2000) concludes that methods of cost-cutting and layoffs in the scope of organizational restructuring are insignificant to the firm's operating performance. Another possible explanation for the weak relationship between organizational restructuring and the performance could be motivations behind restructurings could vary amongst the sample firms, for instance, environments of markets and policies of each financially

distressed firm are different (Kishore, 2004). Though our sample where most firms struggle to survive the financial distress indicates the organizational restructurings of the selected firms are more likely to be defensive (Capelle-Blancard & Couderc, 2006), the possibility of other initiatives cannot be ruled out, of which the effectiveness might be shown on other dimensions like market growth and market share (Riany, 2012).

For **Hypothesis 4 (Not Supported)**: The results of the findings prove no apparent relationship between key management change and the recovery of a firm in respect of overall financial distress, negative earnings or operating margin.

The regression tests key management change to reflect the potential effect indicated by Hotchkiss (1995) and Sudarsanam and Lai (2001). In Hotchkiss' study, the retainment of CEO (management turnover) for the bankrupted firms under Chapter 11 in the United States is proved to affect the post-bankruptcy performance of the firms adversely, where our results could supplement to some extent. In our model, apart from focusing on different markets of the distressed firms, we expand the scope of management turnover to the change of key management board members instead of the CEO turnover alone, defined closer to "managerial restructuring" (Sudarsanam & Lai, 2001) and estimate the post-event performance by proxies for financial performance. Sudarsanam and Lai (2001) associate the effectiveness of the turnaround strategies implementation, which hints the difficulties in the separation of individual effect by the person and the action of managerial replacement.

For **Hypothesis 5 (Not Supported)**: Change of the blockholder does not demonstrate significant influence on the firm's chance of recovery from financial distress and the possibility of creating positive earnings (EBITDA) or profitability.

To test the potential influence caused by the transfer of the powerful voting rights, the change of the blockholder is introduced into the regression model. As different owners hold different attitude to risk-taking (Wright, Ferris, Sarin, & Awasthi, 1996) that influences the corporate strategies (David Denis, Denis, & Sarin, 1999), the agency problem between management and the shareholders (Eisenhardt, 1989) might increase the chance that the transferred power brings out different impact on the implementation of restructuring plans through new pressure. However, this power turns out to be weak in our test. A possible reason behind could be the individual characteristics of the new blockholders; for example, Wright et al. (1996) believe institutional shareholders are more open to risk taking. Blockholders with different intentions are likely to lead to mix results of the post-event performances of the firms, so more detailed information might be necessary to investigate further. Furthermore, the take-overs happening in distress period might not come along with a strong desire for saving the company.

Control Variables

The regression controls for the company size, which is measured by “Size”. From the results in Table 8, the larger firms seem to be more likely to generate positive EBITDA at Year N. Moulton and Thomas (1993)’s findings provide evidence that firm sizes dominate all the other variables in successful reorganization under bankruptcy. In our regression, the results are closer to the paper of Hotchkiss (1995), in which the firm size contributes to the successful emergence from bankruptcy with unstable significance. The positive relation here makes sense since larger companies are perceived to be better at managing the administrative costs and portfolio performance, which makes the larger firms more easily to generate positive EBITDA again after distress.

The regression model also controls the capital structure of the distressed firm to ensure the leverage effect in Year 0 does not affect our main results. The insignificance of the capital structure in the model might be attributed to the characteristics of our sample in this paper, i.e. the higher leverage of some specific firms in our small sample may lead to the overall difficulty of a firm’s recovery.

5.2.2 Recovery and Different Financial Restructuring Plans

Financial Restructuring

From the main results discussed above, we believe that financial restructuring reveals a strong relationship with the failure of a distressed firm. However, the main results do not give us clear insights into the mechanism behind this phenomenon. To explore the details further, we decide to make one step forward to see if different types of financial restructuring contribute differently to the main results. Most of the studies that investigate the relationship between financial restructuring and performance focus on LBOs that are likely to turn the firms private while this sample focuses on the firms staying public to have accessible information.

We break up “FinR” into three subcategories “Financial Contract Restructuring” (FinCR), “New Financial Resource” (NewFin) and “Selling Assets for Debt Repayment” (AssetS) based on the classifications of E. Hotchkiss et al. (2008). We reclassify the actions that are specified as “Financial Restructuring” (“FinR”) in Test 1 into these three subcategories (Figure 1). For example, case YOC AG conducted actions related to financial restructuring, for which its FinR equals one in Test 1. But in Test 2, as YOC implements debt renegotiation (FinCR), shares issuance (“NewFin”) and asset sale for debt repayment (AssetS) within the scope of “FinR”, its “FinCR”, “NewFin” and “AssetS” all equal to one. Appendix-Table 3 displays the descriptive statistics of the sample with the new variables and the original three differently specified dependent variables. More

than 60% of the distressed firms increased their capital substantially through different financing resources, while most of the distressed firms did not intend to sell assets for debt repayment (Appendix-Table 3).

We use consistent models in this Section to estimate the separate effects raised by different actions. Other independent and dependent variables are set the same as in the initial regression model in the last Section. On top of the regression results, we take a look into some of the failed cases to get a better understanding of the firms' actions and logic chain of this negative impact.

Results and Analysis

For ***Hypothesis 1.1 (Not Supported)***: Findings in Table 9 suggest that financial contract restructuring makes the distressed firm less likely to recover from the overall financial distress measured by Z''-score, invariant to the analysis in the main results above.

The partial effects of "FinCR" (Appendix-Table 6) become more negative compared to those of "FinR" in the main findings (Table 8). Therefore, we believe that restructuring the outstanding financial contracts contributes significantly to financial restructuring's adverse relationship with the recovery from negative Z''-scores. Similar to explanations for hypothesis 1, the mechanism of Z''-scores might be partly responsible for it. As financial contract restructuring often come along with the goal for palliation of stress from debt repayment, the decrease of the debt would lead to the enhancement of X₄'s absolute value, worsening the Z''-scores if the improvement is not huge enough to turn the sign of this variable. Moreover, this fact could explain why "FinCR" does not display an apparent relationship with "EBITDA_REC" and "OM_REC", of which the recovery does not seem to directly depend on the new debt structure due to "FinCR".

For ***Hypothesis 1.2 (Not Supported)***: Unlike financial contract restructuring, the introduction of new financing resources displays a negative relationship with the likelihood of the firm's generating positive EBITDA at Year N.

One possible explanation could be referred to the mini case study attached in the Appendix. With actions of capital increase undertaken in 2013, the EBITDA of YOC AG had experienced an upwards trending from Year 1 (2013) to Year N (2017) with a huge increase in 2013, but the improvements had not been huge enough to bring EBITDA back to positive. Also, YOC AG claimed anticipation of positive EBITDA in 2017, which cannot be proved yet due to data unavailability (YOC AG, 2004b-2017). In other words, whether a restructuring plan is done or not cannot be considered as the direct reason why a firm recover or not. Different duration needed for different actions to be sufficiently effective could be one of the likely explanations.

For ***Hypothesis 1.3 (Not Supported)***: Asset sale for debt repayment does not display any noticeable effect on the performance of the distressed firm at Year N.

We believe the fact that only a few cases conducting this plan might be responsible for it. Another possible explanation could be measurement errors due to difficulties in separating the asset sale for debt repayment from portfolio restructuring. In the YOC AG case (2004b-2017), the sale of its media segment initiated for refocusing on the core business also partly contributed to the reduction of its current liabilities, yet the details of methods and amounts were not published, which makes the effects caused by asset sale for debt repayment mixed in the results.

5.2.3 Market Performance and Different Recovery Plans

Given the results above, we would also like to investigate if the different restructuring actions contribute differently to the market performance compared to accounting performance specified previously. To check whether the restructuring plan affects the market performance of the distressed firm at Year N, we introduced a new dependent variable, “g_i” to measure if the stock price of the distressed firm increase from Year 0 to Year N. Due to the unavailability of the stock prices before IPO, we again downsize the original sample to 75 cases, ensuring the all the remaining cases have quoted prices at both Year 0 and Year N. Here we use the same logistic regression model as in the main model. We define the dependent variable as a dummy “Stock Return Recovery”, which equals one if the distressed firm’s stock displays positive return from Year 0 to Year N (i.e. the annualized stock return > 0). All other variables are defined as the same as in the main regression model.

Results and Analysis

From the findings in Table 10 distressed firms that implements organizational restructuring plans are less likely to generate a positive return in respect of the market price of the stock. Our findings do not deviate much from the previous studies. Brickley and van Drunen (1990) conclude that the firms that conducted organizational restructuring actions are more likely to experience a downturn of stock price after the actions in general. Some other papers focus on specific actions related to organizational restructuring; for example, announcements of layoffs is proved to be relative to a decline of the stock price regardless of the period, the country and the type of the firms (Capelle-Blancard & Couderc, 2006). Also, Capelle-Blancard and Couderc (2006) suggest that the market would respond more severely to defensive organizational restructuring than to the offensive layoffs, which well aligns with our findings as the organizational restructuring of distressed firms are perceived more likely to come along with defensive purposes.

However, Iqbal and Shetty (2011)’s paper suggests that stock prices experience larger appreciation for distressed firms than the healthy firms after the layoffs announcements,

attributing it to the huger future benefits expected by the market. In spite of the similar conditions set for the firms studied, our findings are apparently different. The earlier participation of the shareholders and the market might be responsible for the absence of stock appreciation from Year 0 to Year N, which could lead to further research.

5.3 Summary

Comparing the tests using accounting performance proxies (Test 1 and Test 2) and market performance proxy (Test 3), financial restructuring dominates in the lasting poor accounting performance of distressed firms, while organizational restructuring shows stronger relationship with negative equity returns from Year 0 to Year N. Within the scope of financial restructuring, acts of financial contract restructuring and new financing resource are the two primary factors associated with the unlikelihood of firm's recovery in terms of negative Z"-score and negative EBITDA respectively. Additionally, acts of portfolio restructuring display a consistently negative relationship for positive Z"-score in both Test 1 and Test 2 but weakly associated with the other specifications. However, our argument does not sufficiently support the mechanism behind the case's failure to recover, with one possible explanation as below:

"...The major difference between recovery and non-recovery firms is that, with the latter, ineffectiveness of restructuring in early years leads to more intensification of strategies. However, when the restructuring intensity is cumulated over the post-distress years, these strategies nevertheless do not contribute to recovery." (Sudarsanam & Lai, 2001)

In comparison with the previous papers studying mainly the US market or individual sector, our paper focus on the core Eurozone markets without sector constraints that few scholars have investigated, providing an overview of the distressed firms in Europe. In general, our paper broadens some of the control variables and adopts the basic framework of Bowman et al. (1999) for the main restructuring variables. However, most of our findings are inconsistent with the previous conclusions, attributed to various potential reasons including the different assumptions and hidden mechanism explained above.

Table 8 Test 1: Recovery and Different Restructuring Plans

(i) Model (1) is for the main logistic regression model, while (3) and (5) refer to the robustness check using alternative specifications. (1), (3) and (5) use the original sample with the most information available. (2), (4) and (6) use the intersection sample with consistent sample with complete cases to provide supplementary support for (1), (3) and (5) respectively.

(ii) “FinR” equals one if the distressed company implements financial restructuring plans¹⁰. “PorR” equals one if the distressed company implements portfolio restructuring plan. “OrgR” equals one if the company conducted an organizational plan. “BlockC” equals one if the company’s blockholder is changed. “CapStruct” is measured as debt to equity ratio reported in Year 0. “Size” is measured as logarithm of the total assets divided by 1000 reported in Year 0. As for the dependent variables, in (1) “Z_REC” equals one if the Z”-score of the company is positive in Year N. In (3), “EBITDA_REC” equals one if the EBITDA of the company is reported as positive in Year N. In (5), “OM_REC” equals one if the operating margin of the company is reported as positive in Year N.

	Regression Results					
	Dependent variable:					
	Z_REC		EBITDA_REC		OM_REC	
	(1)	(2)	(3)	(4)	(5)	(6)
FinR	-1.85** (-2.22) ¹¹	-1.96** (-2.29)	-1.68** (-2.40)	-1.45** (-2.06)	-1.03* (-1.90)	-0.99* (-1.82)
PorR	-1.45** (-2.01)	-1.89** (-2.20)	0.50 (0.94)	0.19 (0.33)	-0.24 (-0.48)	-0.21 (-0.40)
OrgR	-0.88 (-1.45)	-0.90 (-1.43)	0.21 (0.38)	0.05 (0.09)	-0.81 (-1.58)	-0.84 (-1.63)
BlockC	0.44 (0.51)	0.53 (0.60)	0.01 (0.02)	-0.10 (-0.15)	0.48 (0.75)	0.45 (0.70)
MgmtC	0.84 (1.35)	1.04 (1.56)	0.23 (0.44)	0.03 (0.05)	-0.08 (-0.17)	-0.15 (-0.31)
CapStruct	0.01 (0.19)	0.01 (0.19)	0.03 (1.15)	0.02 (0.81)	0.03 (1.15)	0.03 (1.14)
Size	0.28 (0.54)	0.64 (1.06)	1.01** (2.08)	0.85* (1.70)	0.08 (0.20)	0.02 (0.05)
Constant	3.38*** (2.78)	3.23** (2.44)	0.17 (0.17)	0.68 (0.67)	1.02 (1.16)	1.12 (1.26)
Obs	88	81	87	81	82	81
Log Likelihood	-39.44	-35.39	-47.63	-44.56	-52.87	-52.24
AIC	94.88	86.79	111.27	105.12	121.74	120.47
AUC	0.728	0.768	0.739	0.698	0.659	0.665
Note: *p<0.1; **p<0.05; ***p<0.01						

¹⁰ From Year 1 to Year N.

¹¹ Z-values.

Table 9 Test 2: Recovery and Different Financial Restructuring Plans

(i) Models (7) ~ (12) are for the supplementary regression models with “FinR” replaced by “FinCR”, “NewFin” and “AssetS” respectively in correspondent to models (1) ~ (6) in Table 8. (7), (9) and (11) use the original samples with most information available, while (8), (10) and (12) use the smaller intersection sample with complete cases.

(ii) “FinCR” equals one if the distressed company implements financial restructuring plans. “NewFin” equals one if the distressed company absorbed new financing resources. “AssetS” equals one if the company sold part of its assets for debt repayment. Other independent variables and dependent variables remain the same as in Table 8.

	Regression Results					
	Dependent variable:					
	Z_REC		EBITDA_REC		OM_REC	
	(7)	(8)	(9)	(10)	(11)	(12)
FinCR	-1.01*	-1.40**	-0.45	-0.57	-0.68	-0.60
	(-1.68)	(-2.10)	(-0.83)	(-1.01)	(-1.29)	(-1.14)
NewFin	-0.54	-0.58	-1.45**	-1.30**	-0.87	-0.84
	(-0.84)	(-0.83)	(-2.41)	(-2.06)	(-1.63)	(-1.57)
AssetS	-2.15	-2.25	-0.07	0.001	-0.53	-0.54
	(-1.58)	(-1.58)	(-0.05)	(0.001)	(-0.38)	(-0.39)
PorR	-1.32*	-1.97**	0.56	0.14	-0.32	-0.27
	(-1.81)	(-2.18)	(1.02)	(0.24)	(-0.60)	(-0.52)
OrgR	-0.78	-0.77	0.10	-0.08	-0.92*	-0.93*
	(-1.24)	(-1.16)	(0.17)	(-0.13)	(-1.71)	(-1.74)
BlockC	0.54	0.62	0.05	-0.10	0.51	0.49
	(0.59)	(0.67)	(0.07)	(-0.14)	(0.78)	(0.74)
MgmtC	0.99	1.23*	0.31	0.14	-0.02	-0.07
	(1.51)	(1.69)	(0.57)	(0.25)	(-0.04)	(-0.14)
CapStruct	0.01	0.01	0.03	0.02	0.03	0.03
	(0.23)	(0.16)	(1.17)	(0.80)	(1.17)	(1.16)
Size	0.47	0.91	1.21**	1.02*	0.20	0.14
	(0.87)	(1.43)	(2.34)	(1.91)	(0.49)	(0.35)
Constant	2.30**	2.30*	-0.31	0.44	0.96	1.01
	(2.17)	(1.92)	(-0.36)	(0.46)	(1.11)	(1.17)
Obs.	88	81	87	81	82	81
Log Likelihood	-39.25	-34.44	-47.48	-44.00	-51.96	-51.55
AIC	98.50	88.88	114.96	107.99	123.92	123.10
AUC	0.722	0.781	0.737	0.700	0.661	0.653
Note: *p<0.1; **p<0.05; ***p<0.01						

Table 10 Test 3: Market Performance and Different Restructuring Plans

(i) Model (13) is for the main regression with the dependent variable defined as g_i . Model (14) are for robustness check on different industry performance, while Model (15) uses logit regression with penalized maximum likelihood (PML) for small sample bias reduction.

(ii) Industrial Growth (“ g_{sector} ”) is measured as $(\text{Industrial Price Index at Year } n / \text{Industrial Price Index at Year } 0)^{1/N} - 1$. “ g_i ” equals 1 when the annualized stock return is positive in Year N compared to Year 0. Other variables and dependent variables remain the same as in Table 8.

Regression Results			
	Dependent variable:		
	g_i		
	Logistic		PML (bias reduction)
	(13)	(14)	(15)
FinR	-0.08 (-0.13)	-0.14 (-0.22)	-0.10 (-0.16)
PorR	-0.50 (-0.86)	-0.49 (-0.84)	-0.46 (-0.81)
OrgR	-1.18* (-1.83)	-1.09* (-1.65)	-1.01* (-1.67)
BlockC	-0.57 (-0.74)	-0.62 (-0.80)	-0.43 (-0.60)
MgmtC	-0.57 (-0.98)	-0.57 (-0.98)	-0.48 (-0.85)
CapStruct	0.002 (0.12)	-0.001 (-0.03)	0.002 (-0.09)
Size	-0.28 (-0.55)	-0.32 (-0.62)	-0.24 (-0.49)
g_{sector}		27.86 (0.66)	
Constant	0.53 (0.52)	0.32 (0.29)	0.47 (0.47)
Obs.	75	75	75
Log Likelihood	-42.13	-41.90	-42.25
AIC.	100.25	101.81	100.50
AUC	0.666	0.676	0.672
Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$			

Section 6 Robustness Check

6.1 Different Industries

In our selected sample, the firms come from various industries with different distress durations, which could potentially affect the possibility of the recovery of a distressed firm. For instance, positive expectations or new inventions might cause the whole sector to grow during Year 0 to Year N, naturally increasing the turnaround possibilities of a distressed company. Therefore, we consider investigating the model robustness by adjusting the industry effect. To check the robustness across various industries, we further introduce a new variable “g_sector”, estimating the growth of industry performance during the distress period for each firm. Given the various periods of the firms studied and the uneven distribution of different industries, we believe the industry performance could be a simple proxy for the combination of the time effect and the industry development through the respective distress period. For all the three tests conducted in Section 5, the checks are conducted using logistic regression model with “g_sector”, for example, for the model (1) in Test 1:

$$Z_REC_i = \alpha + \beta_1 FinR_i + \beta_2 PorR_i + \beta_3 OrgR_i + \beta_4 BlockC_i + \beta_5 MgmtC_i + \beta_6 Size_i + \beta_7 CapStruct_i + \beta_8 g_sector_i \quad (9)$$

For Test 1: Recovery and Different Restructuring Plans

According to the results with a new control variable, Industry Growth, implementation of financial restructuring still shows an adverse relationship of significance with the possibilities of recovering from distress (negative Z’’-score), generating positive EBITDA and positive operating margin at Year N.

We believe the results in Table 11 suggest that different industry performance across periods does not change the main results in Section 5. The robustness check provides more affirmative information to support the previous conclusion that the actions related to financial restructuring during Year 0 and Year N are negatively associated with the possibility of the firm’s recovery in respect of financial performance.

For Test 2: Recovery and Different Financial Restructuring Plans

To test if the individual industry performances from Year 0 to Year N influence the relationships between the three new specified sub-variables for different financial restructurings and the firms’ post-distress performance at Year N, we again introduce the “g_sector” factor into the regression.

From the findings in Table 12, we believe that the financial contract restructuring’s contribution to the possibilities of unrecovered Z’’-score at Year N does not deviate with

different periodical industry performance. Similarly, the relationship between acts of new refinancing and the likelihood of negative post-distress EBITDA displays robustness with the new variable. Therefore, the robustness check findings in Table 12 further confirms the conclusions of model (7), (8), (9) and (10) in Test 2. However, the robustness tests for model (11) and (12) fail as the significance across the variables change. We attribute the failure here to too few cases with clearly and transparently reported asset disposals for debt repayment, small sample size bias as well as the relatively weak explanatory power of operating margin. Also, other possible explanations could be unevenly ranged industries and periods of the firms; for example, most distressed firms are from Health Care sector, while only one distressed case is from the Oil & Gas sector.

For Test 3: Market Performance and Different Restructuring Plans

Similar to the robustness check before in table 10, we again introduce the industry performance into the model. Our results imply that the possibility of positive stock return from Year 0 to Year N is adversely associated with the conduction of organizational restructurings regardless of the industry performance during the period, which further confirms the results of original Test 3 and provides much evidence to support the previous studies.

6.2 Alternative Specifications

As it is mentioned in Section 3.1, apart from “Z_REC”, we specify two alternative dependent variables that are closely linked to the financial performance of a firm, “EBITDA_REC” and “OM_REC” as the proxies for cash-flow earnings and profitability. For the sake of consistency, the specifications are all set on an absolute basis, which means the thresholds from 0 to 1 depend on the general definition of non-distressed performance. To be more specific, only when the firm generates positive EBITDA or profits at Year N could the firm be considered as successfully recovered. The time slots of the two specifications are identical with those of the “Z_REC” at Year N to ensure a fair comparison.

The potential risk of the new specifications is that the signs of EBITDA and operating margin cannot tell the whole story of the distressed firm from Year 0 to Year N. The simplified alternative specifications to “Z_REC” could raise the probabilities of information loss in the regression results.

The robustness check for Test 1 and Test 2 have been analyzed and discussed along with the main model in Section 5. Financial restructuring’s effect on the possibility of the firm’s failure is consistent across the three models, which further confirms the rejection of hypothesis 1.

6.3 Sample Adjustment

We test the original sample with as more information as we can get against the smaller intersection sample with all cases complete across the three specifications. The results for the main variables we focus on are consistent across the two sets of regressions. The findings of this test provide some evidence for the relative robustness of the sample and the regression results.

The same sample adjustments are applied to both Test 1 and Test 2 as well as their respective robustness check for sector performance. For example, in Test 1, model (2), (4) and (6) are tested under the smaller intersection sample to compare with model (1), (3) and (5) (Table 8). This approach does not apply to Test 3.

6.4 Revised Regression Method – Logit Regression with PML

A revised regression model with a penalty, logistic regression with penalized maximum likelihood, is applied to Test 1, Test 2 and Test 3 to test the robustness of the results. The PML method is aimed to reduce the sample bias caused by small sample size, discussed in the previous section of the model review.

For test 1, the results of the check are shown in Table 13, displaying that the significance and signs of financial restructuring and portfolio restructuring do not change under the penalty and therefore confirming our conclusions in Test 1 (Table 8) again. For Test 2, findings in Table 14 suggests that the relationship between new financing resources and recovery of EBITDA remains unchanged, while the financial contract restructuring's impact becomes unstable, which might be due to the sample bias caused by the relatively small size. For Test 3, the robustness using PML has been reported with the models in Table 10, where the robustness check is passed.

6.5 Summary

From all the robustness checks illustrated above, the variable “FinR” in Test 1 remains consistently significant with negative signs across the four major robustness checks. In general, the adverse association of financial restructuring plans with the possibilities of the firm's recovery is not significantly influenced by the individual industry performance during the distress period. For Test 2, different financial restructuring plans demonstrate different power across the three specifications, but not substantially affected by the periodical industry performance. For Test 3, the negative correlation between organizational restructuring and stock appreciation is robust under all the checks. Given the dynamic environment of the stock market, we believe the reasons behind are mixed and need more detailed investigation.

Table 11 Robustness Check for Test 1: Industry performance

(i) Model (16) ~ (21) are for the robustness check on different industry performance respectively in correspondent to models (1) ~ (6) in Table 8. (16), (18) and (20) use the original samples with most information available, while (17), (19) and (21) use the smaller intersection sample with complete cases.

(ii) “FinR”, “PorR” and “OrgR” equals 1 if the distressed company implements financial restructuring plans, portfolio restructuring plans, and organizational restructuring plans respectively during Year 1 to Year N. Industry Growth is measured as (Sector Price Index at Year N / Sector Price Index at Year 0) ^ (1/N)-1. Other independent variables and dependent variables remain the same as in Table 8.

	Regression Results					
	Dependent variable:					
	Z_REC		EBITDA_REC		OM_REC	
	(16)	(17)	(18)	(19)	(20)	(21)
FinR	-1.94** (-2.28)	-2.02** (-2.32)	-1.60** (-2.29)	-1.37* (-1.95)	-1.11** (-2.01)	-1.07* (-1.92)
PorR	-1.42* (-1.94)	-1.88** (-2.17)	0.47 (0.87)	0.17 (0.30)	-0.20 (-0.38)	-0.16 (-0.32)
OrgR	-0.75 (-1.21)	-0.82 (-1.26)	0.04 (0.06)	-0.12 (-0.20)	-0.69 (-1.32)	-0.72 (-1.38)
BlockC	0.30 (0.34)	0.43 (0.48)	0.12 (0.17)	-0.01 (-0.02)	0.42 (0.66)	0.40 (0.61)
MgmtC	0.85 (1.36)	1.05 (1.57)	0.20 (0.37)	-0.02 (-0.03)	-0.06 (-0.12)	-0.13 (-0.26)
CapStruct	0.004 (0.13)	0.005 (0.15)	0.03 (1.29)	0.02 (0.96)	0.03 (1.02)	0.03 (1.02)
Size	0.26 (0.49)	0.61 (1.01)	1.05** (2.12)	0.91* (1.77)	0.03 (0.08)	-0.02 (-0.05)
g_sector	36.92 (0.88)	26.25 (0.62)	-46.26 (-1.07)	-45.44 (-1.02)	40.23 (1.10)	38.70 (1.06)
Constant	3.07** (2.45)	3.03** (2.25)	0.63 (0.58)	1.10 (0.98)	0.66 (0.71)	0.76 (0.81)
Obs.	88	81	87	81	82	81
Log Likelihood	-39.06	-35.21	-47.03	-44.01	-52.25	-51.66
AIC.	96.12	88.41	112.06	106.02	122.50	121.33
AUC	0.752	0.772	0.756	0.715	0.672	0.660

Note: *p<0.1; **p<0.05; ***p<0.01

Table 12 Robustness Check for Test 2: Industry performance

(i) Model (22) ~ (27) are for the robustness check on different industry performance respectively in correspondent to models (7) ~ (12) in Table 9. (22), (24) and (26) use the original samples with most information available, while (23), (25) and (27) use the smaller intersection sample with complete cases.

(ii) Industry Growth (“g_sector”) is measured as the annualized sector price return (Sector Price Index at Year N / Sector Price Index at Year 0) ^ (1/N))-1. Other independent variables and dependent variables remain the same as in Table 9.

	Regression Results					
	Dependent variable:					
	Z_REC		EBITDA_REC		OM_REC	
	(22)	(23)	(24)	(25)	(26)	(27)
FinCR	-1.00*	-1.40**	-0.45	-0.60	-0.62	-0.55
	(-1.66)	(-2.09)	(-0.83)	(-1.06)	(-1.17)	(-1.03)
NewFin	-0.64	-0.65	-1.34**	-1.16*	-1.01*	-0.98*
	(-0.95)	(-0.90)	(-2.22)	(-1.81)	(-1.83)	(-1.77)
AssetS	-2.11	-2.22	-0.18	-0.12	-0.52	-0.53
	(-1.53)	(-1.55)	(-0.14)	(-0.09)	(-0.36)	(-0.37)
PorR	-1.30*	-1.96**	0.52	0.12	-0.26	-0.22
	(-1.77)	(-2.18)	(0.95)	(0.20)	(-0.49)	(-0.41)
OrgR	-0.70	-0.72	-0.03	-0.18	-0.82	-0.83
	(-1.10)	(-1.07)	(-0.05)	(-0.30)	(-1.49)	(-1.53)
BlockC	0.45	0.56	0.12	-0.04	0.45	0.43
	(0.49)	(0.61)	(0.17)	(-0.05)	(0.68)	(0.65)
MgmtC	1.02	1.25*	0.28	0.09	0.02	-0.04
	(1.53)	(1.72)	(0.50)	(0.15)	(0.03)	(-0.07)
CapStruct	0.01	0.005	0.03	0.02	0.03	0.03
	(0.18)	(0.14)	(1.30)	(0.92)	(1.03)	(1.02)
Size	0.44	0.88	1.23**	1.08**	0.14	0.09
	(0.83)	(1.40)	(2.36)	(1.97)	(0.36)	(0.23)
g_sector	27.78	17.87	-41.28	-39.67	43.27	42.26
	(0.68)	(0.42)	(-0.96)	(-0.87)	(1.16)	(1.13)
Constant	2.08*	2.18*	0.10	0.78	0.59	0.64
	(1.87)	(1.77)	(0.10)	(0.74)	(0.64)	(0.70)
Obs.	88	81	87	81	82	81
Log Likelihood	-39.02	-34.35	-46.99	-43.59	-51.27	-50.89
AIC.	100.05	90.70	115.98	109.19	124.54	123.78
AUC	0.731	0.784	0.750	0.709	0.681	0.673
Note: *p<0.1; **p<0.05; ***p<0.01						

Table 13 Robustness Check for Test 1: PML Method

(i) Model (28) ~ (33) are for the robustness check using logistic regression with penalized maximum likelihood respectively in correspondent to models (1) ~ (6) in Table 8. (28), (30) and (32) use the original samples with most information available, while (29), (31) and (33) use the smaller interSection sample with complete cases.

(ii) “FinR”, “PorR” and “OrgR” equals 1 if the distressed company implements financial restructuring plans, portfolio restructuring plans, and organizational restructuring plans respectively during Year 1 to Year N. Industrial Growth is measured as (Sector Price Index at Year N / Sector Price Index at Year 0) $^{(1/N)-1}$. Other independent variables and dependent variables remain the same as in Table 8.

	Regression Results					
	Dependent variable:					
	Z_REC		EBITDA_REC		OM_REC	
	(28)	(29)	(30)	(31)	(32)	(33)
FinR	-1.57** (-2.10)	-1.65** (-2.14)	-1.46** (-2.24)	-1.24* (-1.89)	-0.92* (-1.73)	-0.88* (-1.65)
PorR	-1.19* (-1.82)	-1.52** (-2.01)	0.49 (0.94)	0.21 (0.39)	-0.20 (-0.39)	-0.16 (-0.32)
OrgR	-0.77 (-1.34)	-0.78 (-1.31)	0.19 (0.36)	0.05 (0.08)	-0.71 (-1.40)	-0.73 (-1.45)
BlockC	0.28 (0.35)	0.36 (0.44)	-0.02 (-0.03)	-0.13 (-0.19)	0.42 (0.66)	0.39 (0.61)
MgmtC	0.72 (1.23)	0.90 (1.43)	0.20 (0.38)	0.01 (0.02)	-0.07 (-0.15)	-0.14 (-0.28)
CapStruct	-0.002 (-0.09)	-0.002 (-0.09)	0.02 (0.94)	0.01 (0.60)	0.02 (0.93)	0.02 (0.91)
Size	0.24 (0.50)	0.56 (1.00)	0.88* (1.92)	0.73 (1.54)	0.07 (0.19)	0.02 (0.05)
Constant	2.89*** (2.62)	2.68** (-2.14)	0.12 (0.13)	0.58 (0.60)	0.89 (1.03)	0.97 (1.12)
Obs.	88	81	87	81	82	81
Log Likelihood	-39.76	-35.76	-47.81	-44.74	-52.97	-52.34
AIC.	95.53	87.51	111.62	105.48	121.94	120.68
AUC	0.733	0.765	0.738	0.698	0.659	0.659
Note: *p<0.1; **p<0.05; ***p<0.01						

Table 14 Robustness Check for Test 2: PML Method

(i) Model (34) ~ (39) are for the robustness check using logistic regression with penalized maximum likelihood respectively in correspondent to models (7) ~ (12) in Table 9. (34), (36) and (38) use the original samples with most information available, while (35), (37) and (39) use the smaller intersection sample with complete cases.

(ii) The independent variables and dependent variables remain the same as in Table 9.

	Regression Results					
	Dependent variable:					
	Z_REC		EBITDA_REC		OM_REC	
	(34)	(35)	(36)	(37)	(38)	(39)
FinCR	-0.88 (-1.56)	-1.18* (-1.90)	-0.40 (-0.76)	-0.50 (-0.91)	-0.57 (-1.12)	-0.51 (-0.98)
NewFin	-0.48 (-0.78)	-0.51 (-0.78)	-1.27** (-0.76)	-1.12* (-1.88)	-0.78 (-1.49)	-0.75 (-1.43)
AssetS	-1.71 (-1.32)	-1.76 (-1.33)	-0.19 (-2.23)	-0.14 (-0.11)	-0.33 (-0.25)	-0.34 (-0.26)
PorR	-1.04 (-1.59)	-1.52* (-1.95)	0.53 (1.00)	0.17 (0.30)	-0.25 (-0.48)	-0.21 (-0.40)
OrgR	-0.68 (-1.15)	-0.66 (-1.07)	0.09 (0.16)	-0.06 (-0.11)	-0.79 (-1.49)	-0.80 (-1.52)
BlockC	0.32 (0.39)	0.38 (0.46)	-0.01 (-0.02)	-0.15 (-0.22)	0.41 (0.63)	0.39 (0.60)
MgmtC	0.83 (1.36)	1.01 (1.54)	0.28 (0.52)	0.12 (0.23)	0.01 (0.01)	-0.05 (-0.09)
CapStruct	-0.002 (-0.09)	-0.01 (-0.19)	0.02 (0.96)	0.01 (0.59)	0.02 (0.93)	0.02 (0.91)
Size	0.40 (0.80)	0.76 (1.33)	1.03** (2.14)	0.86* (1.72)	0.17 (0.43)	0.12 (0.30)
Constant	1.98** (2.03)	1.90* (1.75)	-0.26 (-0.30)	0.41 (0.44)	0.82 (0.97)	0.87 (1.02)
Obs	88	81	87	81	82	81
Log Likelihood	-39.65	-34.92	-47.68	-44.21	-52.12	-51.70
AIC	99.31	89.84	115.37	108.42	124.24	123.41
AUC	0.716	0.773	0.735	0.698	0.659	0.654
Note: *p<0.1; **p<0.05; ***p<0.01						

Section 7. Conclusion

Following the work on financial distress condition and post-bankruptcy performance by Altman et al. (2017) and Hotchkiss (1995), we perform an empirical analysis of the determinants of firms' post-distress performance within eurozone markets, providing more evidence on the research in this field. Our results suggest that in terms of accounting performance and Z''-score, the management board turnover and blockholder change contribute little to turnaround possibilities. The financial restructuring plan has a negative relationship with a distressed firm's turnaround measured by Z''-score, EBITDA and operating margin, while portfolio restructurings and firm size are proved to only significantly affect the recoveries of Z''-score and EBITDA respectively. The specific classification of three types of financial restructuring provides more insights into how different financial restructurings contribute to the negative relation. Financial contract restructuring and new financing resources display negative relationships with a firm's turnaround possibilities regarding accounting performance with supporting evidence from two mini cases, YOC AG and Solocal SA, while assets sale displays no sign of significant relations with the recovery in our models. It should be pointed out that most literature regarding corporate restructuring effects does not distinguish distressed firms from healthy firms. It could be possible that the restructuring effect may have deviation when a firm is going through severe financial difficulties. The restructuring process is usually complicated and brings mix effects to the firm's performance especially under financial distress condition, which remains to be investigated for further research.

As for market performance, our study suggests that the organizational restructuring plan associates adversely with higher probability of the stock resurgence for distressed firms, while other turnaround plans do not display any evidence of significant effects on the market performance, which may need further robustness check though.

All results in Test 1 remain consistent under several robustness checks. For our supplementary tests (Test 2 and Test 3), the relationships amongst new financing resources versus EBITDA recovery and organizational restructuring versus stock resurgence remain stable. And note that all the relationships indicated in all our regression results do not provide enough support for the restructuring plans being the causes of the non-recovery.

However, our small sample size might still cause some consequences. We only have 19 valid cases of unsuccessful recovery, providing less robust evidence on why those distressed firms failed to turn around by using several restructuring measures. During the data selection process, some distressed firms were merged into another firm, delisted from the exchange or went bankrupt directly, which makes it difficult to track their records or access previous financial reports. Those firms, which could potentially make differences

in the regression results on the relationship between different restructuring plans and recovery, are unintentionally but inevitably excluded from our sample, resulting in possible limitation of our interpretations and conclusions. Extended sample with more accessible information could provide more evidence and new insights for related topics in future studies.

References

- Ahmad, A. H., Kadir, H., & Hamzah, A. (2008). The Equity Performance of Malaysian Companies Emerging from Financially Distressed Condition. *International Journal of Business and Society*, 9.
- Altman, E. I. (1968). FINANCIAL RATIOS, DISCRIMINANT ANALYSIS AND THE PREDICTION OF CORPORATE BANKRUPTCY. *The Journal of Finance*, 23(4), 589–609. <https://doi.org/10.1111/j.1540-6261.1968.tb00843.x>
- Altman, E. I. (1983). *Corporate financial distress: A complete guide to predicting and avoiding distress and profiting from bankruptcy*. Wiley professional computing. New York: John Wiley & Sons.
- Altman, E. I., Iwanicz-Drozowska, M., Laitinen, E. K., & Suvas, A. (2017). Financial Distress Prediction in an International Context: A Review and Empirical Analysis of Altman's Z- Score Model. *Journal of International Financial Management & Accounting*, 28(2), 131–171. <https://doi.org/10.1111/jifm.12053>
- Anginer, D., & Yıldızhan, Ç. (2016). *Is There a Distress Risk Anomaly? Pricing of Systematic Default Risk in the Cross Section of Equity Returns*.
- BarclayHedge. (2012). Investing in Distressed Securities. Retrieved from <https://www.barclayhedge.com/hedge-fund-strategy-distressed-securities/>
- Bergh, D. (1998). Product-market uncertainty, portfolio restructuring, and performance: An information-processing and resource-based view. *Journal of Management*, 24(2), 135–155. [https://doi.org/10.1016/S0149-2063\(99\)80057-9](https://doi.org/10.1016/S0149-2063(99)80057-9)
- Bowman, E., & Singh, H. (1993). Corporate restructuring: Reconfiguring the firm. *Strategic Management Journal*, 14(S1), 5–14. <https://doi.org/10.1002/smj.4250140903>
- Bowman, E., Singh, H., Useem, M., & Bhadury, R. (1999). When Does Restructuring Improve Economic Performance? *California Management Review*, 41(2), 33–54. <https://doi.org/10.2307/41165985>
- Brickley, J. A., & van Drunen, L. D. (1990). Internal corporate restructuring. *Journal of Accounting and Economics*, 12(1-3), 251–280. [https://doi.org/10.1016/0165-4101\(90\)90050-E](https://doi.org/10.1016/0165-4101(90)90050-E)
- Campbell, J. Y., Hilscher, J., & Szilagyi, J. A.N. (2008). In Search of Distress Risk. *The Journal of Finance*, 63(6), 2899–2939. <https://doi.org/10.1111/j.1540-6261.2008.01416.x>
- Capelle-Blancard, G., & Couderc, N. (2006). How Do Shareholders Respond to Downsizing? A Meta-Analysis. *SSRN Electronic Journal*. Advance online publication. <https://doi.org/10.2139/ssrn.952768>
- Cascio, W. F. (2002). Strategies for responsible restructuring. *Academy of Management Perspectives*, 16(3), 80–91. <https://doi.org/10.5465/ame.2002.8540331>
- Chan-Lau, J. A., & Sy, A. N. R. (2007). Distance-to-default in banking: A bridge too far? *Journal of Banking Regulation*, 9(1), 14–24.

- <https://doi.org/10.1057/palgrave.jbr.2350056>
- Chava, S., & Jarrow, R. A. (2004). Bankruptcy Prediction with Industry Effects *Review of Finance*, 8(4), 537–569. <https://doi.org/10.1093/rof/8.4.537>
- Clark, K., & Ofek, E. (1994). Mergers as a Means of Restructuring Distressed Firms: An Empirical Investigation. *The Journal of Financial and Quantitative Analysis*, 29(4), 541. <https://doi.org/10.2307/2331109>
- Crosbie, P., & Bohn, J. (2003). Modeling default risk. *Working Paper*.
- Denis, D. (2000). Managerial discipline and corporate restructuring following performance declines. *Journal of Financial Economics*, 55(3), 391–424. [https://doi.org/10.1016/S0304-405X\(99\)00055-0](https://doi.org/10.1016/S0304-405X(99)00055-0)
- Denis, David, Denis, Diane, & Sarin, A. (1999). Agency theory and the influence of equity ownership structure on corporate diversification strategies. *Strategic Management Journal*, 20(11), 1071–1076. [https://doi.org/10.1002/\(SICI\)1097-0266\(199911\)20:11<1071::AID-SMJ70>3.0.CO;2-G](https://doi.org/10.1002/(SICI)1097-0266(199911)20:11<1071::AID-SMJ70>3.0.CO;2-G)
- Eberhart, A. C., Altman, E. I., & Aggarwal, R. (1999). The Equity Performance of Firms Emerging from Bankruptcy. *The Journal of Finance*, 54(5), 1855–1868. <https://doi.org/10.1111/0022-1082.00169>
- Eby, L. T., & Buch, K. (1998). *Journal of Business Ethics*, 17(12), 1253–1264. <https://doi.org/10.1023/A:1005758628414>
- Eisenhardt, K. M. (1989). Agency Theory: An Assessment and Review. *Academy of Management Review*, 14(1), 57–74. <https://doi.org/10.5465/amr.1989.4279003>
- Firth, D. (1993). Bias reduction of maximum likelihood estimates. *Biometrika*, 80(1), 27–38. <https://doi.org/10.1093/biomet/80.1.27>
- Hane P L. (2012). How well will restructure to create to separate companies, 1–6.
- Hofer, C. W. (1980). TURNAROUND STRATEGIES. *Journal of Business Strategy*, 1(1), 19–31. <https://doi.org/10.1108/eb038886>
- Hotchkiss. (1995). Postbankruptcy Performance and Management Turnover. *The Journal of Finance*, 50(1), 3–21. <https://doi.org/10.1111/j.1540-6261.1995.tb05165.x>
- Hotchkiss, E., John, K., Thorburn, K. S., & Mooradian, R. M. (2008). Bankruptcy and the Resolution of Financial Distress. *SSRN Electronic Journal*. Advance online publication. <https://doi.org/10.2139/ssrn.1086942>
- Hotchkiss, E., & Mooradian, R. M. (1997). Vulture Investors and the Market for Control of Distressed Firms. *SSRN Electronic Journal*. Advance online publication. <https://doi.org/10.2139/ssrn.1883>
- Iqbal, Z., & Shetty, S. (2011). Layoffs, Stock Price, And Financial Condition Of The Firm. *Journal of Applied Business Research (JABR)*, 11(2), 67. <https://doi.org/10.19030/jabr.v11i2.5876>
- Kaplan, S. (1989). The effects of management buyouts on operating performance and value. *Journal of Financial Economics*, 24(2), 217–254. [https://doi.org/10.1016/0304-405X\(89\)90047-0](https://doi.org/10.1016/0304-405X(89)90047-0)

- Kassambara, A. (2018). Multicollinearity Essentials and VIF in R. Retrieved from <http://www.sthda.com/english/articles/39-regression-model-diagnostics/160-multicollinearity-essentials-and-vif-in-r/>
- King, D. R., Dalton, D. R., Daily, C. M., & Covin, J. G. (2004). Meta-analyses of post-acquisition performance: indications of unidentified moderators. *Strategic Management Journal*, 25(2), 187–200. <https://doi.org/10.1002/smj.371>
- Kishore, R. M. (2004). *Financial management*. New Delhi: Taxmann Publications.
- L.A., S. (2012). Does Restructuring Improve Performance? An Industry Analysis Of Nigerian Oil & Gas Sector. *Research Journal of Finance and Accounting*, 3(6), 55–62. Retrieved from <https://www.iiste.org/Journals/index.php/RJFA/article/download/2401/2400>
- Lücke, M.-O., & Rudolf, M. (2010). Bankruptcy Codes, Bargaining, and the Valuation of Distressed Securities. *SSRN Electronic Journal*. Advance online publication. <https://doi.org/10.2139/ssrn.1595992>
- Merton, R. C. (1974). ON THE PRICING OF CORPORATE DEBT: THE RISK STRUCTURE OF INTEREST RATES *The Journal of Finance*, 29(2), 449–470. <https://doi.org/10.1111/j.1540-6261.1974.tb03058.x>
- Moulton, W. N., & Thomas, H. (1993). Bankruptcy as a deliberate strategy: Theoretical considerations and empirical evidence. *Strategic Management Journal*, 14(2), 125–135. <https://doi.org/10.1002/smj.4250140204>
- Muñoz - Bullon, F., & Sanchez - Bueno, M. J. (2010). Downsizing implementation and financial performance. *Management Decision*, 48(8), 1181–1197. <https://doi.org/10.1108/00251741011076735>
- Narkhede, S. (2018). Understanding AUC-ROC Curve. Retrieved from <https://towardsdatascience.com/understanding-auc-roc-curve-68b2303cc9c5>
- Norley, L., Marshall, P., & Swanson, J. (2008). *A practitioner's guide to corporate restructuring: Lyndon Norley, Peter Marshall and Joseph Swanson with the assistance of Manuel Martínez-Fidalgo*. Old Woking, Surrey: City & Financial Pub.
- Ohlson, J. A. (1980). Financial Ratios and the Probabilistic Prediction of Bankruptcy. *Journal of Accounting Research*, 18(1), 109. <https://doi.org/10.2307/2490395>
- Riany, C. (2012). Effects of restructuring on organization performance of mobile phone service providers. *International Review of Social Sciences and Humanities*, 198–204.
- Richard, P. J., Devinney, T. M., Yip, G. S., & Johnson, G. (2009). Measuring Organizational Performance: Towards Methodological Best Practice. *Journal of Management*, 35(3), 718–804. <https://doi.org/10.1177/0149206308330560>
- Saboo, S., & Gopi, S. (2009). Comparison of Post-Merger performance of Acquiring Firms (India) involved in Domestic and Cross-border acquisitions. *MPRA Paper*. (19274).
- Schendel, D., Patton, G. R., & Riggs, J. (1976). Corporate Turnaround Strategies: A Study of Profit Decline and Recovery. *Journal of General Management*, 3(3), 3–11.

- <https://doi.org/10.1177/030630707600300301>
- Schoenberg, R., Collier, N., & Bowman, C. (2013). Strategies for business turnaround and recovery: a review and synthesis. *European Business Review*, 25(3), 243–262. <https://doi.org/10.1108/09555341311314799>
- Shumway, T. (2001). Forecasting Bankruptcy More Accurately: A Simple Hazard Model. *The Journal of Business*, 74(1), 101–124. <https://doi.org/10.1086/209665>
- Solocal SA. (2004a-2017). Annual Report. Retrieved from <https://www.solocal.es/>
- Solocal SA. (2004b-2017). *Press Releases*. Retrieved from <https://www.solocal.es/>
- Sudarsanam, S., & Lai, J. (2001). Corporate Financial Distress and Turnaround Strategies: An Empirical Analysis. *British Journal of Management*, 12(3), 183–199. <https://doi.org/10.1111/1467-8551.00193>
- Wright, P., Ferris, S. P., Sarin, A., & Awasthi, V. (1996). Impact Of Corporate Insider, Blockholder, And Institutional Equity Ownership On Firm Risk Taking. *Academy of Management Journal*, 39(2), 441–458. <https://doi.org/10.5465/256787>
- Yeh, T.-m., & Hoshino, Y. (2002). Productivity and operating performance of Japanese merging firms: Keiretsu-related and independent mergers. *Japan and the World Economy*, 14(3), 347–366. [https://doi.org/10.1016/S0922-1425\(01\)00081-0](https://doi.org/10.1016/S0922-1425(01)00081-0)
- YOC AG. (2004a-2017). Annual Report. Retrieved from <https://yoc.com/>
- YOC AG. (2004b-2017). *Press Releases*. Retrieved from <https://yoc.com/>

Appendix

1. Sample Characteristics

Table 1.1 Decomposition of Each Plan Category

(i) Each row illustrates what other actions the firm take if it already takes one action under the distress condition. “Total” represents the case number for each row category. For example, the first row means that among 64 financial restructuring cases, 41 of them also take portfolio restructuring, 16 of them also take organizational restructuring.

	FinR	PorR	OrgR	MgmtC	BlockC	Total
FinR	-	41	17	28	9	64
PorR	41	-	19	25	9	59
OrgR	17	19	-	11	3	27
MgmtC	28	25	11	-	6	36
BlockC	9	9	3	6	-	13

Table 1.2 Decomposition of Each Plan Category in Percentage

Table 1.2 is Table 1.1 in percentage form. For example, the first row means that among 64 financial restructuring cases, 64.06% also takes portfolio restructuring, 26.56% takes organizational restructuring and so on.

	FinR	PorR	OrgR	MgmtC	BlockC
FinR	-	64.06%	26.56%	43.75%	14.06%
PorR	69.49%	-	32.20%	42.37%	15.25%
OrgR	62.96%	70.37%	-	40.74%	11.11%
MgmtC	77.78%	69.44%	30.56%	-	16.67%
BlockC	69.23%	69.23%	23.08%	46.15%	-

Figure 1 Distress Duration Distribution Based on Z"-score

The percentage of each distress duration among the full sample (88 cases). For example, 2% of the cases were in distress condition for one year, and 4% of the cases were in distress condition for two years.

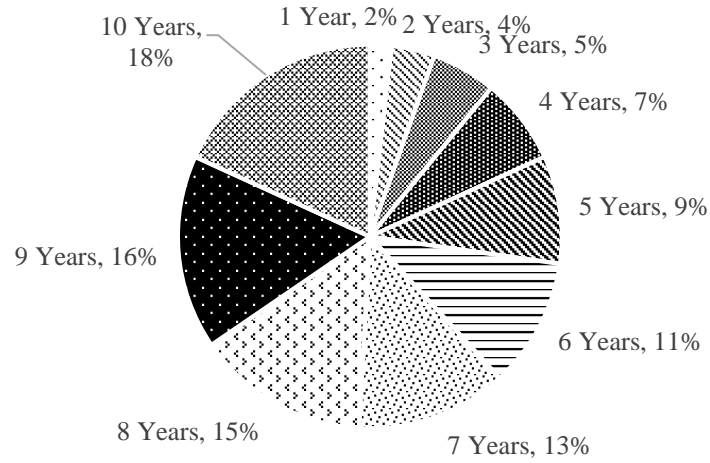


Table 2 Distress Cases Distribution Across Years

Table 2 displays the distribution of the time when firms fell into financial distress based on Z"-score. Total means there are 88 cases, i.e. the full sample regarding Z"-score.

Distress Year	Case Counts	Percentage
2004	12	13.64%
2005	3	3.41%
2006	5	5.68%
2007	3	3.41%
2008	7	7.95%
2009	11	12.50%
2010	6	6.82%
2011	9	10.23%
2012	20	22.73%
2013	3	3.41%
2014	4	4.55%
2015	2	2.27%
2016	3	3.41%
Total	88	100.00%

Figure 2 Market Distribution of Distressed firms

The market distribution of the distress cases among the full sample (88 cases). For example, 5.68% of the cases are from Portugal, and 11.36% come from the Netherlands.

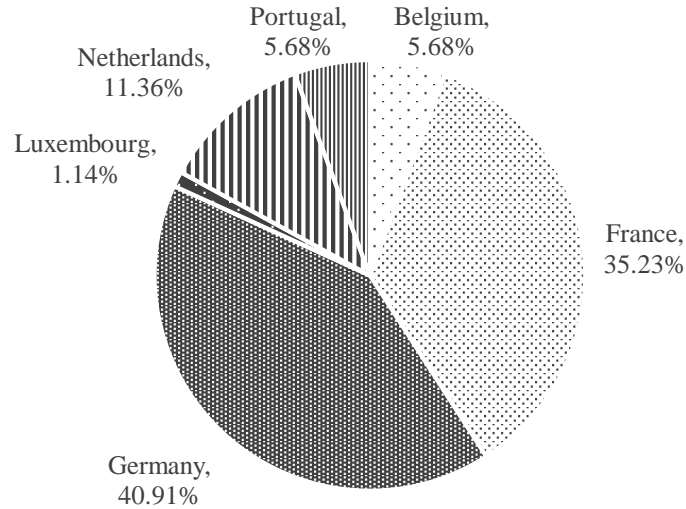


Table 3 Descriptive Statistics of The Subfactors of Financial Restructuring

This table is to demonstrate the descriptive statistics of the new variables “FinCR”, “NewFin” and “AssetS” versus the originally specified proxies for recovery (“Z_REC”, “EBITDA_REC” and “OM_REC”) in Test 2.

- (i) Panel 3.1, 3.2 and 3.3 are for the samples used in Table 9. (13), (15) and (17) respectively.
(ii) “Obs” refers to the number of observations in this sample. “Nbr.null” refers to the number of value zero. For example, in panel 3.1, there are 30 cases (88 minus 58) conducted actions related to financial contract restructuring and 19 out of 88 cases failed to recover from negative Z”-score. “Obs.na” refers to the number of cases with the invalid variables.

3.1 Sample Characteristics of the sample with 88 cases.

	FinCR	NewFin	AssetS	Z_REC	EBITDA_REC	OM_REC
Obs	88	88	88	88	88	88
Obs.null	58	33	85	19	30	46
Obs.na	0	0	0	0	0	0
min	0	0	0	0	0	0
max	1	1	1	1	1	1
sum	30	55	3	69	58	42

3.2 Characteristics of The Sample with 87 Cases.

	FinCR	NewFin	AssetS	Z_REC	EBITDA_REC	OM_REC
Obs	87	87	87	87	87	87
Obs.null	58	33	84	19	29	45
Obs.na	0	0	0	0	0	0
min	0	0	0	0	0	0
max	1	1	1	1	1	1
sum	29	54	3	68	58	42

3.3 Characteristics of The Sample with 82 Cases.

	FinCR	NewFin	AssetS	Z_REC	EBITDA_REC	OM_REC
Obs	82	82	82	82	82	82
Obs.null	53	31	79	18	25	40
Obs.na	0	0	0	0	0	0
min	0	0	0	0	0	0
max	1	1	1	1	1	1
sum	29	51	3	64	57	42

3.4 Characteristics of The Sample with 81 Cases.

	FinCR	NewFin	AssetS	Z_REC	EBITDA_REC	OM_REC
Obs	81	81	81	81	81	81
Obs.null	53	31	78	18	24	39
Obs.na	0	0	0	0	0	0
Min	0	0	0	0	0	0
Max	1	1	1	1	1	1
Sum	28	50	3	63	57	42

Table 4 Descriptive Statistics of the Sample for Market Performance

This table contains the characteristics of the sample used by Test 3. Similar to Appendix Table 3, “Obs” and “Obs.null” refer to the number of cases and number of cases with zero-valued variable respectively. For example, among the 75cases in the sample, there are 53 that did not experience a positive stock return from Year 0 to Year N.

	FinR	PorR	OrgR	Size	g_i
Obs	75	75	75	75	75
Obs.null	21	22	49	0	53
Obs.na	0	0	0	0	0
min	0	0	0	-0.073	0
max	1	1	1	2.92	1
Sum	54	53	26	102	22

2. Other Supplementary Information

Table 5 Variance Inflation Factor (VIF)¹² for Multicollinearity Test

(i) Panel A refers to the Variance inflation factor (VIF) for the sample without the split of “FinR”. And Panel B refers to the VIF value for the sample with “FinR” replaced by “FinCR”, “NewFin” and “AssetS”.

(ii) Variables with VIF value bigger than 5 shows a sign of multicollinearity.

Panel A							
Variable	FinR	PorR	OrgR	BlockC	MgmtC	CapStruct	Size
VIF value	1.0604	1.0602	1.0781	1.0275	1.1342	1.0405	1.1344

Panel B									
Variable	FinCR	NewFin	AssetS	PorR	OrgR	BlockC	MgmtC	CapStruct	Size
VIF value	1.0950	1.1810	1.1201	1.0842	1.1559	1.0636	1.1825	1.0535	1.2051

Table 6 PEA Calculations

Partial effects are calculated based on the model (1), (3) and (5) drawn from the main models in Table 8. For example, the partial effect caused by financial restructuring marginally affects the Z_REC by -0.1016 based on the model (1) in Table 8. Models (1), (3) and (5) are for Test 1; (7), (9) and (11) for Test 2; (13) for Test 3 correspondently.

Panel A: Test 1 & 3		Z_REC (1)	EBITDA_REC (3)	OM_REC (5)	g_i (13)
FinR		-0.1016	-0.3618	-0.2509	-
PorR		-0.0598	-	-	-
OrgR		-	-	-	-0.2553
BlockC		-	-	-	-
MgmtC		-	-	-	-
CapStruct		-	-	-	-
Size		-	0.244	-	-
Obs		88	87	82	75

Panel B: Test 2		Z_REC (7)	EBITDA_REC (9)	OM_REC (11)
FinCR		-0.1468	-	-
NewFin		-	-0.3457	-
AssetS		-	-	-
PorR		-0.2392	-	-
OrgR		-	-	-
BlockC		-	-	-
MgmtC		-	-	-
CapStruct		-	-	-
Size		-	0.2354	-
Obs		88	87	82

¹² Kassambara (2018)

3. Mini Cases

We selected two failed cases from the sample to help illustrate the relationships among distress, recovery and the different restructuring plans.

1.1 YOC AG (Germany)

YOC AG is a Germany company listed on DB. Founded in 2001, YOC has created a marketplace for innovative and non-intrusive digital ad formats and delivers them across all programmatic and direct trading channels. In 2006, YOC initiated IPO as one amongst first in Mobile Advertising area, with business covering European regions like Germany, Spain, France, the UK and so on.

Since 2012, YOC has been financially distressed with continuously negative Z-score. In 2013, YOC started the process of disposing of its mobile technology segment with a main purpose of refocusing on the core media business segment. Part of the proceeds from the disposal also contributed to the decline of the debt repayments. Later in 2014, the sale of the Affiliate Marketing segment was implements. From 2014 to 2016, YOC increased its capital by new share issuance within the framework of the private placement, generating equity effects amounting to EUR 6.0 million with cash effects amounting to EUR 4.2 million. To achieve the set targets, YOC purchased debt from the institutional creditors and receivables from the shareholders to generate revenue and positive equity effects, which came along with some outflows though. During 2012 to 2017 when YOC is defined as distressed, the equity figures dropped sharply below zero in 2013 and never became positive again. The debt experienced a huge decrease in 2014 when YOC repaid all the loan liabilities and came back to normal level subsequently. EBITDA saw improvements year by year but remained negative until 2017. (YOC, 2012~2017)

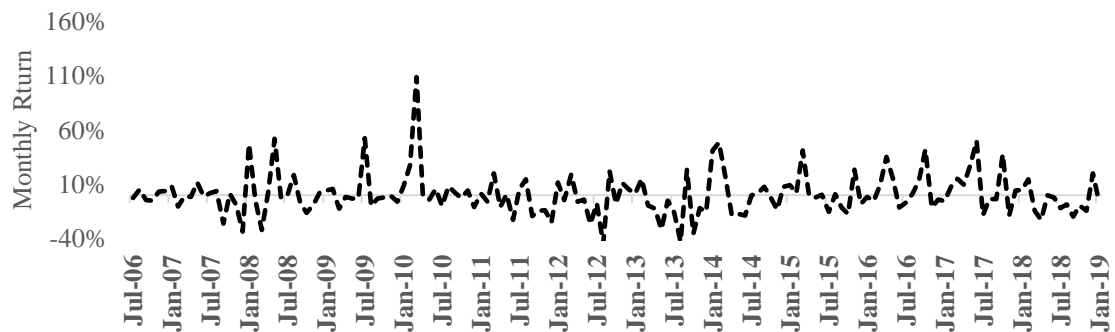
Table 7 Summary of the financial data during distress period for YOC

Z"-score represents our Z"-score evaluation for each year for YOC AG. Equity, Debt, EBITDA and total assets are all in millions EUR.

Year	Z"-score	Equity	Debt	EBITDA	Total Assets
2012	-3.3127	2.7	3.5	-3.2	22.4
2013	-23.6168	-4.7	1.2	-4.5	7.7
2014	-599.484	-1.7	0.0	-1.3	4.1
2015	-25.9985	-2.5	3.7	-1.1	3.9
2016	-27.7232	-3.6	4.3	-1.1	4.0
2017	-22.2075	-4.1	4.9	-0.1	4.7

Figure 3 Monthly Stock Returns of YOC

The monthly return for YOC AG from July 2006 to January 2019.



1.2 Solocal SA (France)

The Group Solocal's core business is to provide local information in France through online and printed directories publishing as well as editorial content to feed the customers' needs. PagesJaunes Group as its subsidiaries conducts complementary businesses like providing content and services, media and advertising representation.

From 2012 to 2017 the Solocal Group was distressed by definition (Z-scores). Since 2014, Solocal has reorganized itself in five vertical markets including Retail, B2B, Services, Home and Health & Public. In the meanwhile, Solocal extinguished part of the bank loan to refinance debt, amended syndicated credit agreement and issued bond loan amounting 350 million euros to increase the capital, which was used to repay the debt of 400 million euros, accelerate the transformation program "Digital 2015" and growth in its Internet business. In 2016, the group negotiated with its creditors for financial debt restructuring and finalized the new agreement that reduced the debt at the end of the year. The CFO attributed the unfavorable change of the working capital requirement to the suppliers' pressures reacting to uncertainty on the financial restructuring. In 2017, the Digital Marketing business' growth (18.1%) offset the Local Search's downturn (-5.8%) due to financial restructuring and below-expectation ramp-up of new products. A great number of shares and bonds were issued and new debt was contracted, including about 479 million new shares amounting to more than 660 million euros, 9 million MCBs and 398 million euros. More than two-thirds of the MCBs were converted to shares at the end of 2017. For financial figure, the equity figures remained negative with slight improvements, while the debt experienced two drops in 2013 and 2017 and EBITDA remained positive with a U-shaped trend through the period from 2012 to 2017. (Solocal, 2012~2017)

Table 8 Summary of the financial data during distress period for Solocal

Z"-score represents our Z"-score evaluation for each year for Solocal SA. Equity, Debt, EBITDA and total assets are all in millions EUR.

Year	Z"-score	Equity	Debt	EBITDA	Total Assets
2012	-6.6059	-2	1.8	0.4	0.8
2013	-7.6921	-1.8	1.6	0.3	0.8
2014	-6.7282	-1.4	1.2	0.3	0.8
2015	-7.8938	-1.3	1.1	0.2	0.8
2016	-16.5357	-1.3	1.2	0.2	0.8
2017	-1.8297	-0.5	0.4	0.5	0.7

Figure 4 Monthly Stock Returns of Solocal

The monthly return for Yocal SA from January 2005 to January 2019.

