

TECHNISCHE UNIVERSITÄT MÜNCHEN  
Lehrstuhl für Betriebswirtschaftslehre – Controlling

## **Restructuring Strategies and Post-Bankruptcy Performance**

Marcel Bruno Naujoks

Vollständiger Abdruck der von der Fakultät für Wirtschaftswissenschaften der Technischen Universität München zur Erlangung des akademischen Grades eines  
Doktors der Wirtschaftswissenschaften (Dr. rer. pol.)  
genehmigten Dissertation.

Vorsitzende: Univ.-Prof. Dr. Dr. Ann-Kristin Achleitner

Prüfer der Dissertation:

1. Univ.-Prof. Dr. Gunther Friedl
2. Univ.-Prof. Dr. Christoph Kaserer

Die Dissertation wurde am 29.02.2012 bei der Technischen Universität München eingereicht und durch die Fakultät für Wirtschaftswissenschaften am 02.05.2012 angenommen.

## Foreword

A corporate insolvency normally has far-reaching consequences for employees, financiers, suppliers and customers alike. Both scientists and practitioners have therefore paid very close attention to this phenomenon. To attenuate the negative repercussions, insolvency law often provides for mechanisms that can help to restructure firms, enabling them to survive and continue operating as a going concern. In the U.S., this kind of reorganization takes place under what is known as "Chapter 11 bankruptcy". It is therefore worth asking what companies can do to make a success of their reorganization – and to stay successful when they emerge from Chapter 11 protection. Although the question is of great significance to modern economies, too little investigative attention has so far been paid to it.

This being the case, the objective of the dissertation that follows is to enrich existing research into the effects of restructuring actions. The author analyzes an extensive range of actions taken by U.S. firms under Chapter 11 protection and examines their impact on the firms' performance. In several respects, he goes beyond the scope of past studies. First, he addresses not only those actions taken during insolvency, but also steps undertaken during the post-bankruptcy phase. This addition makes sense, as it is reasonable to assume that not only actions taken during Chapter 11 bankruptcy are likely to be crucial to the lasting success of a restructured company. Second, he explores a more detailed array of actions than is the case in existing empirical literature. His analysis is based on a sample of large public U.S. firms that filed for bankruptcy between 1993 and 2005. The author's analysis shows that certain restructuring actions have a measurable impact on a company's long-term performance in the wake of insolvency.

The dissertation is underpinned by a carefully constructed framework of hypotheses and an extensive set of data, some aspects of which were gathered at the cost of very considerable effort. Since the empirical analysis is extremely well structured and very clearly reasoned, it is easy to follow all conclusions and findings. The research design and the outcomes alike constitute interesting and innovative additions to the existing body of literature. They build on – and substantially enrich – existing research findings in national and international restructuring literature. Both future research work and corporate decision-makers – who can make a better-informed choice of restructuring actions on the basis of the author's findings – stand to benefit.

Munich, May 2012

Gunther Friedl

## **Preface**

The idea of doing a doctoral thesis about restructuring strategies in the bankruptcy context came to me during one of my consulting projects at Roland Berger Strategy Consultants. I was curious to know what distinguishes firms that successfully rebound from bankruptcy and return to prosperity from those that do not succeed after emerging from bankruptcy. This doctoral thesis was written during my time as an external doctoral student at the Department of Business Administration – Controlling at the Technische Universität München.

First and foremost, I would like to thank my doctoral thesis supervisor, Prof. Dr. Gunther Friedl, for accepting my application, integrating me into his outstanding team, always having an open door and an open ear and, finally, providing prompt and critical feedback on my work. I would also thank Prof. Dr. Christoph Kaserer for kindly agreeing to provide a second opinion and Prof. Dr. Dr. Ann-Kristin Achleitner for chairing the examination board.

Special thanks go to Roland Berger Strategy Consultants, which generously supported my research. In particular, I would like to thank my mentor, Oliver Räuscher, who supported my research proposition right from the outset. Thanks also to Dr. Christian Krysz, who does an exceptional job of managing the Roland Berger doctoral program. Last but not least, I am indebted to Felix Huck for sharing his knowledge of the use of financial databases, and to Stefan Seidemann for critically reviewing my English.

I also would like to thank participants of the doctoral seminars at the Technische Universität München and the Roland Berger doctoral camps who provided constructive feedback on my research. I am especially grateful to my fellow doctoral students Martin Schmuck, who read my thesis and supplied detailed and thoughtful feedback, and Tim Kettenring and Maximilian Bader, whose comments and discussions were exceptionally helpful.

I thank Daniel Arand and Maximilian Doms for all the Wednesday morning research breakfasts, at which we shared the ups and downs of being a doctoral student. I owe special thanks to Dr. Kevin Aretz, who critically reviewed my thesis, challenged me by asking the right questions and was thus instrumental in making this a better thesis.

Finally, and most importantly, I would like to thank my parents, Alwine and Walter Naujoks, and my beloved wife, Annika Naujoks, for always and unconditionally supporting and motivating me during the good and the not-so-good times. Without their help and understanding, this project would not have been possible. I wish to dedicate my thesis to my parents.

Munich, June 2012

Marcel Naujoks

## Table of Contents

<b>List of Figures.....</b>	<b>VIII</b>
<b>List of Tables .....</b>	<b>IX</b>
<b>List of Abbreviations .....</b>	<b>XI</b>
<b>1 Introduction .....</b>	<b>1</b>
1.1 Motivation and Research Questions .....	1
1.2 Research Gap and Contribution.....	4
<b>2 Literature Review .....</b>	<b>8</b>
2.1 Financial Distress and the Efficiency of Chapter 11 .....	8
2.2 Financial Distress and Corporate Restructuring.....	13
2.3 Bankruptcy, Reorganization and Post-Bankruptcy Performance .....	16
<b>3 Corporate Bankruptcy in the U.S. – Liquidation and Reorganization.....</b>	<b>23</b>
3.1 Principles of U.S. Bankruptcy Law .....	23
3.2 Liquidation under Chapter 7.....	25
3.3 Reorganization under Chapter 11 .....	26
<b>4 Research Model .....</b>	<b>31</b>
4.1 Definitions .....	31
4.1.1 General Definitions .....	31
4.1.2 Chapter 11 Outcomes and Post-Bankruptcy Outcomes.....	33
4.2 Research Model .....	35
4.2.1 Post-Bankruptcy Performance as Dependent Variable .....	37
4.2.2 Restructuring Actions as Independent Variables .....	45
4.2.2.1 Operational Restructuring.....	47
4.2.2.2 Financial Restructuring.....	55
4.2.2.3 Managerial Restructuring .....	62
4.2.2.4 Portfolio Restructuring .....	65
4.2.3 Context Factors as Control Variables.....	69

---

<b>5 Methodology and Data</b> .....	<b>77</b>
5.1 Statistical Methodology.....	77
5.1.1 Choice of Regression Model.....	77
5.1.2 Test for Sample Selection Bias .....	78
5.2 Data Sources.....	81
5.3 Sample Selection .....	83
5.3.1 Sample Selection Process .....	83
5.3.2 Sample Size Requirements and Treatment of Missing Data .....	85
5.4 Descriptive Statistics .....	86
<b>6 Analysis and Research Findings</b> .....	<b>97</b>
6.1 Univariate Analysis .....	97
6.2 Multivariate Analysis.....	100
6.2.1 Final Model.....	100
6.2.2 Final Model with Interaction Terms .....	108
6.2.3 Models by Restructuring Strategies .....	109
6.2.4 Effect of Discrete Changes .....	111
6.3 Robustness of Findings and Regression Diagnostics .....	115
6.3.1 Test for Sample Selection Bias .....	115
6.3.2 Test for Endogeneity Bias .....	119
6.3.3 Collinearity among Independent Variables.....	122
6.3.4 Normality of Residuals and Influential Cases .....	124
6.3.5 Robustness of Cutoff Levels of Independent Variables.....	125
<b>7 Conclusions</b> .....	<b>127</b>
7.1 Main Findings and Concluding Remarks .....	127
7.2 Limitations and Directions for Future Research .....	131
<b>References</b> .....	<b>133</b>
<b>Appendix</b> .....	<b>144</b>

---

## List of Figures

Figure 1: Number of Bankruptcy Filings by Public U.S. Companies 1990-2009.....	2
Figure 2: Timing Conventions .....	32
Figure 3: Overview Research Model.....	36
Figure 4: Economic vs. Financial Distress of Emerged Public Sample Firms in F-1 ..	74
Figure 5: Sample Selection Process.....	85
Figure 6: Industry Distribution of Emerged Public Sample Firms in F-1 .....	89
Figure 7: Duration in Chapter 11 .....	92
Figure 8: Performance of Emerged Public Sample Firms from F-3 to E+3 by Performance Groups .....	95
Figure 9: Post-Bankruptcy Outcomes of Emerged Public Sample Firms in E+3.....	96
Figure 10: Sensitivity Graphs of Predicted Success Probabilities.....	114
Figure 11: Distribution of Residuals and Influential Cases .....	124



## List of Tables

Table 1: Generic Restructuring Strategies Defined by Lai and Sudarsanam (1997)....	14
Table 2: Chapter 11 Outcomes.....	33
Table 3: Post-Bankruptcy Outcomes .....	35
Table 4: Performance Metrics of Selected Post-Bankruptcy Performance Studies.....	38
Table 5: Performance Metrics of Selected Restructuring Studies .....	39
Table 6: Definition of Free Cash Flow Performance Metric .....	41
Table 7: Accounting-Based Definitions of Post-Bankruptcy Success of Selected Studies.....	42
Table 8: Accounting-Based Definitions of Turnaround Success of Selected Studies ..	43
Table 9: Definitions of Independent Variables by Restructuring Strategies.....	46
Table 10: Definitions of Control Variables .....	69
Table 11: Data Sources.....	82
Table 12: Sample Distribution by Year of Filing .....	88
Table 13: Key Characteristics of Sample Firms in F-1 .....	90
Table 14: Performance of Emerged Public Sample Firms from F-3 to E+3 .....	94
Table 15: Univariate Analysis of Post-Bankruptcy Success – Independ. Variables .....	98
Table 16: Univariate Analysis of Post-Bankruptcy Success – Control Variables.....	99
Table 17: Multivariate Logistic Regression of Post-Bankruptcy Performance - Preliminary Model based on Univariate Analysis .....	101
Table 18: Multivariate Logistic Regression of Post-Bankruptcy Performance - Final Model .....	104
Table 19: Multivariate Logistic Regression of Post-Bankruptcy Performance – Final Model with Interaction Terms.....	109
Table 20: Multivariate Logistic Regression of Post-Bankruptcy Performance by Restructuring Strategies .....	111
Table 21: Effects of Discrete Changes on Predicted Success Probabilities.....	113
Table 22: Definition of Factors Potentially Influencing Survival in Chapter 11 .....	116
Table 23: Determinants of Emergence in Chapter 11 – First Stage Probit Model with Sample Selection.....	117
Table 24: Multivariate Analysis of Post-Bankruptcy Performance – Second Stage Probit Model with Sample Selection .....	118
Table 25: Two-Stage Rivers-Vuong Probit Regressions (Part I) .....	121
Table 26: Two-Stage Rivers-Vuong Probit Regressions (Part II).....	122

---

Table 27: Collinearity Diagnostics.....	123
Table 28: Emerged Public Sample Firms.....	144
Table 29: Multivariate Probit Regression of Post-Bankruptcy Performance - Final Model .....	145
Table 30: Multivariate Logistic Regression of Post-Bankruptcy Performance – Cumulative Models by Restructuring Strategies .....	146
Table 31: Correlation Matrix of Independent and Control Variables .....	147

---

## List of Abbreviations

AICPA	American Institute of Certified Public Accountants
APR	Absolute priority rule
BAPCPA	Bankruptcy Abuse Prevention and Consumer Protection Act of 2005
BRD	UCLA-LoPucki Bankruptcy Research Database
CAPEX	Capital expenditures
CEO	Chief Executive Officer
COGS	Cost of goods sold
CPI	Consumer price index
DBeta	Pregibon's Delta-Beta
DIP	Debtor in possession
EBT	Earnings before taxes
EBIT	Earnings before interest and taxes
EBITD	Earnings before interest, taxes and depreciation
EBITDA	Earnings before interest, taxes, depreciation and amortization
EDGAR	Electronic Data Gathering, Analysis, and Retrieval system
FCF	Free cash flow
FDIC	Federal Deposit Insurance Corporation
LR	Likelihood ratio
M&A	Mergers and acquisitions
PBGC	Pension Benefit Guaranty Corporation
ROA	Return on assets
ROS	Return on sales

SDNY	United States District Court for the Southern District of New York
SEC	Securities and Exchange Commission
SG&A	Selling, general and administrative expenses
SIC	Standard Industrial Classification
SOP	Statement of Position of the American Institute of Certified Public Accountants
UCP	Unanimous consent procedure
UK	United Kingdom
U.S.	United States
U.S.C.	United States Code
USD	U.S. dollar
VIF	Variance inflation factor

# 1 Introduction

## 1.1 Motivation and Research Questions

The need to resolve financial distress in general and bankruptcy in particular has been on the agenda of both academics and practitioners for many years.<sup>1</sup> Recent large bankruptcy cases such as Eastman Kodak in 2012, American Airlines in 2011, General Motors in 2009 and Lehman Brothers in 2008 have attracted considerable attention. Yet such high-profile bankruptcy cases are only the tip of the iceberg. From a total of almost 20,000 business bankruptcy filings in 2006, the number increased to over 60,000 in 2009 during the global economic and financial crisis.<sup>2</sup> The situation of public U.S. firms filing for bankruptcy has developed in a similar fashion since 2006 as Figure 1 shows.<sup>3</sup> While Lehman Brothers was sold piecemeal and no longer exists, General Motors emerged from bankruptcy as going concern.<sup>4</sup> However, even emerging from bankruptcy is no guarantee of subsequent success as, for instance, the case of US Airways has shown. Having survived its initial bankruptcy, US Airways had to refile for bankruptcy protection in 2004.<sup>5</sup> Eventually, the company merged with its competitor America West in 2005.<sup>6</sup> This raises a question: What distinguishes those companies that emerge from Chapter 11 and successfully continue in business as going concerns from those companies that emerge but ultimately fail?

---

<sup>1</sup> For a definition of financial distress, see chapter 2.1. Principles of corporate bankruptcy law in the U.S. are discussed in chapter 3. A literature review with regard to both interrelated topics of financial distress and bankruptcy is provided by Hotchkiss et al. (2008).

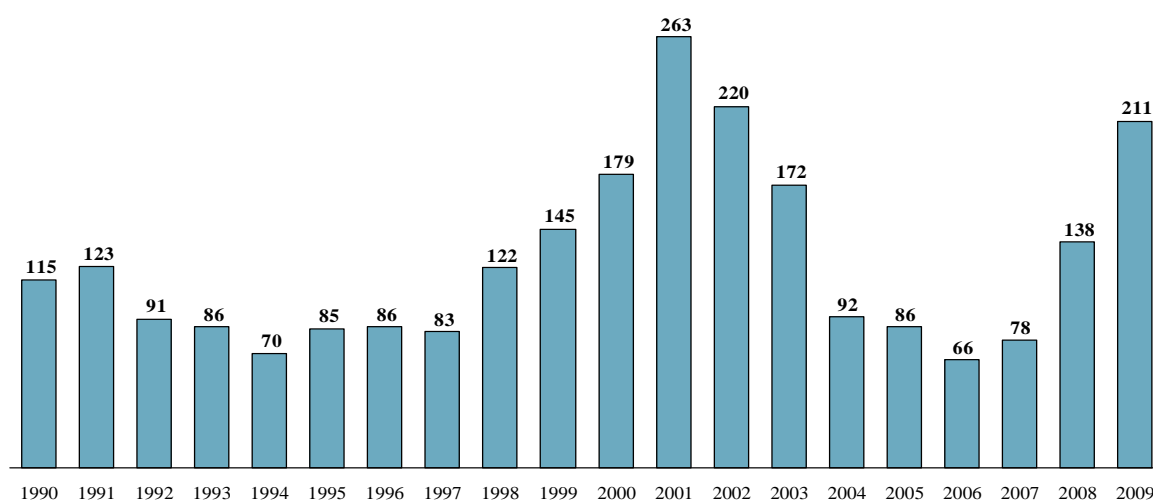
<sup>2</sup> See the 2010 Bankruptcy Yearbook & Almanac, p. 4. The data originates from the Administrative Office of the United States Courts, which can be downloaded from [www.uscourts.gov](http://www.uscourts.gov). It includes both public and private firms filing for bankruptcy. The focus of this study is on public firms.

<sup>3</sup> Public companies in the 2010 Bankruptcy Yearbook & Almanac are defined as firms with either publicly traded stocks or publicly traded bonds, see the 2010 Bankruptcy Yearbook & Almanac, p. 33.

<sup>4</sup> See 8-K of Lehman Brothers Holdings, dated September 16, 2008, stating that most parts of the North American business of Lehman Brothers were sold in a § 363 sale to Barclays Capital. Other businesses of Lehman Brothers were sold over the next months. See 10-K of General Motors (NewCo) for the fiscal year 2009, stating that the NewCo acquired substantially all assets and assumed certain liabilities of General Motors (OldCo) in a § 363 sale on July 10, 2009. Substantially all the business of General Motors was thus transferred to a new legal entity that subsequently took on the old company name.

<sup>5</sup> See 8-K of US Airways Group dated September 12, 2004.

<sup>6</sup> See rule 425 filing, dated May 19, 2005, stating that America West Holdings merged with the bankrupt US Airways Group.

**Figure 1: Number of Bankruptcy Filings by Public U.S. Companies 1990-2009**

Source: The 2010 Bankruptcy Yearbook & Almanac, p. 34.

There are broadly two different streams in bankruptcy literature with respect to how reorganization under Chapter 11 is perceived. On the one hand, some scholars argue that Chapter 11 allows viable firms to restructure their debt and operations in a systematic manner facilitating a fresh start once the firm has left Chapter 11. Asquith, Gertner, and Scharfstein (1994) argue that Chapter 11 gives a bankrupt firm time to negotiate restructuring with its creditors while the firm's going concern value is preserved.<sup>7</sup> Heron, Lie, and Rodgers (2009) assert that Chapter 11 can be interpreted as a unique opportunity for firms to establish a new and, presumably, more suitable capital structure without the difficulties associated with the holdout problem among creditors that can arise in out-of-court debt restructurings.<sup>8</sup> Wruck (1990) emphasizes that financial distress (including Chapter 11 bankruptcy) often results in comprehensive restructurings or triggers a change to corporate strategy that can increase the firm's value.<sup>9</sup> On the other hand, some scholars criticize the Chapter 11 process for inefficiently fil-

<sup>7</sup> See Asquith, Gertner, and Scharfstein (1994), p. 651.

<sup>8</sup> See Heron, Lie, and Rodgers (2009), p. 727. Similar reasoning appears in Alderson and Betker (1995a). The holdout problem shall be defined as in Gertner and Scharfstein (1991), p. 1200, who view this problem as an incentive for creditors not to exchange their old debt for new debt (i.e. to hold out) since the value of the old debt is likely to rise when the exchange takes place, due to the lower risk of default, for example.

<sup>9</sup> See Wruck (1990), p. 420 and pp. 433-435.

tering viable and nonviable firms, and for being biased in favor of the survival of inefficient firms. Baird (1986) argues that the U.S. bankruptcy law is biased toward reorganization.<sup>10</sup> Hotchkiss (1995) conjectures that failing to replace the incumbent management during reorganization may be related to this bias.<sup>11</sup> This is in line with Bradley and Rosenzweig (1992), who argue that provisions of the Bankruptcy Code give the incumbent management preferential treatment at the expense of stockholders and bondholders.<sup>12</sup>

Reconciling these two streams, White (1994) argues that the U.S. bankruptcy law faces a trade-off between letting inefficient firms reorganize under Chapter 11 (type I error) and liquidating efficient firms under Chapter 7 (type II error).<sup>13</sup> Consequently, estimating the level of the type I error is an empirical question, as Hotchkiss (1995) suggests.<sup>14</sup> However, the trade-off illustrated by White (1994) assumes that the Chapter 11 process is static and that firms are either viable or nonviable.<sup>15</sup> In contrast, I regard reorganization under Chapter 11 as a highly dynamic process that allows important stakeholders in a firm – namely the shareholders, the management and the creditors – to define and implement value-preserving and value-increasing restructuring actions that may contribute to (i) firm survival and (ii) post-bankruptcy success. This interpretation of the reorganization process under Chapter 11 relates to the dynamic liquidation theory put forward by Kahl (2002). He models the decision of the creditors to liquidate a firm in financial distress as a dynamic process that gives a firm's shareholders and management time to convince the creditors that continuing the firm may be the preferred option.<sup>16</sup> Due to the creditors' postponement of the liquidation decision, this time can be useful to implement value-increasing restructuring actions.

---

<sup>10</sup> See Baird (1986), pp. 133-134 and p. 145.

<sup>11</sup> See Hotchkiss (1995), p. 4.

<sup>12</sup> See Bradley and Rosenzweig (1992), pp. 1049-1050.

<sup>13</sup> See White (1994), p. 269.

<sup>14</sup> See Hotchkiss (1995), pp. 4-5.

<sup>15</sup> See White (1994), p. 268.

<sup>16</sup> See Kahl (2002), pp. 136-138.

Accordingly, this study concerns itself with analyzing the restructuring strategies and the post-bankruptcy performance of large public U.S. companies and addresses the following research questions: First, how effective are restructuring efforts of bankrupt U.S. firms in contributing to post-bankruptcy success? Second, which restructuring strategies in general and which restructuring actions in particular significantly impact the probability of post-bankruptcy success? This focus is motivated as follows: First, the number of bankruptcies is still not receding despite decades of research into business failure, implying the need for further research into restructuring strategies.<sup>17</sup> Sudarsanam and Lai (2001) argue that “[...] *insolvency is the ultimate non-recovery and thus merits analysis as to [the] recovery strategies employed [...]*”<sup>18</sup>. Second, Chapter 11 of the U.S. Bankruptcy Code has served as a role model for many countries in recent decades.<sup>19</sup> Third, since large bankruptcy cases such as those of American Airlines or General Motors catch public attention, it is mostly in respect of these cases that both academics and practitioners debate the efficiency of the bankruptcy system and firms’ post-bankruptcy performance.<sup>20</sup> Besides, the challenges that small companies face during bankruptcy can differ significantly from those with which large companies are confronted.<sup>21</sup> Fourth, given the highly developed capital markets in the U.S., data availability in terms of the number of bankrupt public companies places no material restrictions on the study.

## 1.2 Research Gap and Contribution

This chapter details how this study contributes to and extends existing post-bankruptcy performance literature. The scope of the analyzed restructuring actions is enlarged compared to prior contributions to post-bankruptcy performance literature. I have relied on the seminal contribution to the restructuring literature by Lai and Sudar-

---

<sup>17</sup> Similar arguments are put forward by Arogyaswamy, Barker, and Yasai-Ardekani (1995), p. 493, and Lai (1997), p. XVI.

<sup>18</sup> Sudarsanam and Lai (2001), p. 190.

<sup>19</sup> See Warren and Westbrook (2009), p. 604.

<sup>20</sup> See Denis and Rodgers (2007), p. 113, and Baird (1993), p. 637.

<sup>21</sup> See Lemmon, Ma, and Tashjian (2009), p. 6, and, more generally, Evans and Koch (2007).



sanam (1997), who define four generic restructuring strategies that financially distressed firms may choose.<sup>22</sup> Thus, I examine restructuring actions of bankrupt firms falling into one of the four generic restructuring strategies operational, financial, managerial and portfolio restructuring.<sup>23</sup> To make sure that the analysis of restructuring strategies and post-bankruptcy performance is sufficiently detailed with respect to the restructuring actions taken, I have combined both quantitative and mostly hand-collected qualitative data from different sources for my analysis. In doing so, I have sought to provide a sufficiently detailed, but also comprehensive analysis of which restructuring actions contribute to a higher probability of post-bankruptcy success.

To analyze the impact of restructuring on post-bankruptcy performance, this study scrutinizes the restructuring actions undertaken during both the bankruptcy phase and the post-bankruptcy phase. This novel approach in post-bankruptcy literature to date is supported by theoretical and conceptual models from restructuring literature such as those of Robbins and Pearce (1992) and Arogyaswamy, Barker, and Yasai-Ardekani (1995). I have adapted these contributions from restructuring literature modeling turnaround as a process to the bankruptcy context.<sup>24</sup> This appears to be a promising approach, since both process stages can be considered to be very different. During Chapter 11, the firm as a debtor in possession is subject to the rules and regulations of U.S. bankruptcy law and is supervised by the bankruptcy court. In recent years, firms in Chapter 11 have also increasingly been controlled by their creditors.<sup>25</sup> Many of the rules and regulations that apply during bankruptcy, such as the automatic stay or the right to reject executory contracts and unexpired leases, are designed to give a bankrupt firm the opportunity of a fresh start when it emerges from bankruptcy.<sup>26</sup> Once it has emerged from Chapter 11 and is no longer “[...] largely shielded from

---

<sup>22</sup> See Lai and Sudarsanam (1997), p. 207 and p. 209.

<sup>23</sup> Lai and Sudarsanam (1997) use the term *asset restructuring* instead of *portfolio restructuring*, which I employ in line with Bowman and Singh (1993) and Eichner (2010).

<sup>24</sup> A similar approach has been recently applied by Eichner (2010) with regard to the restructuring of financially distressed (non-bankrupt) manufacturing firms. He analyzes which restructuring actions effectively contribute to a higher turnaround probability, relying on a two-phased process model involving early and late restructuring actions.

<sup>25</sup> See Skeel (2003), p. 918, for example.

<sup>26</sup> See White (1989), pp. 144-145, and Asquith, Gertner, and Scharfstein (1994), pp. 651-652.

*market forces [...]*<sup>27</sup>, the firm needs to return to normal business and recover any market share it may have lost during bankruptcy by focusing on growth. The post-bankruptcy phase can thus be compared to the recovery phase of a non-bankrupt restructuring as formulated by Robbins and Pearce (1992).<sup>28</sup>

Contributions to post-bankruptcy performance literature have so far largely ignored corporate restructuring actions undertaken in the post-bankruptcy phase. This is surprising, since it seems straightforward to assume that restructuring actions taken after emerging from bankruptcy should impact post-bankruptcy performance measured, say, three years after emergence. Hotchkiss (1995) focuses on how management changes up to emergence influence post-bankruptcy performance.<sup>29</sup> Denis and Rodgers (2007) examine the effect of firm and industry characteristics before and during Chapter 11 on the post-bankruptcy performance.<sup>30</sup> Other contributions focus on a variety of individual topics without (i) analyzing the impact of specific restructuring actions on post-bankruptcy performance in a comprehensive manner and without (ii) taking account of the process aspect with regard to the bankruptcy and the post-bankruptcy phase. Dahiya et al. (2003), for example, examine debtor-in-possession (DIP) financing during Chapter 11, while Heron, Lie, and Rodgers (2009) focus on the capital structure upon emergence and Bandopadhyaya and Jaggia (2001) look at firms that refiled for bankruptcy after initial emergence, the so-called "*Chapter 22*"<sup>31</sup>. Datta and Iskandar-Datta (1995) examine different restructuring actions taken before and during Chapter 11 without analyzing their impact on post-bankruptcy performance and without taking account of restructuring actions implemented in the post-bankruptcy phase.<sup>32</sup> Finally, Eberhart, Altman, and Aggarwal (1999) analyze the equity performance of firms emerging from bankruptcy.

---

<sup>27</sup> Denis and Rodgers (2007), p. 101.

<sup>28</sup> See Robbins and Pearce (1992), p. 291.

<sup>29</sup> See Hotchkiss (1995), pp. 19-20.

<sup>30</sup> See Denis and Rodgers (2007), p. 116.

<sup>31</sup> Altman and Hotchkiss (2006), p. 12.

<sup>32</sup> See Datta and Iskandar-Datta (1995), p. 19. The restructuring types comprise financial, asset, governance restructuring and labor recontracting.

The two contributions that are most similar to my research, Denis and Rodgers (2007) and Hotchkiss (1995), examine the post-bankruptcy performance of firms for the periods 1985-1994 and 1979-1988. The firms in my sample filed for bankruptcy between 1993 and 2005. Accordingly, my findings can be used to update prior findings by Denis and Rodgers (2007) and Hotchkiss (1995). This seems especially valuable given that bankruptcy practice has changed over time from being perceived as pro-debtor to pro-creditor, as argued by Skeel (2003), Baird and Rasmussen (2003), Adler, Capkun, and Weiss (2006) and Bharath, Panchapagesan, and Werner (2010).

Finally, this study contributes methodologically to existing post-bankruptcy performance literature by explicitly testing for the presence of any sample selection bias which might undermine the reliability of the regression results. To this end, I use a two-stage probit model with sample selection. Additionally, I perform several further tests which support the general robustness of my findings, for instance, by employing a two-stage Rivers-Vuong test, which cannot reject the exogeneity assumption for the independent variables in my final regression model.

## 2 Literature Review

The literature review provides an overview of the most relevant and influential contributions to research in the fields of financial distress, corporate restructuring and corporate bankruptcy. The literature mentioned here is far from being exhaustive. Instead, I have limited myself to contributions that directly relate to my research topic of restructuring strategies and post-bankruptcy performance.<sup>33</sup> My research thus integrates into the three research fields mentioned above. While the focus remains on contributions from financial economics, other related fields such as strategic management and the legal perspective on corporate bankruptcy have also been taken into account.

### 2.1 Financial Distress and the Efficiency of Chapter 11

According to Wruck (1990), financial distress is defined as “[...] *a situation where cash flow is insufficient to cover current obligations.*”<sup>34</sup> Bankruptcy is explicitly included in this definition of financial distress.<sup>35</sup> Much of the theoretical work on financial distress and corporate bankruptcy focuses on the efficiency of the bankruptcy process. In this context, efficiency may refer to two related yet distinct topics. First, efficiency relates to the screening or filtering process by which inefficient firms should be separated from efficient ones.<sup>36</sup> Inefficient firms should be liquidated under Chapter 7 while efficient firms should be given the opportunity to reorganize under Chapter 11. As White (1989) shows, this is in line with basic economic theory which predicts that competition will drive prices toward the equilibrium price and results in

---

<sup>33</sup> See Hotchkiss et al. (2008) or Altman and Hotchkiss (2006) for a review of literature on financial distress and corporate bankruptcy and Eichner (2010) or Nothardt (2001) for reviews of literature on corporate restructuring and turnaround. Refer to chapter 3 for an overview of U.S. bankruptcy law from a legal perspective.

<sup>34</sup> Wruck (1990), p. 421. This definition includes, for instance, unpaid liabilities to suppliers or employees, liabilities (actual or potential) arising from any litigation (e.g. asbestos claims), and default on any principal or interest payments. Wruck (1990) defines financial distress as flow-based insolvency in contrast to stock-based insolvency. Refer to Altman and Hotchkiss (2006), p. 5, for more on the stock- and flow-based definitions of financial distress.

<sup>35</sup> See Wruck (1990), p. 422.

<sup>36</sup> See White (1989), White (1994) and Mooradian (1994).

firms being driven out of the market if their unit production costs are above the equilibrium price.<sup>37</sup> However, White (1989) demonstrates that, under Chapter 11, there is a tendency to keep alive inefficient firms that should have been liquidated, or at least to unnecessarily delay the move of corporate resources to more favorable uses.<sup>38</sup> One of the driving factors behind the continuation of inefficient firms is argued to be connected to the manifold subsidies that are granted to firms under Chapter 11.<sup>39</sup> These subsidies include the retention of accrued tax loss carryforwards, exemption from tax on the gains from any forgiven debt, the right to terminate pension plans under certain conditions, the automatic stay of most interest and principal payments due by the debtor and the right to reject executory contracts and unexpired leases.<sup>40</sup>

White (1994) presents a game-theoretic model about the initial outcome of the bankruptcy process and interprets the process as a filter that may not work perfectly. It follows that some inefficient firms could reorganize under Chapter 11 (type I error) while some efficient firms might be liquidated under Chapter 7 (type II error).<sup>41</sup> These results may materialize because efficient firms can benefit from appearing less efficient than they actually are (as, in this case, creditors might forgive more debt in order to rescue the firm) while inefficient firms can profit from appearing more efficient than they actually are (as this might result in reorganization rather than liquidation).<sup>42</sup> White (1994) concludes that the bankruptcy policy practiced in the U.S. leads to a trade-off between type I and type II errors with a bias in favor of type I errors, i.e. letting inefficient firms reorganize under Chapter 11.<sup>43</sup> She explains this bias in favor of the type I error by pointing to the immediately visible cost of type II errors, namely job losses,

---

<sup>37</sup> See White (1989), p. 129. Similar arguments are put forward by Baker and Kennedy (2002).

<sup>38</sup> See White (1989), p. 130.

<sup>39</sup> These subsidies are especially valuable compared to firms outside of Chapter 11 and also to firms that liquidate under Chapter 7, see White (1989), p. 144.

<sup>40</sup> See White (1989), pp. 144-145, and White (2007), p. 1021.

<sup>41</sup> See White (1994), p. 269. Bradley and Rosenzweig (1992) argue that the U.S. bankruptcy law introduces biases for incumbent managers toward reorganization in Chapter 11, even when liquidation should be preferred. A similar position is adopted by Baird (1986). This can also be regarded as management entrenchment in the sense put forward by Shleifer and Vishny (1989). Bolton and Scharfstein (1996), p. 2 and p. 5, refer to the issue as a strategic filing by management intended to divert available cash to themselves.

<sup>42</sup> See White (1994), p. 269.

<sup>43</sup> See White (1994), p. 293.

which policymakers try to avoid for obvious reasons.<sup>44</sup> Validation of the scope of type I errors would be an empirical question analyzing the fate of firms emerging from bankruptcy.<sup>45</sup>

Second, as Gertner and Scharfstein (1991) show, efficiency may relate to investment incentives of financially distressed firms. Inefficiencies in investment behavior may be triggered by coordination problems and conflicts of interest in the renegotiation (or bargaining) process among creditors and debtors.<sup>46</sup> Building on earlier work by Bulow and Shoven (1978) and White (1983), they show that two inefficiencies in the renegotiation process may occur: underinvestment and overinvestment.<sup>47</sup> On the one hand, underinvestment may result since public debtholders of a distressed firm are likely to claim their share in any cash flows resulting from new investments. Given this circumstance, it may be difficult to convince some investors to provide fresh money to the firm. Consequently, some positive net present value projects could not be undertaken.<sup>48</sup> On the other hand, overinvestment may occur because the shareholders of a distressed firm, finding themselves with their back to the wall, stand to receive much of the potential upside benefits of risky investments while bearing close to nothing of the cost of downside risks.<sup>49</sup> Consequently, a distressed firm's shareholders and incumbent management might be incentivized to undertake high-risk projects and thereby effectively shift risk to the creditors.<sup>50</sup> Additionally, Gertner and Scharfstein (1991) show in their model that it can be difficult to renegotiate with public debtholders in an exchange offer due to the holdout problem.<sup>51</sup> Some debtholders

---

<sup>44</sup> See White (1994), p. 293.

<sup>45</sup> See Hotchkiss (1995), p. 5.

<sup>46</sup> See Gertner and Scharfstein (1991), pp. 1190-1191.

<sup>47</sup> See Gertner and Scharfstein (1991), p. 1191.

<sup>48</sup> See Gertner and Scharfstein (1991), p. 1191 and p. 1195, and generally Myers (1977).

<sup>49</sup> In most cases, this will also apply to the management as agent to the shareholders, especially when managers have stock holdings of the firm or when managers fear losing their job. In such a setting, managers might also be inclined to gamble in risky projects.

<sup>50</sup> See Gertner and Scharfstein (1991), p. 1191 and p. 1195, and generally Jensen and Meckling (1976).

<sup>51</sup> An example of the holdout problem is Amerco. Its efforts to restructure out of court were unsuccessful due to the differing interests of several creditor groups. By consequence, Amerco filed for bankruptcy as documented in Amerco's 2003 annual report, p. 2. Another example can be found in Applied Magnetics' 2001 annual report, p. 4, which states that "[t]he Company made a formal proposal to its trade creditors regarding a compromise and extension of the Company's obligations. While certain of the Company's trade creditors accepted the Company's proposal, a substantial number of the trade creditors did not and in certain instances they commenced enforcement actions against the Company."

with small stakes benefit from holding out. Assuming the exchange offer is successful, some debt will be forgiven, which will result in less default risk for the firm. Accordingly, the value of the original debt should rise.<sup>52</sup> The authors then go on to show that the holdout problem can be controlled by enticing the debtholders with a more senior security in exchange for the old debt. Subject to certain assumptions, the holdout problem may even convert to a hold-in problem, since individual debtholders may be willing to accept the exchange offer to avoid becoming junior relative to the exchanged debt, even though the debtholders do not collectively benefit from the exchange.<sup>53</sup>

Besides the implications for firms in financial distress in general, Gertner and Scharfstein (1991) also analyze the impact of specific aspects of Chapter 11 on a bankrupt firm's investment decisions. They find that the automatic stay increases the incentives for a bankrupt firm to invest, since the maturity of its debt is effectively prolonged, resulting in higher cash holdings for the firm to invest.<sup>54</sup> Additionally, since creditors have to wait for their claims to be honored, the risk-shifting problem arises again as creditors bear the risk while shareholders and managers may benefit from any upside potential. Debtor-in-possession financing or financing by using cash collateral may further increase the incentive to invest which in the presence of risk-shifting may turn into overinvestment. These overinvestment incentives may be limited by effective control of the debtor in possession by the bankruptcy court and the creditors.<sup>55</sup> Conversely, Gertner and Scharfstein (1991) find that the voting procedure in Chapter 11 may be efficient, since the holdout problem of public debtholders can be overcome.<sup>56</sup>

In contrast to the aforementioned contributions, the model by Kahl (2002) relies neither on coordination problems among different stakeholders nor on inefficiencies in the filtering process during bankruptcy proceedings.<sup>57</sup> Rather, by assuming that credi-

---

<sup>52</sup> See Gertner and Scharfstein (1991), p. 1191.

<sup>53</sup> See Gertner and Scharfstein (1991), p. 1191 and pp. 1201-1202.

<sup>54</sup> See Gertner and Scharfstein (1991), pp. 1209-1210.

<sup>55</sup> See Gertner and Scharfstein (1991), p. 1210.

<sup>56</sup> See Gertner and Scharfstein (1991), p. 1211. A third aspect of Chapter 11 is also analyzed, deviations from absolute priority, which is considered less relevant for the current study and is left out accordingly.

<sup>57</sup> See Kahl (2002), pp. 135-137.

tors will have imperfect information about the viability of distressed firms, he models the decision to liquidate distressed firms as a dynamic process.<sup>58</sup> When creditors are faced with sufficient uncertainty about the economic viability of a distressed firm, they might be better off deferring the decision to liquidate and allow more information about the firm's viability to arrive over time. In this situation, creditors might be unwilling to forgive their original debt claims and instead adopt a 'wait and see' policy. Should the distressed firm recover over time, the debt claims will have been secured and liquidation avoided. Conversely, if the distressed firm stays in (or reenters) financial distress, creditors can push for liquidation at a later stage.<sup>59</sup> This might also explain the empirical findings of Gilson (1997) and LoPucki and Whitford (1993b), namely, that many firms emerge from debt restructurings and Chapter 11 with above-industry leverage ratios.<sup>60</sup> Furthermore, the model can also explain the findings of Gilson (1997) and Hotchkiss (1995), that up to one third of distressed firms again run into financial distress shortly after completing debt restructurings or leaving Chapter 11.<sup>61</sup> Kahl (2002) concludes that viewing financial distress as a dynamic process might imply that the selection process is "[...] *more efficient than previously thought and, hence, debt is more beneficial because the benefits of financial distress may outweigh its costs.*"<sup>62</sup>

Summarizing these contributions reveals some important implications for the current empirical study. On the one hand, if the bankruptcy process is merely an imperfect filter to separate efficient (or viable) from inefficient (or nonviable) firms, some inefficient firms are likely to continue in business after reorganizing under Chapter 11. This, according to Hotchkiss (1995), will most likely result in a negative post-bankruptcy performance for these firms.<sup>63</sup> Furthermore, investment inefficiencies in the Chapter 11 process may lead to both suboptimal financing for the firm and subop-

---

<sup>58</sup> See Kahl (2002), p. 135.

<sup>59</sup> See Kahl (2002), pp. 136-139.

<sup>60</sup> See Gilson (1997), p. 166, and LoPucki and Whitford (1993b), p. 607.

<sup>61</sup> See Gilson (1997), p. 161, and Hotchkiss (1995), p. 3.

<sup>62</sup> Kahl (2002), p. 136.

<sup>63</sup> See Hotchkiss (1995), p. 5.



timal investment activities by the firm, both of which can affect post-bankruptcy performance. On the other hand, the dynamic liquidation theory of Kahl (2002) allows financial distress to be linked to corporate restructuring.<sup>64</sup> According to the dynamic liquidation theory, distressed firms (and bankrupt firms too) may win some time before creditors decide again whether to liquidate the firms or not. This time should allow the incumbent management to engage in comprehensive restructuring strategies such as restructuring operations or the firm's portfolio, with a view to returning the company to profitability.<sup>65</sup> These actions could help to convincing creditors that the firm is viable and that liquidation should be avoided.

## 2.2 Financial Distress and Corporate Restructuring

For the purposes of this study, restructuring in the context of financial distress follows the definition given in Eichner (2010), who builds on the work of Altman and Hotchkiss (2006) and Bowman and Singh (1993).<sup>66</sup> Accordingly, aimed at turning the firm around and overcoming financial distress, restructuring is defined as any material discretionary change in a firm's assets, its capital structure, its operations, or its top management. While restructuring refers to discretionary changes or actions, turnaround refers to the outcome of the restructuring process: Either the firm managed to overcome financial distress or it did not. As Eichner (2010) points out, it is important to limit the definition of restructuring to material discretionary changes in contrast to any incremental continuous improvement programs.<sup>67</sup>

One pioneering contribution to restructuring literature comes from Lai and Sudarsanam (1997), who embed their empirical analysis in a theoretical framework that brings together the fields of financial economics and strategic management.<sup>68</sup> Based on

---

<sup>64</sup> In this case, corporate restructuring involves more than merely restructuring debt and should be understood in the sense used by Lai and Sudarsanam (1997) or Eichner (2010).

<sup>65</sup> Note, however, that the potential issue of overinvestment might prevail unless the bankruptcy court or the creditors effectively supervise the decisions taken by the incumbent management during Chapter 11.

<sup>66</sup> See Eichner (2010), p. 50, Altman and Hotchkiss (2006), p. 122, and Bowman and Singh (1993), p. 8.

<sup>67</sup> See Eichner (2010), p. 50.

<sup>68</sup> See Lai and Sudarsanam (1997), p. 198, which is based on Lai (1997).

an agency model, they examine the influence of the ownership structure, corporate governance and lender monitoring on the chosen restructuring strategies for a sample of UK firms whose performance is in decline.<sup>69</sup> They are thus concerned with potential conflicts of interest among the shareholders, managers and creditors of poorly performing firms and how these conflicts relate to the choice of restructuring strategies.<sup>70</sup> They define four generic restructuring strategies: operational, financial, managerial and asset restructuring which are shown in Table 1 below.<sup>71</sup> Lai and Sudarsanam (1997), and originally Lai (1997), deduced these generic restructuring strategies from prior turnaround research emanating from both the financial economics and the strategic management perspectives.<sup>72</sup> Accordingly, these restructuring strategies can be regarded as the attempt of Lai (1997) to establish a comprehensive and integrative restructuring framework based on previous literature.<sup>73</sup> These four generic restructuring strategies serve as the basis for my empirical analysis below. However, I follow the rationale elaborated by Eichner (2010) in replacing *asset restructuring* as defined by Lai and Sudarsanam (1997) by the term *portfolio restructuring*. This term seems better suited to distinguishing between significant changes to the business portfolio, such as divestments and acquisitions, and changes in capital expenditures that are regarded as an aspect of operational restructuring.<sup>74</sup>

**Table 1: Generic Restructuring Strategies Defined by Lai and Sudarsanam (1997)**

Restructuring Strategy	Individual Restructuring Actions
Operational	Cost reduction, improved financial control, closures and integration of production and other facilities
Financial	Equity-based (cash equity issue, dividend cuts or omission) and debt-based (debt refinancing, debt renegotiation)
Managerial	Replacement of CEO, chairman or managing director
Asset	New investments (e.g. acquisitions, capital expenditures in plant and machinery) and asset reductions (e.g. divestments, management buy-outs, spin-offs, sale-and-leaseback transactions)

Source: Based on Lai and Sudarsanam (1997), pp. 207-209.

<sup>69</sup> See Lai and Sudarsanam (1997), p. 198.

<sup>70</sup> See Lai and Sudarsanam (1997), pp. 199-206, for a detailed discussion of the various conflicts of interest.

<sup>71</sup> See Lai and Sudarsanam (1997), p. 207 and p. 209, and Lai (1997), pp. 72-75.

<sup>72</sup> See the extensive review of prior turnaround literature in Lai (1997), pp. 72-82.

<sup>73</sup> See Lai and Sudarsanam (1997), p. 198.

<sup>74</sup> See Eichner (2010), p. 53, who draws on Bowman and Singh (1993), p. 8.

Robbins and Pearce (1992) establish a seminal turnaround process framework that comprises two overlapping stages.<sup>75</sup> The first stage of the turnaround process is called retrenchment and the second stage is called recovery stage. Cost-cutting and asset reductions are characteristic of the retrenchment stage whose aim is to ensure survival, reestablish positive cash flows and improve operational efficiency. The recovery stage involves targeted investments and aims at establishing long-term profitability and conquering new markets. The process aspect had already been presented by Schendel, Patton, and Riggs (1976) in the context of corporate turnaround and Pettigrew (1987a) in the context of managing strategic change. According to the framework put forward by Pettigrew (1987a), the management of strategic change hinges on three important aspects to be considered successful: the content of the strategy, managing the process of change and taking the context into account.<sup>76</sup> These aspects of successful strategic change lay the foundation for my research model, as described in more detail in chapter 4 below. Another important contribution to restructuring literature is provided by Arogyaswamy, Barker, and Yasai-Ardekani (1995). These authors present a two-stage contingency model for corporate turnaround. Initially, the model firm is faced with declining performance as defined by Schendel, Patton, and Riggs (1976). In other words, the decline is not just a temporary phenomenon. Moreover, the firm's survival would be at stake if performance did not improve.<sup>77</sup> It can thus be assumed that the model firm is in financial distress. The distressed firm responds by launching so-called decline-stemming strategies in the first stage whose aim is to increase efficiency.<sup>78</sup> The scope of the decline-stemming strategy is a function of the severity of the performance decline and the available slack resources.<sup>79</sup> In the second stage, the distressed firm will implement recovery strategies subject to the initial causes of decline and the firm's competitive position in the market.<sup>80</sup> The stages need not be sequential

---

<sup>75</sup> See Robbins and Pearce (1992), pp. 290-291.

<sup>76</sup> See Pettigrew (1987a), p. 657.

<sup>77</sup> See Arogyaswamy, Barker, and Yasai-Ardekani (1995), p. 497, relying on Hofer (1980).

<sup>78</sup> See Arogyaswamy, Barker, and Yasai-Ardekani (1995), p. 498.

<sup>79</sup> See Arogyaswamy, Barker, and Yasai-Ardekani (1995), pp. 498-499.

<sup>80</sup> See Arogyaswamy, Barker, and Yasai-Ardekani (1995), p. 499.

in nature, but are rather modeled as interdependent and having several feedback loops.<sup>81</sup>

Taken together, the selected contributions from corporate restructuring literature provide a solid basis on which to analyze restructuring strategies in the context of bankruptcy. The various restructuring actions of bankrupt firms (i.e. the content) are categorized according to the generic strategies put forward by Lai and Sudarsanam (1997) and modified by Eichner (2010). The process aspect of restructuring introduced by Schendel, Patton, and Riggs (1976), Pettigrew (1987b) and Robbins and Pearce (1992) and modeled by Arogyaswamy, Barker, and Yasai-Ardekani (1995) is translated into the bankruptcy setting to provide for a more detailed and differentiated analysis of the relationship between post-bankruptcy performance and the restructuring strategies adopted at different process stages. Finally, the context of restructuring during and after bankruptcy is accounted for using appropriate control variables related to firm and industry characteristics and the nature of the bankruptcy proceedings.

### **2.3 Bankruptcy, Reorganization and Post-Bankruptcy Performance**

As pointed out in chapter 2.1, some scholars argue that inefficiencies in the bankruptcy process linked to the filtering of viable and nonviable firms or to the bargaining between different stakeholders result in certain nonviable firms emerging as reorganized entities. Accordingly, one should empirically find that the post-bankruptcy performance mirrors these poor investment decisions.<sup>82</sup> By contrast, Altman, Kant, and Rattanuengyot (2009) highlight a number of success stories, documenting that some firms emerging from Chapter 11 exhibit excess stock returns above 40% compared to the S&P 500 in the two years following emergence.<sup>83</sup> In the following, I review the most influential contributions from post-bankruptcy literature in order to shed more

---

<sup>81</sup> See Arogyaswamy, Barker, and Yasai-Ardekani (1995), p. 513.

<sup>82</sup> Compare to the type I error in White (1994), p. 269, and see Hotchkiss et al. (2008), p. 33.

<sup>83</sup> See Altman, Kant, and Rattanuengyot (2009), pp. 6-7.

light on how prior contributors perceived the Chapter 11 process and the resulting performance after emergence.

A seminal paper regarding post-bankruptcy performance is Hotchkiss (1995). She analyzes the performance of public companies in the U.S. after their emergence from Chapter 11 for filings made between October 1979 and September 1988.<sup>84</sup> She concludes that there seems to be a bias in favor of continuing unprofitable firms in the Chapter 11 process.<sup>85</sup> Specifically, when pre-bankruptcy management continues to be involved in the reorganization, this is associated with poor post-bankruptcy performance.<sup>86</sup> Furthermore, she finds that larger firms exhibit a lower probability of negative operating income after emergence while the pre-bankruptcy diversity of firms does not seem to have a significant impact on post-bankruptcy performance.<sup>87</sup> The pre-bankruptcy industry-adjusted operating margin is found to have only an insignificant positive impact on post-bankruptcy performance.<sup>88</sup> Focusing on management turnover during reorganization, Hotchkiss (1995) does not comprehensively examine which restructuring actions increase the probability of post-bankruptcy success.<sup>89</sup>

More recently, Denis and Rodgers (2007) analyze the post-bankruptcy performance of public U.S. companies for the period 1985 through 1994.<sup>90</sup> They examine factors influencing the time spent in Chapter 11, the initial outcome of Chapter 11 and the post-bankruptcy performance of those companies that emerged as independent public companies.<sup>91</sup> Like Hotchkiss (1995), they employ several accounting-based performance metrics. They find that significant reductions in assets and liabilities during Chapter 11 contribute to a higher likelihood of positive operating margins after emer-

---

<sup>84</sup> See Hotchkiss (1995), p. 4 and p. 6.

<sup>85</sup> See Hotchkiss (1995), pp. 19-20.

<sup>86</sup> See Hotchkiss (1995), p. 4.

<sup>87</sup> See Hotchkiss (1995), p. 18. Size is only significantly related to post-bankruptcy performance when performance is defined as negative operating income. Pre-bankruptcy diversity in business is measured as the number of distinct 2-digit SIC codes two years before filing.

<sup>88</sup> See Hotchkiss (1995), p. 18.

<sup>89</sup> See Hotchkiss (1995), pp. 17-18. She does not include financial restructuring actions in her analysis. On the other hand, she states that the number of business lines divested or the change in the number of employees does not show any significant relationship to post-bankruptcy performance.

<sup>90</sup> See Denis and Rodgers (2007), p. 102 and p. 105. They use the term post-reorganization performance instead of post-bankruptcy performance. For reasons of consistency, I have used the term post-bankruptcy performance throughout this study.

<sup>91</sup> See Denis and Rodgers (2007), p. 102.

gence.<sup>92</sup> The same holds true for the pre-filing size of the firm.<sup>93</sup> Additionally, companies with higher pre-bankruptcy industry-adjusted operating margins exhibit superior post-bankruptcy performance.<sup>94</sup> Denis and Rodgers (2007) document a positive relationship between improvements to the operating margin during Chapter 11 and post-bankruptcy performance.<sup>95</sup> Conversely, companies that do not manage to improve their operating margin in Chapter 11 are more likely to experience further financial distress later on.<sup>96</sup> Both the pre-filing firm and industry operating margin show a negative relation to the time spent in Chapter 11.<sup>97</sup> With regard to the initial outcome of the Chapter 11 filings, Denis and Rodgers (2007) conclude that the pre-bankruptcy industry-adjusted operating margin of emerging firms is significantly greater than that for liquidated or acquired firms.<sup>98</sup> Furthermore, larger firms show a higher likelihood of reorganizing instead of being liquidated or acquired.<sup>99</sup> The work of Denis and Rodgers (2007) can be criticized, as they compare changes in firm characteristics such as firm size or the leverage ratio from the last 10-K before filing (denoted as F-1) to the last 10-K before the resolution (denoted as R-1).<sup>100</sup> They therefore do not include the presumably beneficial effects of the reorganization in their analysis of post-bankruptcy performance. By contrast, I compare the last available 10-K before the filing to the first 10-K after emergence to ensure that the effects of the reorganization are reflected therein.<sup>101</sup>

From a legal perspective, LoPucki and Whitford (1993b) document mixed results for a sample of bankrupt firms between 1979 and 1988. Some firms are considered successful because they survive Chapter 11, emerge with their core business in-

<sup>92</sup> See Denis and Rodgers (2007), p. 101 and p. 116. This holds true for the industry-adjusted operating margin as performance metric.

<sup>93</sup> See Denis and Rodgers (2007), p. 116. Size shows a significant impact on the likelihood of positive operating margin in at least two years after emergence and on the likelihood to survive through three years after emergence.

<sup>94</sup> See Denis and Rodgers (2007), p. 104 and p. 118. The operating margin is defined as operating income before depreciation and the liabilities ratio is defined as total liabilities over assets.

<sup>95</sup> See Denis and Rodgers (2007), p. 116.

<sup>96</sup> See Denis and Rodgers (2007), p. 116 and p. 118.

<sup>97</sup> See Denis and Rodgers (2007), p. 118.

<sup>98</sup> See Denis and Rodgers (2007), p. 109.

<sup>99</sup> See Denis and Rodgers (2007), p. 103.

<sup>100</sup> See Denis and Rodgers (2007), p. 116.

<sup>101</sup> These effects may, for example, include reductions in leverage resulting from debt renegotiation with debtholders.

tact and show financial success.<sup>102</sup> Yet they also document high leverage ratios with 76% of the sample firms emerging with a leverage ratio above industry benchmarks. Furthermore, they also report a high refiling rate of almost one third of the emerging firms.<sup>103</sup> Gilson (1997) finds similar patterns for firms emerging from Chapter 11. He notes that 70% of the emerging firms maintain leverage ratios that are above the respective industry median.<sup>104</sup> More than 25% of the firms need to refile for bankruptcy or require a second debt restructuring.<sup>105</sup> Gilson (1997) argues that firms might choose to keep leverage high upon emergence to make it easier for creditors to monitor the firm's managers.<sup>106</sup> Accordingly, he does not blame these findings on inefficiencies in the Chapter 11 process which is in line with the dynamic liquidation theory of Kahl (2002). Analyzing firms that adopted fresh-start reporting between 1990 and 2003, Heron, Lie, and Rodgers (2009) find that post-bankruptcy debt ratios correlate positively to the pre-filing debt ratios.<sup>107</sup> They also document that most firms emerge with debt ratios significantly above industry levels.<sup>108</sup> Heron, Lie, and Rodgers (2009) argue that these findings are generally consistent with potential inefficiencies in Chapter 11 that can hamper firms' ability to reset their capital structures to optimal levels.<sup>109</sup>

Kalay, Singhal, and Tashjian (2007) examine the changes in firms' operating performance during bankruptcy from the last fiscal year before filing until the first fiscal year following emergence.<sup>110</sup> The sample period spans the years 1991 through 1998. Their key finding is a significant improvement in average operating performance during Chapter 11, which they interpret as net benefits of the Chapter 11 proceedings.<sup>111</sup> Firms with higher pre-filing debt-to-asset ratios seem to benefit more from Chapter 11, while the complexity of debt renegotiation – measured by the number of

---

<sup>102</sup> See LoPucki and Whitford (1993b), p. 611.

<sup>103</sup> See LoPucki and Whitford (1993b), pp. 607-608 and p. 611.

<sup>104</sup> See Gilson (1997), pp. 165-166, based on book values of long-term debt to assets.

<sup>105</sup> See Gilson (1997), pp. 166-167.

<sup>106</sup> See Gilson (1997), p. 190.

<sup>107</sup> See Heron, Lie, and Rodgers (2009), p. 742.

<sup>108</sup> See Heron, Lie, and Rodgers (2009), p. 742.

<sup>109</sup> See Heron, Lie, and Rodgers (2009), p. 742.

<sup>110</sup> See Kalay, Singhal, and Tashjian (2007), p. 782.

<sup>111</sup> See Kalay, Singhal, and Tashjian (2007), p. 789 and pp. 794-795.

classes in the reorganization plan – is significantly negatively related to the improvement in operating performance.<sup>112</sup>

For their sample from 1991 through 2004, Lemmon, Ma, and Tashjian (2009) find that the post-bankruptcy performance of financially distressed firms is stronger compared to that of economically distressed firms.<sup>113</sup> This evidence seems to lend support to the efficiency of the filtering process in Chapter 11.<sup>114</sup> Some scholars have examined factors that could potentially lead to a subsequent refiling for bankruptcy, the so-called “*Chapter 22*”.<sup>115</sup> Bandopadhyaya and Jaggia (2001) find that firms that spend more time under Chapter 11, reduce their leverage and retain more business lines exhibit a lower probability of reentering bankruptcy.<sup>116</sup> Several restructuring strategies before and during bankruptcy are analyzed by Datta and Iskandar-Datta (1995). For a sample of bankrupt U.S. firms from 1980-1989, they document that, during Chapter 11, almost 50% of the firms replace the top management, 19% lay off personnel and 66% engage in asset restructurings. However, they do not explore the performance effects of the different restructuring strategies.<sup>117</sup>

Alderson and Betker (1999) take a different approach to measuring post-bankruptcy performance. They rely on cash flow figures instead of accruals for their sample of firms that emerged from Chapter 11 between 1983 and 1993.<sup>118</sup> They regard their cash flow performance metric as superior to accrual-based operating margins – which are frequently used as proxies for operating cash flow – since these may significantly deviate from cash flows.<sup>119</sup> Their key finding is that the performance of reorganized companies is comparable on average to the performance of a benchmark portfo-

---

<sup>112</sup> See Kalay, Singhal, and Tashjian (2007), pp. 794-795.

<sup>113</sup> See Lemmon, Ma, and Tashjian (2009), p. 4.

<sup>114</sup> See Lemmon, Ma, and Tashjian (2009), p. 1.

<sup>115</sup> Altman and Hotchkiss (2006), p. 12. Surprisingly, TransTexas Gas filed for bankruptcy protection four times, as shown by Altman and Hotchkiss (2006), p. 90.

<sup>116</sup> See Bandopadhyaya and Jaggia (2001), p. 217.

<sup>117</sup> The restructuring strategies analyzed are financial restructuring, asset restructuring, governance restructuring and labor recontracting. See Datta and Iskandar-Datta (1995), p. 19.

<sup>118</sup> See Alderson and Betker (1999), pp. 69-70.

<sup>119</sup> See Alderson and Betker (1999), p. 79. They specifically name asset sales and other transactions as factors that cause operating margins to deviate from cash flows. Other factors include, for instance, capital expenditures and changes in net working capital.



lio.<sup>120</sup> Eberhart, Altman, and Aggarwal (1999) analyze the equity performance of public U.S. firms after their emergence from Chapter 11 for the period 1980 through 1993. They find positive excess returns over the first 200 days and hence question the efficiency of the market. They conclude that the market seems – relative to prior expectations – to be surprised by the performance of reorganized firms.<sup>121</sup> However, these findings are called into question by the findings of Goyal, Kahl, and Torous (2003) who identify average excess returns of almost zero for a benchmark portfolio weighted by value, and negative excess returns for a benchmark portfolio matched by size and book-to-market.<sup>122</sup> Jory and Madura (2010) arrive at a similar conclusion as Goyal, Kahl, and Torous (2003) since they document that firms emerging from bankruptcy perform on average similar as their peers matched on size and book-to-market.<sup>123</sup>

To summarize, the existing literature on post-bankruptcy performance shows that many different aspects of post-bankruptcy performance have been analyzed. However, no study has yet adopted a comprehensive approach analyzing which restructuring strategies contribute to a higher probability of post-bankruptcy success. On the one hand, some common results of prior contributions stand out. Pre-filing firm size seems to correlate positively to higher post-bankruptcy performance.<sup>124</sup> Furthermore, firms seem to leave Chapter 11 with relatively high leverage ratios compared to industry peers.<sup>125</sup> Finally, firms filing primarily due to financial distress are found to perform better on average compared to firms that file primarily due to economic distress.<sup>126</sup> On the other hand, studies comparing the post-bankruptcy performance of formerly bankrupt firms to the performance of non-bankrupt firms yield inconsistent results. Some authors, such as Alderson and Betker (1999), Goyal, Kahl, and Torous (2003) or Jory and Madura (2010), find no significant difference between the two groups, while oth-

---

<sup>120</sup> See Alderson and Betker (1999), p. 79.

<sup>121</sup> See Eberhart, Altman, and Aggarwal (1999), p. 1867.

<sup>122</sup> See Goyal, Kahl, and Torous (2003) found in Hotchkiss et al. (2008), p. 35.

<sup>123</sup> See Jory and Madura (2010), p. 1145.

<sup>124</sup> See Denis and Rodgers (2007), p. 116, and Hotchkiss (1995), p. 17.

<sup>125</sup> See Heron, Lie, and Rodgers (2009), p. 742, Gilson (1997), pp. 165-166, and LoPucki and Whitford (1993b), p. 611.

<sup>126</sup> This relationship was suggested by Hotchkiss (1995), p. 20, and is empirically supported by Lemmon, Ma, and Tashjian (2009), p. 4.

ers, such as Eberhart, Altman, and Aggarwal (1999), document positive excess returns for the emerged firms.

### 3 Corporate Bankruptcy in the U.S. – Liquidation and Reorganization

Reorganization under Chapter 11 is one way of resolving corporate bankruptcy in the U.S. To put the reorganization under Chapter 11 into a broader legal perspective, this chapter explores some of the general provisions of U.S. bankruptcy law and presents the basic characteristics and governing rules of both liquidation under Chapter 7 and reorganization under Chapter 11.<sup>127</sup>

#### 3.1 Principles of U.S. Bankruptcy Law

Aghion, Hart, and Moore (1994) name two goals of any bankruptcy law. Besides resolving insolvency and financial distress in a timely manner, the assets of insolvent and financially distressed firms shall be disposed of in a socially efficient way.<sup>128</sup> According to White (2007), corporate bankruptcy can be characterized as the legal process in which firms in financial distress resolve their debts.<sup>129</sup> Bankruptcy law prescribes rules as to which debtor's assets are to be used to repay debts ("*size of the pie*"<sup>130</sup>) and how the proceeds are divided among the creditors ("*division of the pie*"<sup>131</sup>).

The current U.S. bankruptcy law was enacted by U.S. Congress with the Bankruptcy Reform Act of 1978, which took effect on October 1, 1979. The Bankruptcy Reform Act of 1978 is commonly referred to as the Bankruptcy Code, which can be found in Title 11 of the United States Code (U.S.C.).<sup>132</sup> Since 1979, the Code has been amended several times, one recent example being the Bankruptcy Abuse Prevention

---

<sup>127</sup> This chapter provides an overview of the most relevant aspects of U.S. bankruptcy law with particular regard to reorganization under Chapter 11. For a detailed account of U.S. bankruptcy law, see e.g. Baird (2006) or Epstein and Nickles (2007).

<sup>128</sup> See Aghion, Hart, and Moore (1994), p. 215.

<sup>129</sup> See White (2007), p. 1016.

<sup>130</sup> White (2007), p. 1016.

<sup>131</sup> White (2007), p. 1016.

<sup>132</sup> See Epstein and Nickles (2007), p. 2.

Consumer Protection Act (BAPCPA) in 2005.<sup>133</sup> The most important changes introduced by the BAPCPA include limiting the exclusivity period for the management to produce a reorganization plan to 18 months and granting the debtor only a one-time extension of 90 days to assume or reject executory contracts and unexpired leases.<sup>134</sup>

Two important principles lay the foundations of U.S. bankruptcy law. First, the automatic stay relates to the legal consequences of a bankruptcy filing.<sup>135</sup> Once a debtor has filed for bankruptcy, the automatic stay provides for instantaneous protection of the debtor against individual creditors trying to enforce their pre-petition claims *stante pede*.<sup>136</sup> Returning to the analogy of the pie, the automatic stay thus guarantees the pure existence of the pie that can be orderly divided among the creditors. Second, the absolute priority rule (APR) provides guidelines on how the pie is to be distributed among the creditors.<sup>137</sup> The APR establishes a hierarchy according to which claims are to be settled. First in line are secured senior lenders, followed by unsecured junior lenders and, lastly, the equityholders as residual claimants.<sup>138</sup> In Chapter 7 liquidations, the APR is used to distribute the proceeds of asset sales to the creditors. According to the APR, a higher priority class needs to be paid in full before a lower priority class receives anything.<sup>139</sup> Generally, the APR applies also to Chapter 11 reorganizations.<sup>140</sup> Deviations from the APR are, however, permitted by the Bankruptcy Code in Chapter 11 reorganizations and do occur, as documented by prior research.<sup>141</sup> The APR can

---

<sup>133</sup> See Altman and Hotchkiss (2006), pp. 26-28 and pp. 47-55, Epstein and Nickles (2007), p. 2 or Baird (2006), p. 6. According to Altman and Hotchkiss (2006), p. 49, and Bharath, Panchapagesan, and Werner (2010), p. 13, most provisions of the BAPCPA took effect on October 17, 2005. None of the firms in my final sample filed for bankruptcy on or after October 17, 2005. It seems therefore reasonable to conclude that my analyses are not subject to any bias linked to the BAPCPA.

<sup>134</sup> See Altman and Hotchkiss (2006), p. 48.

<sup>135</sup> Refer to 11 U.S.C. § 362.

<sup>136</sup> See e.g. Epstein and Nickles (2007), p. 15 or Baird (2006), p. 207.

<sup>137</sup> See e.g. White (2007), p. 1016 or Baird (2006), pp. 66-67.

<sup>138</sup> See generally Bris (2008).

<sup>139</sup> See White (2007), p. 1019. However, some scholars, such as Bebchuk and Fried (1996), p. 934, argue that strict adherence to the APR also has its costs. These costs include excessive use of security interests, reducing the firm's incentives to carefully select investment projects and, according to Bebchuk and Fried (1996), p. 934, introducing distortions to the monitoring mechanism between creditors and borrowers.

<sup>140</sup> See Baird (2006), pp. 81-86.

<sup>141</sup> See Weiss (1990), Eberhart, Moore, and Roenfeldt (1990), Franks and Torous (1989) and the discussion in Eberhart and Weiss (1998). A more recent study is Carapeto (2000). The notion of frequent deviations from APR (often documented in the 1980s) has changed in recent years, as e.g. Ayotte and Morrison (2009) find in their study for petitions filed in 2001. They argue that deviations in favor of equityholders are largely replaced by creditor control. Similar arguments can be found in Adler, Capkun, and Weiss (2006) and Baird and Rasmussen (2003).

thus be considered as a starting point for the bargaining about the distribution between the debtor in possession (management and equityholders) and the creditors in Chapter 11 reorganizations.<sup>142</sup>

A debtor may file for bankruptcy protection without being insolvent, i.e. the debtor is still able to satisfy its current obligations and the debtor's total liabilities do not exceed its total assets.<sup>143</sup> Apart from a voluntary filing by the debtor, involuntary filings submitted by creditors are also possible. U.S. firms seeking bankruptcy protection can file for either Chapter 7 or Chapter 11 both of which are explored in more detail below.

### 3.2 Liquidation under Chapter 7

Chapter 7 of the Bankruptcy Code formulates rules on how to liquidate the assets of a bankrupt firm. It can be regarded as the benchmark or baseline to which Chapter 11 needs to be compared. The objective of Chapter 7 is to dissolve the company by selling its assets. The bankruptcy court names a trustee in charge of the dissolution.<sup>144</sup> Once the assets have been sold, the proceeds are distributed to the creditors in accordance with the APR.<sup>145</sup> Typically, when a firm files for Chapter 7 the value of the assets has already decreased considerably. This mostly results in the equityholders receiving nothing in the final distribution.<sup>146</sup>

Large public firms usually file for reorganization under Chapter 11. Only in rare cases do they file for liquidation under Chapter 7.<sup>147</sup> Sometimes business prospects deteriorate heavily during Chapter 11 leading firms to convert their Chapter 11 cases to Chapter 7 liquidations. Furthermore, some reorganization plans confirmed under Chapter 11 are actually so-called liquidating plans.<sup>148</sup> There are two forms of liquidat-

---

<sup>142</sup> See Altman and Hotchkiss (2006), p. 34, and White (1989), p. 139.

<sup>143</sup> See Bradley and Rosenzweig (1992), p. 1044, Warren and Westbrook (2000), p. 47, or Baird (2006), p. 9.

<sup>144</sup> See White (2007), p. 1019.

<sup>145</sup> See White (2007), p. 1019, and generally Bris (2008).

<sup>146</sup> This is in line with the absolute priority rule.

<sup>147</sup> See Bebchuk (1998), p. 1, White (2007), p. 1022, and Lemmon, Ma, and Tashjian (2009), p. 6.

<sup>148</sup> See Warren and Westbrook (2009), p. 611 and 11 U.S.C. § 1123(b)(4).

ing plans. First, substantially all assets are often sold and maintained as a going concern. Second, a liquidating plan may be similar to liquidation under Chapter 7, where all assets are sold piecemeal.<sup>149</sup>

### 3.3 Reorganization under Chapter 11

Chapter 11 allows the debtor to continue business as so-called debtor in possession (DIP), indicating that the pre-petition management can remain in office, albeit under the supervision of the bankruptcy court.<sup>150</sup> Material decisions outside the ordinary course of business “[...] are subject to court review and legal motions by creditors to disallow the proposed policy.”<sup>151</sup> While the creditors’ claims are stayed as of the bankruptcy filing, the debtor can stop its payments for interests and principal during the bankruptcy proceedings.<sup>152</sup>

The aim of Chapter 11 is to eventually settle the creditors’ claims in an orderly procedure (via the plan of reorganization) and to rehabilitate the business as a going concern.<sup>153</sup> Ideally, this should mean that a higher value is ultimately available for distribution than if the company were to be liquidated. Crucial to the success of reorganization under Chapter 11 is the proposal and adoption of a reorganization plan. The reorganization plan determines how much claimholders receive in response to their pre-petition claims.<sup>154</sup> Creditors and equityholders are assigned to different classes in accordance with the priority and nature of their claims.<sup>155</sup> Unsecured claims can be broken down into priority claims, such as administrative expenses, personnel expenses

---

<sup>149</sup> See Warren and Westbrook (2009), p. 611, and White (1989), p. 140.

<sup>150</sup> See White (2007), p. 1021. In rare cases where the management is found having acted fraudulently a trustee is named to take control of the bankrupt firm, as shown by Gertner and Scharfstein (1991), p. 1209, and by Altman and Hotchkiss (2006), p. 14.

<sup>151</sup> Gertner and Scharfstein (1991), p. 1209.

<sup>152</sup> See White (2007), p. 1021. Secured loans nevertheless require the firm to continue paying interest.

<sup>153</sup> See Thoma and Wilke (2006), pp. 112-113.

<sup>154</sup> See Thoma and Wilke (2006), p. 113.

<sup>155</sup> See White (2007), p. 1021. Although distribution to pre-petition equityholders under the plan mostly entails a deviation from the absolute priority rule, Hart (2000), p. 5, argues that this deviation might be in line with creditors’ preferences. If equityholders were to receive nothing under the plan, management, acting as the equityholders’ agent, would have an incentive to postpone the bankruptcy filing for as long as possible and engage in high-risk investments. On the one hand, if such high-risk investments turn out well, most of the benefits would accrue to the equityholders. On the other hand, if they turn out not so well, the loss will be shared by the creditors. This reasoning follows the risk-shifting incentives and overinvestment hypothesis introduced by Jensen and Meckling (1976) and discussed in chapter 2.1.

and taxes, and general unsecured claims.<sup>156</sup> Generally, all claims within a given class must be treated equally. A class is called unimpaired (impaired) if 100% (less than 100%) of its claims are satisfied.<sup>157</sup>

Management is assigned the exclusive right to propose a reorganization plan within the first 120 days after filing.<sup>158</sup> However, the exclusivity period is often extended by the bankruptcy court, as found by prior research.<sup>159</sup> The adoption of the reorganization plan depends on a voting procedure. All impaired classes of creditors and equityholders have to accept the plan. For a class of creditors to accept the plan, the majority of the votes and more than two-thirds of the sum of the claims in this class are required to vote in favor of the plan.<sup>160</sup> Acceptance by the equityholders requires a two-thirds majority.<sup>161</sup> Voting is based on a disclosure statement that must contain sufficient information to enable “[...] a hypothetical investor of the relevant class to make an informed judgment about the plan [...]”<sup>162</sup>. White (1989) calls this procedure the “unanimous consent procedure”<sup>163</sup> (UCP) as opposed to the absolute priority rule (APR) under Chapter 7. The bankruptcy court will confirm the proposed plan if all classes accepted it. If a class rejected the plan, the court can apply the cram-down procedure, which effectively leads to the adoption of the reorganization plan despite objections by some creditors.<sup>164</sup> Generally, the bankruptcy court applies the “best interest of creditors test”<sup>165</sup>, which stipulates that each class must receive at least as much as it would have received in a hypothetical liquidation.<sup>166</sup> Distribution to claimholders under Chapter 11 must therefore always be compared with the respective hypothetical distribution under Chapter 7. Moreover, before confirming the plan, the bankruptcy

---

<sup>156</sup> See Bris (2008).

<sup>157</sup> See Hotchkiss et al. (2008), p. 14, and Thoma and Wilke (2006), p. 114.

<sup>158</sup> See White (2007), p. 1021 and Bris (2008).

<sup>159</sup> See Jensen (1991), p. 29, where he refers to the famous case of Eastern Airlines in which the judge granted at least eight extensions. The BAPCPA of 2005 limits the exclusivity period to a maximum of 18 months, see Altman and Hotchkiss (2006), p. 50.

<sup>160</sup> See Thoma and Wilke (2006), p. 115 and Bris (2008).

<sup>161</sup> For a discussion of the different distribution regimes under Chapter 11 and Chapter 7 see White (2007), pp. 1021-2023.

<sup>162</sup> 11 U.S.C. § 1125 (a)(1). Refer also to Alderson and Betker (1999), p. 69, regarding disclosure statements.

<sup>163</sup> White (1989), p. 139.

<sup>164</sup> See White (2007), p. 1022, and, for details of more requirements for the cram-down procedure, Thoma and Wilke (2006), p. 115.

<sup>165</sup> White (2007), p. 1022, and 11 U.S.C. § 1129 (a)(7).

<sup>166</sup> See White (2007), p. 1022 or Alderson and Betker (1999), p. 69.

court must check that any subsequent reorganization or liquidation is unlikely.<sup>167</sup> The company formally emerges from Chapter 11 on the effective date of the reorganization plan, which is usually shortly after confirmation by the bankruptcy court.<sup>168</sup>

Apart from the standard Chapter 11 procedure described above, firms can file prepackaged bankruptcies. In a prepackaged bankruptcy (alternatively called prepack or prearranged bankruptcy), the reorganization plan is typically filed in conjunction with the actual filing.<sup>169</sup> Tashjian, Lease, and McConnell (1996) distinguish between “*pre-voted*”<sup>170</sup> and “*post-voted prepacks*”<sup>170</sup>. The difference between the two being that, with the first, the voting procedure for acceptance of the reorganization plan takes place before filing, while, in the latter, the voting takes place after filing. The advantage of prepackaged bankruptcies, especially the “*pre-voted*”<sup>170</sup> ones, is that they usually take less time under court supervision and as a result can be less costly. Prepacks are sometimes also described as a hybrid form between Chapter 11 reorganization and out-of-court restructurings.<sup>171</sup> According to Hotchkiss et al. (2008) prepacks began to replace some out-of-court restructurings as of the 1990s.<sup>172</sup>

In recent years, more and more bankruptcies under Chapter 11 have resulted in the going-concern sale of the bankrupt firm’s assets.<sup>173</sup> According to Jensen (1991), acquiring assets through an auction process can improve the efficiency of the bankruptcy process.<sup>174</sup> Hotchkiss and Mooradian (1998) document a 45% discount for the acquisition of bankrupt targets relative to non-bankrupt targets.<sup>175</sup> They argue that an

---

<sup>167</sup> See 11 U.S.C. § 1129 (a)(11) and LoPucki and Whitford (1993b), pp. 608-609.

<sup>168</sup> See Zhang (2010), p. 1722. However, as the case of American Banknote Corporation has shown, the time between confirmation of the reorganization plan and consummation of the plan, i.e. the effective date, can be quite extensive. After the bankruptcy court confirmed the third amended reorganization plan in November 2000, it took another amendment to the plan and almost two more years until American Banknote Corporation emerged from bankruptcy in October 2002. Refer to the 2002 10-K of American Banknote Corporation for more information on the causes of the delay.

<sup>169</sup> See Tashjian, Lease, and McConnell (1996), p. 138 or Betker (1995), p. 3.

<sup>170</sup> Tashjian, Lease, and McConnell (1996), p. 138. Post-voted prepacks are sometimes referred to as prenegotiated prepacks. See, for instance, Baird and Rasmussen (2003), p. 674.

<sup>171</sup> See Tashjian, Lease, and McConnell (1996), p. 135.

<sup>172</sup> See Hotchkiss et al. (2008), p. 16, and, for prepacks in general, Tashjian, Lease, and McConnell (1996).

<sup>173</sup> See Baird, Bris, and Zhu (2007), p. 4, Skeel (2003), p. 921, and Baird and Rasmussen (2002), pp. 35-36.

<sup>174</sup> See Jensen (1991), p. 32. Estimation of the value of the bankrupt firm would thus be left to the market for corporate control.

<sup>175</sup> See Hotchkiss and Mooradian (1998), p. 243.



“[...] *acquisition is a substitute for a reorganization in Chapter 11 [...]*”<sup>176</sup>. In Chapter 11, a business can be sold as a going concern in one of two ways: either through a § 363 sale or as part of a confirmed plan of reorganization.<sup>177</sup> One reason why many cases have resulted in § 363 sales over the last years is that the assets can be bought free and clear of all claims without the approval of a reorganization plan.<sup>178</sup> The difference between the legal entity and the business entity thus becomes evident.<sup>179</sup> The legal entity, deprived of most of its assets, remains in Chapter 11, while the business entity (i.e. most of the assets) has been sold off. Consequently, from a legal perspective, the question about the going-concern value of the bankrupt firm (the size of the pie) is separated from the question of the distribution to the creditors and equityholders (who gets how large a slice of the pie). The bankruptcy court is in charge of the distribution only.<sup>180</sup> Selling a business as part of a confirmed reorganization plan typically takes more time than a § 363 sale, since creditors have to approve the reorganization plan.<sup>181</sup>

During reorganization under Chapter 11, the debtor in possession will in many cases be confronted with financing problems. Upon approval by the bankruptcy court, a debtor in possession may obtain new financing means, know as DIP financing or post-petition financing.<sup>182</sup> This financing is intended to pay professionals such as lawyers, consultants and accountants during the bankruptcy proceedings, to satisfy working capital requirements and to fund necessary capital expenditures to keep the business running.<sup>183</sup> DIP financing typically enjoys higher seniority and increased security.<sup>184</sup> The terms of the DIP loan are specific to each contract. Nonetheless, they are mostly floating rate notes provided as a short- to medium-term revolving credit line.<sup>185</sup> Some legal scholars argue that, through the terms of the DIP financing such as debt

<sup>176</sup> Hotchkiss and Mooradian (1998), p. 241.

<sup>177</sup> See Hotchkiss and Mooradian (1998), p. 251. § 363 sales refer to 11 U.S.C. § 363.

<sup>178</sup> See Baird and Rasmussen (2002), p. 35.

<sup>179</sup> Compare to LoPucki and Whitford (1993b), pp. 601-602, on the separation of “*business survival*” from “*entity survival*”.

<sup>180</sup> Compare to Jensen (1991), p. 32, or Baird and Rasmussen (2002), p. 36.

<sup>181</sup> See Hotchkiss and Mooradian (1998), p. 251.

<sup>182</sup> See White (2007), p. 1021.

<sup>183</sup> See Altman and Hotchkiss (2006), p. 44.

<sup>184</sup> See Altman and Hotchkiss (2006), p. 44 and 11 U.S.C. § 364.

<sup>185</sup> See Altman and Hotchkiss (2006), pp. 44-45.

covenants, creditors have *de facto* taken control of the debtor in possession in recent years, contrary to the widely held view that Chapter 11 would be debtor-friendly.<sup>186</sup>

Finally, U.S. bankruptcy law provides the debtor in possession with many options to facilitate a successful fresh start after emergence. As shown in chapter 2.1, these include the right to terminate pension plans under certain conditions. Pension plans can be stopped under Chapter 11 and handed over to the public Pension Benefit Guaranty Corporation (PBGC).<sup>187</sup> Furthermore, the debtor in possession has the right to reject executory contracts and unexpired leases.<sup>188</sup>

---

<sup>186</sup> See Muro (2008), pp. 3-4, Baird and Rasmussen (2002) and Skeel (2003), p. 918. Baird and Rasmussen (2009), p. 30, provide a list of covenants and provisions approved by the bankruptcy court in DIP financing orders.

<sup>187</sup> See White (2007), p. 1021, or Datta and Iskandar-Datta (1995), p. 28.

<sup>188</sup> See White (1989), pp. 144-145, and White (2007), p. 1021, who states that penalties for breach of contract are assigned to the class of general unsecured claims that will only be satisfied at the class' pro-rata distribution under the plan of reorganization.

## 4 Research Model

### 4.1 Definitions

To facilitate the following analyses and avoid ambiguities with regard to the most important terms, some definitions should be established at the outset. Certain definitions, such as financial distress, restructuring and turnaround were already introduced in chapter 2 above.

#### 4.1.1 General Definitions

This study is concerned with restructuring strategies and the post-bankruptcy performance of large public U.S. firms. I selected public instead of private firms for two reasons.<sup>189</sup> First, both the public and academic debates concerning the efficiency of the Chapter 11 process and with regard to the ultimate fate of bankrupt firms focus on the cases of public companies.<sup>190</sup> Second, limitations in data availability for non-public firms place a serious burden on empirical research that focuses on private firms.<sup>191</sup> Public companies are defined as those companies that are required to make filings with the U.S. Securities and Exchange Commission (SEC). This corresponds to the definition employed in the UCLA-LoPucki Bankruptcy Research Database, from which the original sample of bankrupt firms was drawn.<sup>192</sup>

When referring to the bankruptcy process, I use the notational conventions shown in Figure 2 to denote specific dates or time periods. In contrast to Hotchkiss (1995), who takes the year in which the reorganization plan was confirmed as the starting point for the post-bankruptcy analyses, I take the year in which the firm formally

---

<sup>189</sup> The broader motivation for this study is explained in chapter 1.1.

<sup>190</sup> See Denis and Rodgers (2007), p. 113.

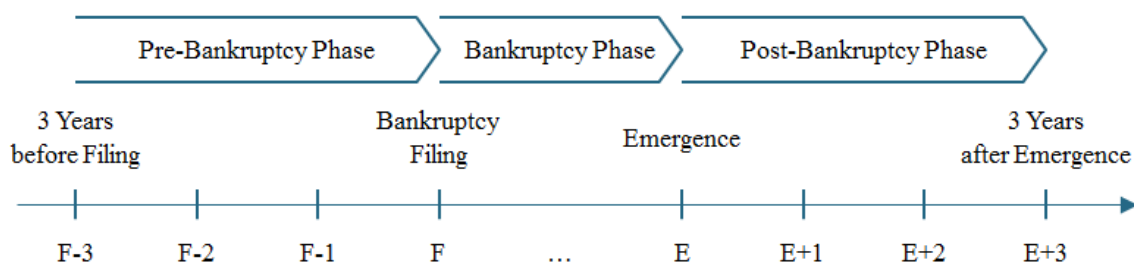
<sup>191</sup> In the absence of any private or proprietary data, such research is difficult to do. One notable exception is, for instance, Bris, Welch, and Zhu (2006), who had access to data on private and public companies that filed for bankruptcy either in Arizona or the Southern District of New York.

<sup>192</sup> Refer to the website of the Bankruptcy Research Database at [lopucki.law.ucla.edu](http://lopucki.law.ucla.edu).

emerged from bankruptcy as my starting point.<sup>193</sup> This is in line with Denis and Rodgers (2007), who refer to this year as the year of resolution.<sup>194</sup> I rely on the year of emergence because there can be considerable delays between initial confirmation of the reorganization plan and ultimate emergence from bankruptcy, as the example of American Banknote has shown.<sup>195</sup> Accordingly, relying on the year of confirmation rather than emergence could lead to years spent in bankruptcy being treated as years spent out of bankruptcy.<sup>196</sup> Emergence refers either to the date when the reorganization plan became effective or, in case of a § 363 sale, to the date when the transaction was consummated (closing). Ayotte and Morrison (2009) refer to this date as the “*economic outcome*”<sup>197</sup> in contrast to the “*legal outcome*”<sup>197</sup>. Accordingly, E+1 designates the first full fiscal year after emergence that contains no direct bankruptcy effects.

## Figure 2: Timing Conventions

The symbols from F-3 through E+3 can refer to both a point in time and a period of time depending on the context. For instance, the last 10-K before bankruptcy filing is denoted by F-1. This refers to the point in time when the fiscal year in question ended. However, in the 10-K in year F-1 the statement of operations, for instance, refers to the whole fiscal year F-1 and not just to the last day of the fiscal year. Known from accounting, this ambivalence also applies to the timing conventions used in this study. The bankruptcy phase is equivalent to the Chapter 11 phase.



Source: Author's own illustration.

<sup>193</sup> See Hotchkiss (1995), pp. 8-9.

<sup>194</sup> See Denis and Rodgers (2007), p. 104 and p. 110.

<sup>195</sup> See the detailed description in chapter 3.3.

<sup>196</sup> In a few cases, such as Genesis Health Ventures or Assisted Living Concepts, the year of emergence was taken as the year in which fresh-start reporting was implemented. Typically for such cases, official emergence took place a few days after the initial application of fresh-start reporting.

<sup>197</sup> Ayotte and Morrison (2009), p. 521. When substantially all assets are sold in a § 363 sale, the original firm is left as a shell company containing virtually no assets. However, this shell company must still be shut down in an orderly manner during Chapter 11. This usually takes the form of a liquidating reorganization plan. Accordingly, it is important to distinguish between the economically relevant transfer of assets in a § 363 sale and the formal legal consummation of the reorganization.

### 4.1.2 Chapter 11 Outcomes and Post-Bankruptcy Outcomes

Table 2 provides an overview of the Chapter 11 outcome definitions used in this study. Firms emerging from Chapter 11 can be classified as reorganized (public or private), merged, liquidated or dismissed.

**Table 2: Chapter 11 Outcomes**

Outcome	Definition
Reorganized public	Firms that left Chapter 11 as going concerns having had their reorganization plans confirmed (or all or substantially all assets were sold in a § 363 sale) and continued to file documents with the SEC (i.e. remained public entities). In addition, firms that were acquired, but that continued to operate independently and filed documents with the SEC
Reorganized private	Firms that left Chapter 11 as going concerns having had their reorganization plans confirmed (or all or substantially all assets were sold in a § 363 sale), but that no longer filed documents with the SEC (i.e. firms that went private). In addition, firms that were acquired, continued to operate independently, but that no longer filed documents with the SEC
Merged	Firms that were acquired and were merged into the acquiring firm, i.e. that lost their status as independent entities (including § 363 sales and sales as part of the reorganization plan)
Liquidated	Firms that either had a liquidating plan confirmed or were converted to Chapter 7. Assets were sold piecemeal
Dismissed	Firms that filed for Chapter 11, but the bankruptcy court dismissed the case

Source: Author's own illustration, influenced by Hotchkiss (1993) and Denis and Rodgers (2007).

Firms that emerge as reorganized entities have either had their reorganization plans confirmed or all or substantially all assets were sold in a § 363 sale. It is crucial that these firms continue to operate as independent entities to be classified as reorganized.<sup>198</sup> The legal entity of a reorganized company can either remain unchanged or be newly established. In some cases, the reorganized company changes its name before, upon or shortly after emergence. Continuing to file documents with the SEC distinguishes firms that reorganized as public entities (reorganized public) and those that reorganized as private entities (reorganized private).

In Chapter 11, companies can be acquired either through a § 363 sale or through a confirmed reorganization plan.<sup>199</sup> Compared to prior literature, the distinction between acquired and merged is crucial, since performance improvements of firms that

<sup>198</sup> See Hotchkiss (1993), p. 11 of the second essay.

<sup>199</sup> See Hotchkiss and Mooradian (1998), p. 251, who explain in detail what differentiates the two methods from each other. Compare also to chapter 3.3.

were merged into the acquiring firm cannot be accurately disentangled from performance improvements induced by the acquiring firm.<sup>200</sup> Accordingly, I classify these firms as merged. Conversely, I assign firms that have been acquired but that continue to operate as independent public entities to the reorganized public group. This is in line with Hotchkiss (1995) and Bandopadhyaya and Jaggia (2001).<sup>201</sup>

Firms that are liquidated see their assets sold piecemeal either pursuant to a liquidating plan under Chapter 11 or through conversion to Chapter 7. Most of the time, the reason for liquidation is that the estimated going concern value falls below the liquidation value.<sup>202</sup> In a few cases, petitions for bankruptcy protection are dismissed by the bankruptcy court. These cases are excluded from the analyses.<sup>203</sup> Some cases may be dismissed because the debtor and its creditors have been able to reach an agreement which they had not been able to work out outside the courtroom before the filing.<sup>204</sup> To summarize, firms are only considered for the analysis of post-bankruptcy performance if they emerged from Chapter 11 as independently operating public entities.<sup>205</sup>

Since I am interested in the ultimate fate of firms that emerge from bankruptcy, it is important to define possible post-bankruptcy outcomes. These can be public, private, merged, refiled or liquidated. These are summarized and defined in Table 3. Firms are tracked from the year of emergence from Chapter 11 (E) until three years after emergence (E+3).<sup>206</sup>

---

<sup>200</sup> Hotchkiss and Mooradian (1998) analyze acquisitions in Chapter 11, but from a transactional point of view. They conclude that acquiring (parts of) an insolvent firm can create value for the acquiring firm. Including firms in the reorganized public outcome group that were acquired during Chapter 11 and remained independently operating public entities reflects the prevailing reality in Chapter 11 as documented by e.g. Baird and Rasmussen (2003), p. 691. They stipulate that the "*dominant feature of the large corporate Chapter 11 today is the asset sale.*"

<sup>201</sup> See Hotchkiss (1995) who builds on Hotchkiss (1993), p. 11 of the second essay, and Bandopadhyaya and Jaggia (2001), p. 203.

<sup>202</sup> See Hotchkiss (1993), pp. 11-12 of the second essay.

<sup>203</sup> Of the initial sample, 7 cases are dismissed.

<sup>204</sup> See Warren and Westbrook (2009), p. 611.

<sup>205</sup> Compare to Hotchkiss (1993), p. 11 of the second essay. The same definition is applied in Hotchkiss (1995). Denis and Rodgers (2007) use a similar definition, but exclude firms that were acquired in Chapter 11 from their post-bankruptcy performance analyses.

<sup>206</sup> This choice conforms to time horizons used by prior research such as Denis and Rodgers (2007). Refer also to chapter 4.2.1.

**Table 3: Post-Bankruptcy Outcomes**

Outcome	Definition
Public	Firms that continued to operate as independent public entities through E+3
Private	Firms that went private through E+3
Merged	Firms that were acquired and merged into the acquiring public firm through E+3
Refiled	Firms that refiled for Chapter 11 or Chapter 7 after their initial emergence through E+3
Liquidated	Firms that were liquidated after their initial emergence through E+3

Source: Author's own illustration, influenced by Hotchkiss (1993) and Denis and Rodgers (2007).

## 4.2 Research Model

The aim of this study is to identify restructuring strategies and actions that are associated with a higher probability of post-bankruptcy success in a multivariate setting. The research model is grounded in the conceptual work of Pettigrew (1987b), who introduced the triangle of content, process and context recommended for any meaningful strategic management research and especially the management of strategic change.<sup>207</sup> Restructuring in a bankruptcy setting can also be understood as the management of strategic change in a broader sense.

In the context of this study, content builds on the four generic restructuring strategies introduced by Lai and Sudarsanam (1997) that are intended to turn around the bankrupt firm and eventually facilitate post-bankruptcy success. The process aspect is operationalized by two distinct stages referring to (i) the bankruptcy phase, beginning when the firm files for bankruptcy (F) and ending when it emerges from Chapter 11 (E), and (ii) the post-bankruptcy phase, which is defined as three full fiscal years following emergence (E+1 through E+3).<sup>208</sup> The process aspect seems especially important in the bankruptcy context, since the institutional framework during bankruptcy is substantially different to the post-bankruptcy phase. This becomes evident when one considers that the firm acts as debtor in possession during bankruptcy supervised by the bankruptcy court. The automatic stay provides relief from honoring debt payment

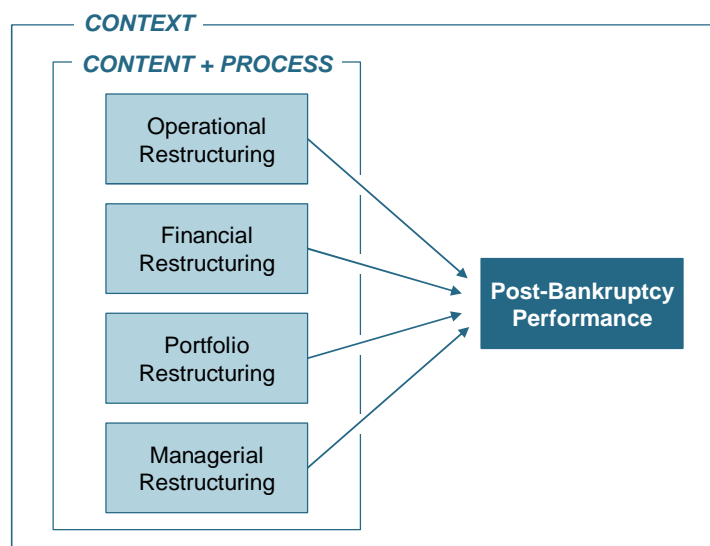
<sup>207</sup> See Pettigrew (1987b), pp. 4-6, and Pettigrew (1987a), p. 657.

<sup>208</sup> This process approach resembles the approach taken by Eichner (2010) for analyzing the effectiveness of restructuring actions of non-bankrupt manufacturing firms.

obligations during bankruptcy, which is particularly beneficial for firms that filed primarily due to financial distress. The two process stages resemble the two-stage turnaround models introduced by Robbins and Pearce (1992) and Arogyaswamy, Barker, and Yasai-Ardekani (1995) featuring a retrenchment and a recovery stage. Finally, the context or control variables relate to the inner context of the firm as represented by firm characteristics before filing or by the main reason for filing in terms of economic or financial distress, for example. Context may also relate to the outer context, such as industry characteristics before filing or the nature of the bankruptcy proceedings, such as e.g. a prepackaged bankruptcy.

Especially the process aspect combined with the scope of analyzed restructuring strategies and actions is novel in post-bankruptcy literature. Using this research model, I build on prior contributions from financial distress and corporate restructuring literature as shown in chapter 2. Figure 3 provides an overview of the chosen research model.

**Figure 3: Overview Research Model**



Source: Author's own illustration.



### 4.2.1 *Post-Bankruptcy Performance as Dependent Variable*

This study focuses on accounting-based performance data rather than on market-based data such as stock price performance. This approach seems plausible for several reasons. First, as Hotchkiss (1995) reports, the fact that not all emerged firms list their new stock on an exchange could bias any analysis based on stock price performance.<sup>209</sup> Second, as discussed by Lai (1997) and extensively documented by prior research, stock prices are susceptible to market inefficiencies and anomalies.<sup>210</sup> Third, many prior contributions on both post-bankruptcy performance and restructuring strategies have relied on accounting-based performance metrics, which makes it easier to relate my findings to prior contributions. Fourth, the information contained in and the significance of forms 10-K and 10-Q has been analyzed in the accounting literature. For instance, Griffin (2003) finds that investors respond quickly to the information conveyed in forms 10-K and 10-Q.<sup>211</sup> Performance metrics used in selected prior research are shown in Table 4 and Table 5.

---

<sup>209</sup> See Hotchkiss (1995), p. 8. Despite the fact that some firms do not list their new stock on an exchange, they still meet the criteria for a public firm, as they continue to file documents with the SEC such as the 10-K.

<sup>210</sup> See Lai (1997), pp. 27-31.

<sup>211</sup> See Griffin (2003), p. 434.

**Table 4: Performance Metrics of Selected Post-Bankruptcy Performance Studies**

Author(s)	Performance Metric
<i>Accounting-Based Performance Metrics</i>	
Lemmon, Ma, and Tashjian (2009)	EBITDA scaled by total assets (also as industry-adjusted value)
Denis and Rodgers (2007)	Operating income before depreciation scaled by total assets (also as industry-adjusted value)
Kalay, Singhal, and Tashjian (2007)	EBITDA scaled by total assets (also as industry-adjusted value and as normalized value scaled by the industry standard deviation)
Dawley, Hoffman, and Brockman (2003)	Return on assets (also as industry-adjusted value)
Alderson and Betker (1999)	<ul style="list-style-type: none"> <li>Net cash flows to claimholders, defined as net cash flow from operations + net cash flow from investment + cash interest paid – change in cash – other cash flows from financing</li> <li>EBITDA scaled by sales (as industry-adjusted value)</li> </ul>
Maksimovic and Phillips (1998)	<ul style="list-style-type: none"> <li>Plant-level productivity</li> <li>Operating cash flows (also as industry-adjusted value)</li> </ul>
Hotchkiss and Mooradian (1997)	Operating income, i.e. net sales - COGS - SG&A before depreciation and amortization (also scaled by total assets or sales, or as industry-adjusted value)
Hotchkiss (1995)	Operating income, i.e. net sales - COGS - SG&A before depreciation and amortization (also scaled by total assets or sales, or as industry-adjusted value)
<i>Market-Based Performance Metrics</i>	
Jory and Madura (2010)	Stock price performance
Eberhart, Altman, and Aggarwal (1999)	Stock price performance

Source: Author's own illustration.

Within the class of accounting-based performance metrics two major groups emerge from prior research. While Hotchkiss (1995), Denis and Rodgers (2007) and Kalay, Singhal, and Tashjian (2007) use operating performance metrics such as operating income or EBITDA, others, such as Asquith, Gertner, and Scharfstein (1994), Jostarndt and Sautner (2010) or Eichner (2010) use performance metrics that additionally take financial or investment activities into account.<sup>212</sup> These metrics include, for instance, EBITDA less interest expenses or EBITDA less interest expenses less capital expenditures. These metrics typically serve as free cash flow proxies.<sup>213</sup> Hotchkiss (1995) uses a similar free cash flow proxy for her descriptive statistics to compare her results to the operating performance metric.<sup>214</sup> Similar cash flow proxies have been

<sup>212</sup> Another distinction could be made between accrual-based accounting metrics and cash flow-based accounting metrics. However, in most of the related prior studies cash flow-based metrics are approximated using accrual-based metrics which presumably contain some non-cash items. For a more detailed discussion of the differences between accruals and cash flows, refer to Dechow (1994).

<sup>213</sup> See Jostarndt and Sautner (2010), pp. 16-17 and Asquith, Gertner, and Scharfstein (1994), p. 628. These metrics are often interpreted as interest coverage ratios.

<sup>214</sup> See Hotchkiss (1995), p. 9.

used in other research fields such as post-merger performance (Healy, Palepu, and Ruback (1992)) or buyout performance (Guo, Hotchkiss, and Song (2011)).<sup>215</sup>

**Table 5: Performance Metrics of Selected Restructuring Studies**

Author(s)	Performance Metric
<i>Accounting-Based Performance Metrics</i>	
Eichner (2010)	Interest coverage, i.e. EBITDA – capital expenditures – net interest expenses
Jostardt and Sautner (2010)	Interest coverage, i.e. EBIT < interest expenses
Jostardt and Sautner (2008)	Interest coverage, i.e. EBIT < interest expenses
Buschmann (2006)	Return on investment, i.e. EBT/(fixed assets + working capital)
Kahl (2001)	EBITD scaled by total assets or sales (also as industry-adjusted value)
Asquith, Gertner, and Scharfstein (1994)	Interest coverage, i.e. EBITDA < interest expenses (also scaled by total assets, or as industry-adjusted value)
<i>Market-Based Performance Metrics</i>	
Lai and Sudarsanam (1997)	Stock price performance
Ofek (1993)	Stock price performance

Source: Author's own illustration.

Often, these metrics are scaled either by total assets or net sales to produce a return on assets (ROA) or return on sales (ROS) which can be better compared over time and across firms.<sup>216</sup> In cross-industry studies, performance metrics are often scaled by subtracting the respective industry median matched by SIC codes. Industry medians are defined as the contemporaneous values for a specific item (e.g. total assets) of all firms appearing in a given 3-digit SIC group. In line with Denis and Rodgers (2007) it is required that at least five distinct firms form the basis for calculating the industry median.<sup>217</sup> Where this criterion is not met, I have moved from 3-digit SIC groups to 2-digit SIC groups, and ultimately to 1-digit SIC groups. As Hotchkiss (1993) points out, the comparison of emerged firms' performance with the median industry performance might overstate both positive results and negative results for the bankrupt firms in rela-

<sup>215</sup> See Healy, Palepu, and Ruback (1992), p. 139, using pretax cash flow return on assets to measure operating performance improvements. The pretax cash flow is defined as sales less cost of goods sold less selling, general and administrative expenses before depreciation and amortization. Guo, Hotchkiss, and Song (2011), p. 515, use net cash flow defined as EBITDA less capital expenditures to measure firm performance.

<sup>216</sup> See Healy, Palepu, and Ruback (1992), p. 139.

<sup>217</sup> See Denis and Rodgers (2007), p. 104.

tion to the respective industry.<sup>218</sup> This is due to the fact that many emerging companies adopt fresh-start reporting, recording assets at fair market values which are presumably below the book values recorded at historic costs which probably apply to the respective industry peers.<sup>219</sup> This problem is overcome by using sales instead of total assets as a scaling factor in line with Hotchkiss (1995).<sup>220</sup>

In contrast to prior post-bankruptcy performance studies, which focus on firm and industry characteristics and only selectively examine specific restructuring actions such as replacing the CEO or reducing leverage, this study scrutinizes the restructuring actions employed by bankrupt firms in a comprehensive manner.<sup>221</sup> It therefore seems appropriate to alter the performance metric, since the variety of potential restructuring actions is not restricted to improving a firm's operating performance, but also aims to improve a firm's financial position and investments.<sup>222</sup> Accordingly, I use a proxy for pretax free cash flow as a performance metric in this study. The pretax free cash flow proxy is defined as shown in Table 6.<sup>223</sup> My definition draws on prior literature by Asquith, Gertner, and Scharfstein (1994) and the extension employed by Eichner (2010), who additionally takes capital expenditures into account.<sup>224</sup> My choice is corroborated by Alderson and Betker (1999), who do not use operating margins for their analysis of

---

<sup>218</sup> See Hotchkiss (1993), pp. 14-15 of the first essay.

<sup>219</sup> Fresh-start reporting in accordance with Statement of Position (SOP) 90-7 of the American Institute of Certified Public Accountants (AICPA) refers to financial reporting by entities in reorganization under the Bankruptcy Code. The provisions of SOP 90-7 can be applied subject to two conditions: (i) the reorganization value of the assets of the emerging entity before confirmation is less than the sum of all post-petition liabilities and allowed claims (i.e. the firm is insolvent in the stock-based definition) and (ii) holders of voting shares before confirmation receive less than 50% of the voting shares of the emerging company (i.e. a substantial change in ownership takes place). If these conditions are met, the firm should apply fresh-start reporting upon emergence from Chapter 11. The application of fresh-start reporting entails allocating the reorganization value of the entity to the assets of the emerging firm which will result in many if not all assets being written down to their fair market values. Liabilities are also set to their fair values (calculated as discounted expected cash flows). For further details refer to e.g. Lehavý (2002) or Heron, Lie, and Rodgers (2009).

<sup>220</sup> See Hotchkiss (1995), p. 8.

<sup>221</sup> Refer to the literature review in Hotchkiss et al. (2008), pp. 31-35.

<sup>222</sup> A simple example serves to illustrate this: Assume a firm manages to reduce its debt significantly over the course of the three years after emergence. This is likely to reduce its interest payments in absolute terms and should, *ceteris paribus*, contribute to better performance. This, in turn, is not directly reflected in any operating performance metric (e.g. operating income). Only indirect effects could be captured by an operating performance metric, such as spending the saved interest payments for marketing purposes, possibly resulting in higher sales. Applying a broader performance metric that takes interest payments into account would directly measure this effect.

<sup>223</sup> For the remainder of this study, I refer to the proxy for pretax free cash flow as free cash flow.

<sup>224</sup> Typically, free cash flow includes changes in net working capital. I do not uphold this due to limitations in data availability. Kaplan (1989), p. 224, provides similar reasons for not including changes in net working capital in his cash flow measure. The limitations in data availability mainly relate to firms whose post-bankruptcy data was not available in Worldscope and which had to be manually extracted from company filings which would have been outside the scope of this study. This is consistent with prior literature in the restructuring and turnaround field. Eichner (2010), for instance, leaves changes in net working capital out too.

post-bankruptcy performance as they “do not tell the whole story”<sup>225</sup>. They rather rely on a net cash flow definition.<sup>226</sup>

**Table 6: Definition of Free Cash Flow Performance Metric**

Item	Definition
Sales	Net sales
./. COGS	Cost of goods sold corrected for any depreciation and amortization included
./. SG&A	Selling, general and administrative expenses
= Operating income	Operating income before deducting depreciation and amortization
./. CAPEX	Capital expenditures other than those associated with acquisitions
./. Interest expenses	Interest expenses
= Free cash flow	Proxy for pretax free cash flow

Source: Author’s own illustration.

So far, I have explained the rationale behind the choice of free cash flow as the appropriate performance metric for my study. The next step concerns the operationalization of the performance metric for the definition of post-bankruptcy success. There is a myriad of different definitions of post-bankruptcy success (or failure). Representing the legal strand of the bankruptcy literature, LoPucki and Whitford (1993b) present different measures of success. Notably, these include confirmation of a plan of reorganization, firm survival, improved financial performance such as, on the one hand, improved profitability, less debt or reduction in asset size and, on the other hand, no refiling of the emerged firm.<sup>227</sup>

From a financial economics point of view, it is important to distinguish between a successful reorganization (labeled reorganized public or reorganized private above) and post-bankruptcy success.<sup>228</sup> For the reasons cited above, I rely on accounting-based definitions of post-bankruptcy success. Denis and Rodgers (2007) and Hotchkiss (1995) use several definitions of post-bankruptcy success, as shown in Table 7. They

<sup>225</sup> Alderson and Betker (1999), p. 79.

<sup>226</sup> See Alderson and Betker (1999), p. 70.

<sup>227</sup> See LoPucki and Whitford (1993b), pp. 598-609. Warren and Westbrook (2009), pp. 610-611, conclude that the key measure for reorganization success is confirmation of the reorganization plan.

<sup>228</sup> See Dawley, Hoffman, and Brockman (2003) p. 413.

define success in a similar fashion, relying principally on the firm operating income scaled by total assets or sales which must be positive in at least one or two of the three years following confirmation (Hotchkiss (1995)) or emergence (Denis and Rodgers (2007)). Additionally, they treat refiling, liquidation or another debt workout as failure.

**Table 7: Accounting-Based Definitions of Post-Bankruptcy Success of Selected Studies**

Author(s)	Definition of Post-Bankruptcy Success
<i>Financial Economics Perspective</i>	
Lemmon, Ma, and Tashjian (2009)	No explicit success definition. Firm performance measured as raw and industry-adjusted EBITDA scaled by total assets for up to two years following emergence from Chapter 11
Denis and Rodgers (2007)	<ul style="list-style-type: none"> <li>Survived public for three years after emerging from Chapter 11</li> <li>Positive operating income before depreciation scaled by total assets in at least one or two years until E+3 (also as industry-adjusted value)</li> <li>Further distressed restructuring, refiling, liquidation modeled as failure</li> <li>Combination of the foregoing</li> </ul>
Dawley, Hoffman, and Brockman (2003)	Two consecutive years of return on assets on or above industry level in years two through five since the filing
Alderson and Betker (1999)	Total cash flow (net cash flow to claimholders + terminal value) compared to S&P 500 benchmark
Hotchkiss (1995)	<ul style="list-style-type: none"> <li>Private workout, refiling, liquidation within five years after emerging from Chapter 11 modeled as failure</li> <li>Negative (net sales - COGS - SG&amp;A before depreciation and amortization) or private workout, refiling, liquidation in at least two of the three years after emerging from Chapter 11 modeled as failure</li> <li>Negative industry-adjusted (net sales - COGS - SG&amp;A before depreciation and amortization scaled by sales) in all of the three years after emerging from Chapter 11 or private workout, refiling, liquidation modeled as failure within three years after emerging modeled as failure</li> </ul>
<i>Legal Perspective</i>	
LoPucki and Whitford (1993b)	<ul style="list-style-type: none"> <li>Confirmation of reorganization plan</li> <li>Firm survival after emergence</li> <li>Improved financial performance after emergence (profitability, less debt, reduction in asset size)</li> <li>No refiling</li> </ul>

Source: Author's own illustration.

From the restructuring literature, Eichner (2010) uses a definition of turnaround based on free cash flow three years after the onset of financial distress. He treats a firm as a success (i.e. the turnaround was successful) if a firm's EBITDA less capital expenditures is sufficient to cover the net interest expenses.<sup>229</sup>

<sup>229</sup> See Eichner (2010), p. 134.

**Table 8: Accounting-Based Definitions of Turnaround Success of Selected Studies**

Author(s)	Definition of Turnaround Success
Eichner (2010)	$(EBITDA - \text{capital expenditures} - \text{net interest expenses}) > 0$ three years after the onset of distress
Jostardt and Sautner (2010)	Firm in financial distress avoids bankruptcy filing and completes debt restructuring
Buschmann (2006)	$EBT / (\text{fixed assets} + \text{working capital})$ above 9% for at least two years and long-term average of at least 5%
Kahl (2001)	No explicit success definition. Firm performance measured as industry-adjusted EBITD scaled by total assets for up to five years following distress resolution

Source: Author's own illustration.

Based on the above mentioned contributions from post-bankruptcy literature and restructuring literature, I define post-bankruptcy success as returning to a non-negative free cash flow in year E+3, as defined in Table 6. This means that the company generates enough cash to cover its operating costs, interest payments and capital expenditures. Post-bankruptcy success is coded as a dichotomous variable as opposed to a continuous variable, following the rationale put forward by Hotchkiss (1993).<sup>230</sup> To allow for an easier comparison among firms and industries, free cash flow is either scaled by sales or the respective industry median is subtracted.<sup>231</sup>

The treatment of the post-bankruptcy outcomes refiled, liquidated, merged and private is explained in more detail below.<sup>232</sup> In addition to the performance-based definition of success using the free cash flow metric, these four outcomes determine whether or not a firm should be counted as being successful after its emergence. Classifying companies that refiled or liquidated as failed seems straightforward and is supported by Denis and Rodgers (2007) and Hotchkiss (1995).<sup>233</sup> Bandopadhyaya and Jaggia (2001), however, do not regard a second bankruptcy filing as failure *a priori*. Taking the point of view of creditors, they argue that a second reorganization can be deemed successful if the creditors receive at least as much as they would have received

<sup>230</sup> See Hotchkiss (1993), p. 21 of the first essay. The potential influence of missing observations is mitigated by employing performance groups in the logistic model as opposed to continuous accounting variables. Refer to chapter 5 for a description of the treatment of missing data in this study.

<sup>231</sup> Scaling free cash flow by total sales yields a return on sales performance metric. In line with Hotchkiss (1995), scaling by sales is preferred to scaling by total assets since some firms adopt fresh-start reporting which could bias any performance metric scaled by total assets.

<sup>232</sup> Refer also to chapter 5.3.1 for the treatment of firms that refiled, liquidated, merged or went private in the sample selection process.

<sup>233</sup> See Denis and Rodgers (2007), p. 116 and Hotchkiss (1995), p. 17.

in a liquidation.<sup>234</sup> While this is true from the creditors' perspective, a second filing violates one pivotal condition on which the bankruptcy court based its confirmation of the reorganization plan of the initial bankruptcy. This condition requires that “[c]onfirmation of the plan is not likely to be followed by the liquidation, or the need for further financial reorganization, of the debtor or any successor to the debtor under the plan, unless such liquidation or reorganization is proposed in the plan.”<sup>235</sup> Consequently, I treat refiling and liquidation as failure. Denis and Rodgers (2007) and Hotchkiss (1995) even regard a subsequent out-of-court restructuring as evidence of failure.<sup>236</sup> I refrain from following this example, however, as my definition of success is primarily based on the performance metric. If out-of-court restructuring is mirrored in negative firm performance, this will in any case lead my performance metric to indicate failure. According to the model by Kahl (2002), one should observe more liquidations (i.e. real failures in my terminology) when firms reenter financial distress.<sup>237</sup> Assignment to the successful or unsuccessful group is less clear-cut for firms that merged or went private after emerging. While Hotchkiss (1993) assumes that merged firms are to be treated as successful, I do not automatically treat merged and private firms as successes.<sup>238</sup> Instead, these firms are categorized according to their performance one year before merging or going private, which seems to be more plausible.<sup>239</sup>

Measurement to determine whether post-bankruptcy performance can be regarded as a success takes place at the end of year E+3. This corresponds to a typical time horizon in prior post-bankruptcy performance literature since both Denis and Rodgers (2007) and Hotchkiss (1995) track their accounting data for up to three

---

<sup>234</sup> See Bandopadhyaya and Jaggia (2001), p. 202.

<sup>235</sup> 11 U.S.C. § 1129(a)(11). Refer also to LoPucki and Whitford (1993b), pp. 608-609.

<sup>236</sup> See Denis and Rodgers (2007), p. 116 and Hotchkiss (1995), p. 17.

<sup>237</sup> See Kahl (2002), p. 157.

<sup>238</sup> See Hotchkiss (1993), p. 21 of the first essay.

<sup>239</sup> This entails measuring the restructuring actions over a shorter period of time to avoid any endogeneity by construction, as explained in chapter 4.2.2.



years.<sup>240</sup> Eichner (2010) tracks his distressed firms for three years from the onset of financial distress.<sup>241</sup>

#### 4.2.2 *Restructuring Actions as Independent Variables*

This section examines which restructuring actions tend to influence post-bankruptcy performance, how these are operationalized and which hypotheses are deduced from prior theoretical and empirical research. In contrast to prior contributions such as Denis and Rodgers (2007) and Hotchkiss (1995), I explicitly model restructuring actions depending on the phase of the restructuring process in which they are implemented. Furthermore, relying on results from prior restructuring research, I extend the scope of analyzed restructuring actions in the bankruptcy context.<sup>242</sup> The categorization into operational, financial, managerial and portfolio restructuring strategies follows Lai and Sudarsanam (1997) and Eichner (2010).<sup>243</sup> Table 9 below summarizes the definitions of each independent variable which will be detailed in the following. The reference period is always the last available fiscal year before filing (F-1) for the bankruptcy period and the fiscal year of emergence (E) for the post-bankruptcy phase. To avoid any endogeneity by construction in the post-bankruptcy phase, the independent variables are measured from E through E+2, while the dependent variable is measured with a lag of one year in E+3.<sup>244</sup> The lagged measurement to avoid or mitigate any endogeneity is standard in other research areas such as asset pricing.<sup>245</sup> Nevertheless, I explicitly test the exogeneity assumption for the restructuring actions in the post-bankruptcy phase in chapter 6.3.2.

---

<sup>240</sup> See Hotchkiss (1995), p. 17 and Denis and Rodgers (2007), p. 116. Hotchkiss (1995), p. 17, tracks her sample firms for up to five years to check whether they liquidate, refile or need a private workout during this time. Her main regression models take a time horizon of three years into account. As can be seen in Table 7 and Table 8, some authors use shorter time periods (e.g. Lemmon, Ma, and Tashjian (2009) with two years) while some use longer time periods (e.g. Kahl (2001)).

<sup>241</sup> See Eichner (2010), p. 71.

<sup>242</sup> Refer to chapter 2.3 for more details of post-bankruptcy performance literature.

<sup>243</sup> Refer to chapter 2.2 for a more detailed motivation of this approach.

<sup>244</sup> In line with Eichner (2010), p. 173, I assume that restructuring actions during bankruptcy can be deemed exogenous, since they differ by at least three years from the measurement of post-bankruptcy success in E+3.

<sup>245</sup> See, for instance, Welch and Goyal (2008). In another context, notably the influence of security class actions on takeovers and CEO disciplinary events, Humphery-Jenner (2012), p. 159, applies the same technique.

**Table 9: Definitions of Independent Variables by Restructuring Strategies**

The reference period refers to the last available fiscal year before filing (F-1) for the bankruptcy phase and to the fiscal year of emergence (E) for the post-bankruptcy phase. All variables except DIP Financing are defined for both the bankruptcy phase (in) and the post-bankruptcy phase (out). For ease of reading this table shows only one definition per variable.

Strategy	Variable	Definition
<b>Operational</b>	Sales Increase	Increase in net sales or revenues by at least 10% compared to reference period
	Cost Reduction	Reduction of [(COGS+SG&A)/net sales or revenues] by at least 10% compared to reference period. COGS and SG&A are before deducting depreciation and amortization
	Personnel Reduction	Reduction in number of employees by at least 10% compared to reference period
	CAPEX Increase (Reduction)	Increase (Reduction) in capital expenditures over total assets by at least 10% compared to reference period. Expenditures associated with acquisitions are not included
<b>Financial</b>	Leverage Reduction	Reduction in leverage ratio (total liabilities/total assets) by at least 10% compared to reference period
	Equity Issue	Mentioning of completed issue of new equity in return for cash (does not include warrants, convertible bonds, debt-to-equity swaps or executive compensation). Includes private placements and public offerings as well as rights offerings for common or preferred stock
	DIP Financing	Mentioning of the provision of debtor-in-possession financing during Chapter 11. Use of collateral as a means of financing is not treated as DIP financing
<b>Managerial</b>	Top Executive Change	Mentioning of the initial change in the top executive position of CEO or president. It is assumed that the change occurred when the new top executive took office. Changes on the emergence day are treated as having occurred out of Chapter 11
<b>Portfolio</b>	Acquisition	Mentioning of a closed majority acquisition (either asset or share deal)
	Divestment	Mentioning of a completed divestment (i.e. sale of business segment, subsidiary and alike), includes carveouts, spin-offs and buy-outs

Source: Author's own illustration.

To grasp only significant changes in the variables over time, I use a 10% threshold for some variables. Designating 10% as a threshold is somewhat arbitrary. However, it conforms to prior research such as Eichner (2010), Atanassov and Kim (2009) or Lai and Sudarsanam (1997), who employ similar thresholds to separate significant changes from less significant changes.<sup>246</sup> The change in the respective variable is calculated as the difference between the value in the given year, say E+2, and the value in the reference period, in this case E, divided by the value in the reference period.

<sup>246</sup> See Eichner (2010), p. 136 and p. 138, Atanassov and Kim (2009), pp. 349-350 and Lai and Sudarsanam (1997), p. 208. Specifically, for sales increases Eichner (2010) uses 10% as threshold. John, Lang, and Netter (1992), p. 906, report that poorly performing firms increased their sales in the distress year by an average of 6% and from the distress year until three years after distress they increased average sales by 10%. Concerning cost reduction, John, Lang, and Netter (1992), p. 908, find that the poorly performing firms reduce their cost of goods sold scaled by sales by an average 4% in the first year, and that they reduce their advertising costs scaled by sales by another 6% on average. With regard to reduction in the number of employees, Ofek (1993), p. 10, employs a 10% threshold. Whereas Eichner (2010), p. 138, uses a 25% threshold for changes in capital expenditures, Lai (1997), p. 159, uses a 10% threshold. Finally, Eichner (2010), p. 138, uses a 10% threshold for a reduction of total debt and John, Lang, and Netter (1992), p. 908, document that poorly performing firms reduce their debt ratio by 8% on average in the distress year.

Some variables, such as the increase in sales, are measured indirectly.<sup>247</sup> Measuring sales-increasing actions by the change in net sales or revenues over time is an indirect measurement, since the change can be regarded as a proxy for the outcome of the sales-increasing action and not as the restructuring action itself.<sup>248</sup> This is recognized by prior studies such as those of Eichner (2010), Buschmann (2006) and Sudarsanam and Lai (2001).<sup>249</sup> While Sudarsanam and Lai (2001) exclude sales-increasing actions from their analysis, Eichner (2010), Buschmann (2006) and Nothardt (2001) include the change in sales as a proxy for sales-increasing actions in their analyses.<sup>250</sup> I follow the latter studies in including the indirectly measured proxies for certain restructuring actions in my analysis.

#### 4.2.2.1 Operational Restructuring

Operational restructuring is concerned with improving or optimizing the core of the business itself, more precisely the production process.<sup>251</sup> In the short term, operational restructuring refers to actions intended to improve efficiency.<sup>252</sup> Once efficiency is restored and survival is secured, more strategic goals such as regaining lost market share or expanding into new markets come into focus. The process aspect builds on Robbins and Pearce (1992), who introduced the two-stage process involving the retrenchment stage followed by the recovery stage.<sup>253</sup> Applied to the bankruptcy context, the retrenchment stage resembles the bankruptcy phase during Chapter 11, in which management negotiates with the creditors over the terms of the reorganization plan and tries to stabilize operations. The post-bankruptcy phase compares to the recovery

---

<sup>247</sup> The other variables besides sales increase are cost reduction, personnel reduction and leverage reduction. All other variables are directly measured. Changes in capital expenditures are considered to be a direct measurement as they reflect discretionary management decisions.

<sup>248</sup> This point has been made by Lai (1997), p. 6 and pp. 129-130.

<sup>249</sup> See Eichner (2010), p. 82, Buschmann (2006), p. 168, and Sudarsanam and Lai (2001), p. 185.

<sup>250</sup> Likewise, John, Lang, and Netter (1992), p. 907, use the change in the cost of goods sold scaled by sales as a proxy for cost-cutting actions.

<sup>251</sup> For an industrial firm this refers to the production of goods, whereas for a service or trade firm this refers to the 'production' of services or trade.

<sup>252</sup> This follows Sudarsanam and Lai (2001), p. 185.

<sup>253</sup> See Robbins and Pearce (1992), p. 291.

phase, where the firm is given the chance of a fresh start to recover and possibly grow its market share again.

#### *4.2.2.1.1 Increasing Sales*

Increasing sales seems to be a natural way to overcome distress or bankruptcy and has been suggested by contributions from the restructuring literature such as the theoretical contribution of Hofer (1980).<sup>254</sup> Revenue generation is one of the four generic operating turnaround strategies put forward by Hofer (1980).<sup>255</sup> Notwithstanding, the positive effect of sales-increasing actions may be difficult to realize in many bankruptcy situations, especially when taking into account that e.g. increased marketing efforts do only translate into higher sales after a time lag. It therefore seems appropriate to distinguish the potential effects of sales-increasing actions in terms of the time when they are employed (bankruptcy phase vs. post-bankruptcy phase) and in terms of the underlying reason for distress (economic vs. financial distress).

During the bankruptcy phase it may be difficult to implement sales-increasing actions successfully as management will likely be distracted by other, more urgent topics. These might include convincing suppliers to continue supplying, retaining key employees, receiving DIP financing to keep the business running, and preventing important customers from turning their back on the bankrupt firm. Once the business emerges from bankruptcy as a reorganized going concern, the perspective is likely to change. In this situation, management might define sales-increasing actions in an attempt to regain lost market share, as shown by Hofer (1980), or to conquer new markets. In the restructuring literature, these different notions of sales-increasing actions are highlighted by Buschmann (2006).<sup>256</sup>

It is important to distinguish between economically and financially distressed firms. While increasing sales for economically distressed firms could even be counter-

---

<sup>254</sup> See Hofer (1980), p. 26. Similarly, Hambrick and Schecter (1983), p. 233. Sudarsanam and Lai (2001), p. 185, support the suitability of sales-increasing strategies to overcome financial distress.

<sup>255</sup> See Hofer (1980), p. 20.

<sup>256</sup> See Buschmann (2006), pp. 54-56.

productive if some of the products sold return negative contribution margins, firms that went bankrupt mainly for financial reasons are not *a priori* susceptible of selling unprofitable products with negative contribution margins.<sup>257</sup> Sales-increasing actions should therefore always be a function of the primary underlying distress cause. Discontinuing unprofitable product lines (and reducing sales accordingly) could be beneficial to economically distressed firms, whereas financially distressed firms might benefit if sales increase due to better capacity utilization and greater economies of scale.<sup>258</sup>

Empirically, Nothardt (2001) finds that sales-increasing actions exhibit a significant positive influence on the turnaround probability.<sup>259</sup> Both Eichner (2010) and Buschmann (2006) find no significant relation between sales-increasing actions and the turnaround probability.<sup>260</sup> Empirical evidence for bankrupt firms is sparse. Kalay, Singhal, and Tashjian (2007) document for their U.S. sample that firms reduce sales on average by 14% while in Chapter 11. This is interpreted as focusing on the core of the business.<sup>261</sup> Taking the ambivalent notion of sales-increasing actions as a whole, I formulate the following hypothesis:

H1: Pursuing sales-increasing actions in Chapter 11 (out of Chapter 11) is not (positively) related to the probability of post-bankruptcy success.<sup>262</sup>

Sales increase is operationalized as an increase in net sales or revenues by at least 10% compared to the reference period. Like Eichner (2010), I use a 10% threshold to grasp significant changes in the sales level only.<sup>263</sup> Additionally, to control for any inorganic sales growth (through acquisitions), I include an interaction term of both sales growth and acquisitions in my analysis.<sup>264</sup>

---

<sup>257</sup> See Buschmann (2006), p. 55.

<sup>258</sup> See Buschmann (2006), p. 55.

<sup>259</sup> See Nothardt (2001), p. 271.

<sup>260</sup> See Eichner (2010), p. 215 and Buschmann (2006), p. 187.

<sup>261</sup> See Kalay, Singhal, and Tashjian (2007), pp. 789-790.

<sup>262</sup> To make reading easier, the presented hypotheses are always formulated as alternative hypotheses.

<sup>263</sup> See Eichner (2010), p. 136.

<sup>264</sup> Eichner (2010), p. 138, states that he corrected sales growth for any acquisitions. However, he provides no details of how this correction was operationalized.

#### 4.2.2.1.2 Reducing Costs

Reducing costs as part of the retrenchment stage of a turnaround is widely acknowledged, for instance in the two-stage turnaround model of Robbins and Pearce (1992).<sup>265</sup> They argue that firms in distress “*should activate the turnaround strategy by sharply reducing operational costs through an aggressive retrenchment response.*”<sup>266</sup> However, as Arogyaswamy, Barker, and Yasai-Ardekani (1995) point out, cost cutting alone may not be sufficient to turn the firm around.<sup>267</sup> The results of cost-cutting actions usually materialize faster than sales-increasing actions, as argued by Hofer (1980).<sup>268</sup> During the recovery phase, cost cutting should become less important compared to increasing sales and carrying out investments to achieve long-term profitability and growth.<sup>269</sup> Nevertheless, continued cost controls are recommended by e.g. Robbins and Pearce (1992).<sup>270</sup>

Empirical results concerning cost-cutting actions are mixed. Buschmann (2006) finds that almost all distressed German firms in his sample undertake cost-cutting actions. At the same time, he finds no significant difference between recovery and non-recovery firms.<sup>271</sup> Sudarsanam and Lai (2001) find that non-recovery firms employ operational restructuring actions (including cost-cutting actions) more often which are associated with a lower chance of recovery.<sup>272</sup> Nothardt (2001) finds only insignificant contributions of cost-cutting actions other than personnel-related costs to the turnaround probability.<sup>273</sup> Slatter (1984) shows that both recovery and non-recovery firms engage in cost-cutting actions although the frequency is higher for non-recovery firms.<sup>274</sup> In the bankruptcy context, Kalay, Singhal, and Tashjian (2007) and Datta and

---

<sup>265</sup> See Robbins and Pearce (1992), p. 291. Other contributions to strategic management literature include Schendel, Patton, and Riggs (1976), Hofer (1980), Arogyaswamy, Barker, and Yasai-Ardekani (1995) or, more recently, Filatotchev and Toms (2006).

<sup>266</sup> Robbins and Pearce (1992), p. 304.

<sup>267</sup> See Arogyaswamy, Barker, and Yasai-Ardekani (1995), p. 495. Similarly, Robbins and Pearce (1992), p. 303.

<sup>268</sup> See Hofer (1980), p. 26.

<sup>269</sup> See Balgobin and Pandit (2001), p. 305.

<sup>270</sup> See Robbins and Pearce (1992), p. 291, and Slatter (1984), p. 120.

<sup>271</sup> See Buschmann (2006), pp. 186-189.

<sup>272</sup> See Sudarsanam and Lai (2001), p. 197.

<sup>273</sup> See Nothardt (2001), p. 259.

<sup>274</sup> See Slatter (1984), p. 120.

Iskandar-Datta (1995) report descriptive results concerning changes in labor contracts, in the number of employees, in both the costs of goods sold and in selling, general and administrative expenses.<sup>275</sup> Specifically, Kalay, Singhal, and Tashjian (2007) document that bankrupt firms reduce the number of employees on average by 23%, while the costs of goods sold scaled by total assets increase slightly on average. Conversely, selling, general and administrative expenses decrease slightly on average.<sup>276</sup> The provisions of Chapter 11 allow firms to reject executory contracts and unexpired leases. These steps can therefore be taken to reduce operating costs during Chapter 11.<sup>277</sup> Lemmon, Ma, and Tashjian (2009) examine the rejection of unexpired lease contracts in greater detail, finding that the inherent put option is frequently used in Chapter 11.<sup>278</sup>

In sum, many prior theoretical contributions have emphasized the importance of cost cutting in the initial retrenchment phase, whereas in the recovery stage the focus shifts to cost control. Adapting this finding to the bankruptcy context yields the following hypothesis:

H2: Pursuing cost-cutting actions in Chapter 11 (out of Chapter 11) is positively related to the probability of post-bankruptcy success.

Cost reductions are defined as the reduction of the sum of cost of goods sold (COGS) and selling, general and administrative expenses (SG&A) before deducting depreciation and amortization scaled by net sales or revenues by at least 10% compared to the reference period.

---

<sup>275</sup> Datta and Iskandar-Datta (1995), p. 19, document that 19% of the sample firms lay off personnel during Chapter 11 and 6% reach wage concessions.

<sup>276</sup> See Kalay, Singhal, and Tashjian (2007), p. 789.

<sup>277</sup> Refer to e.g. Morrison (2011), p. 26, for more information on executory contracts or White (1989), pp. 144-145. Rejection of unexpired leases may entail property, plant and equipment leases and executory contracts include, for instance, employment contracts with directors.

<sup>278</sup> See Lemmon, Ma, and Tashjian (2009), p. 3.

#### 4.2.2.1.3 Reducing the Number of Employees

Like cost cutting, Robbins and Pearce (1992) regard reducing the number of employees too as a part of the retrenchment stage in their two-stage turnaround model.<sup>279</sup> In the turnaround model of Arogyaswamy, Barker, and Yasai-Ardekani (1995), headcount reductions are an implicit part of the strategy to increase efficiency.<sup>280</sup> However, typical problems that companies face in times of distress – and especially during bankruptcy – include lower employee morale, reduced commitment and loyalty, all of which can result in the loss of important employees, as highlighted by Filatotchev and Toms (2006).<sup>281</sup> This, in turn, could lead to a lower performance level for the firm. On the other hand, employee reductions in the recovery phase are not in focus similarly to cost reductions and may even be counterproductive through persistently low employee morale.<sup>282</sup>

In the empirical turnaround literature, Eichner (2010) finds that a late announcement of layoffs has a significant negative impact on the turnaround probability.<sup>283</sup> Buschmann (2006) finds that 93% of the distressed German firms in his sample reduce the number of employees.<sup>284</sup> However, he does not find any significant correlation with turnaround. For a UK sample of distressed firms, Sudarsanam and Lai (2001) show that both recovery and non-recovery firms engage in operational restructuring (among which they also subsume layoffs). The difference between successful recovery firms and the unsuccessful ones is that the latter more frequently engage in operational restructuring.<sup>285</sup> Ofek (1993) shows that highly leveraged firms are more likely to restructure their operations by laying off personnel in response to performance de-

---

<sup>279</sup> See Robbins and Pearce (1992), p. 291.

<sup>280</sup> See Arogyaswamy, Barker, and Yasai-Ardekani (1995), p. 502.

<sup>281</sup> See Filatotchev and Toms (2006), p. 426. Programs such as key employee retention (KERP) are designed to attenuate the negative effect of losing important employees. Other possibilities of retaining the most talented employees are shown by e.g. Arogyaswamy, Barker, and Yasai-Ardekani (1995), p. 503.

<sup>282</sup> See e.g. Sudarsanam and Lai (2001), p. 197, who show that non-turnaround firms are preoccupied with continued operational and financial restructuring whereas turnaround firms focus on investments and acquisitions.

<sup>283</sup> See Eichner (2010), p. 229. Relying on the announcement of layoffs appears to be relatively imprecise and risky since one cannot assume that all actions which have been announced are carried out in reality.

<sup>284</sup> See Buschmann (2006), p. 186.

<sup>285</sup> See Sudarsanam and Lai (2001), p. 197.



cline.<sup>286</sup> John, Lang, and Netter (1992) find that firms in performance decline quickly reduce their personnel costs ratio as part of adjusting operations and the organization.<sup>287</sup>

The extent to which reducing the number of employees impacts performance, especially during Chapter 11, remains largely unexplored. Datta and Iskandar-Datta (1995) show that around 19% of their sample firms implement layoffs during bankruptcy.<sup>288</sup> Kalay, Singhal, and Tashjian (2007) report that the number of employees declines on average by 23% during Chapter 11.<sup>289</sup> Khanna and Poulsen (1995) document positive announcement effects of layoffs in the three years before filing for bankruptcy.<sup>290</sup> The bankruptcy phase, on the one hand, should provide for a realignment of the number of employees that is needed to return the firm to adequate performance levels. On the other hand, reducing the number of employees in the post-bankruptcy phase could be negatively related to post-bankruptcy success when the firm should be on a growth or recovery path. Bringing the aforementioned together, I formulate the following hypothesis:

H3: Reducing personnel in Chapter 11 (out of Chapter 11) is positively (negatively) related to the probability of post-bankruptcy success.

Personnel reductions are operationalized by a reduction in the number of employees by at least 10% compared to the reference period, as found in Worldscope. This follows the operationalization by Atanassov and Kim (2009).<sup>291</sup> The number of employees thus serves as a proxy for personnel-related costs.

#### 4.2.2.1.4 *Changing Capital Expenditures*

Reducing capital expenditures in financial distress fits into the retrenchment stage of Robbins and Pearce (1992) as it aims to improve cash flow in the short term

---

<sup>286</sup> See Ofek (1993), p. 27.

<sup>287</sup> See John, Lang, and Netter (1992), p. 907.

<sup>288</sup> See Datta and Iskandar-Datta (1995), p. 28, who do not report any performance effects from layoffs.

<sup>289</sup> See Kalay, Singhal, and Tashjian (2007), p. 789.

<sup>290</sup> See Khanna and Poulsen (1995), pp. 927-928. Note that these effects are measured before filing for bankruptcy.

<sup>291</sup> See Atanassov and Kim (2009), p. 349, who use a threshold of 20% as opposed to my threshold of 10%.

and, thereby, to contribute to firm survival.<sup>292</sup> Conversely, during the recovery phase, capital expenditures should increase as a result of focusing on investment and growth to return the company to long-term profitability, as put forward by Robbins and Pearce (1992).<sup>293</sup> Capital expenditures can be changed relatively easily at the discretion of management.<sup>294</sup> Compared to layoffs, the cash flow effect can also be significant depending on the capital intensity of the industry. Implementing capital expenditure changes seems also fairly uncomplicated. With regard to capital expenditures during financial distress and bankruptcy, the problem of overinvestment induced by the risk-shifting incentives for the incumbent management and shareholders must be considered, as described in chapter 2.1. However, it should be emphasized that overinvestment can only occur if firms have sufficient internal capital left to invest, or if they can raise external capital such as DIP financing, which does not impose restrictive covenants on the firm's investment behavior. Accordingly, if overinvestment prevails, it is reasonable to expect capital expenditures to increase during Chapter 11.

Empirically, Buschmann (2006) finds that distressed firms in his German sample reduce their investments during the crisis. However, he cannot trace any significant difference between successful and unsuccessful firms.<sup>295</sup> Sudarsanam and Lai (2001) analyze the contribution of increased capital expenditures on the likelihood of recovery.<sup>296</sup> They find no significant impact of an increase in capital expenditures. Bergauer (2001) shows that distressed firms in her German sample reduce their investments during the crisis and moderately increase investments after turnaround has been achieved.<sup>297</sup> For a sample of junk bond issuers, Asquith, Gertner, and Scharfstein (1994) show that capital expenditures plummet by 66% during financial distress.<sup>298</sup> This corresponds to findings by Andrade and Kaplan (1998) for highly leveraged

---

<sup>292</sup> See Robbins and Pearce (1992), p. 291.

<sup>293</sup> See Robbins and Pearce (1992), p. 291. Similarly, Balgobin and Pandit (2001), p. 305.

<sup>294</sup> See Eichner (2010), p. 85.

<sup>295</sup> See Buschmann (2006), p. 193.

<sup>296</sup> See Sudarsanam and Lai (2001), p. 189.

<sup>297</sup> See Bergauer (2001), pp. 214-215.

<sup>298</sup> See Asquith, Gertner, and Scharfstein (1994), p. 650.

transactions that subsequently became distressed.<sup>299</sup> Eichner (2010) analyzes both an increase and a reduction in capital expenditures for the retrenchment and the recovery phase for his distressed sample. However, he cannot substantiate any significant impact of changes in capital expenditures on the turnaround probability.<sup>300</sup>

For bankrupt firms empirical evidence is sparse. In her descriptive statistics, Hotchkiss (1995) documents that, in the years leading to bankruptcy, firms reduce their median capital expenditures from 6% to 4% of total assets. The median remains at 3% in the post-bankruptcy phase.<sup>301</sup> Due to the automatic stay and the possibility of DIP financing it can be assumed that the pressure to reduce capital expenditures during Chapter 11 merely to generate cash is not as pronounced as for an out-of-court restructuring. To shed more light on the impact of changes in capital expenditures in the bankruptcy context, I formulate the following hypotheses:

- H4: Increasing capital expenditures in Chapter 11 (out of Chapter 11) is negatively (positively) related to the probability of post-bankruptcy success.
- H5: Reducing capital expenditures in Chapter 11 (out of Chapter 11) is positively (negatively) related to the probability of post-bankruptcy success.

The change in capital expenditures is measured as a change of at least 10% with respect to the reference period. Capital expenditures are operationalized as capital expenditures scaled by total assets as defined in Worldscope. Expenditures associated with acquisitions are not included. Accordingly, only additions to property, plant and equipment and investments in machinery and equipment are included in capital expenditures.

#### 4.2.2.2 *Financial Restructuring*

Financial restructuring concerns itself with the right-hand side of the balance sheet, i.e. with changes to a firm's liabilities and stockholders' equity.

---

<sup>299</sup> See Andrade and Kaplan (1998), p. 1464.

<sup>300</sup> See Eichner (2010), p. 215.

<sup>301</sup> See Hotchkiss (1995), p. 9.

#### 4.2.2.2.1 Reducing Leverage

Many firms enter bankruptcy in a position of financial distress.<sup>302</sup> This may be due to high leverage ratios either as a result of taking on too much debt or accumulating too large losses. Accordingly, the firm may be unable to refinance some debt, pay interest on the existing debt or repay principal. In their theoretical model, Harris and Raviv (1990) find that the higher the leverage ratio of a firm, the lower the probability of reorganization following default.<sup>303</sup> However, as Jensen (1989) points out, high leverage can also be advantageous.<sup>304</sup> This results from a timing effect, since highly leveraged firms tend to become technically insolvent faster than less leveraged firms. More importantly, the remaining firm value will likely be greater for highly leveraged firms at the onset of insolvency.<sup>305</sup> Furthermore, Jensen (1989) argues that high leverage may also be used as a monitoring device, putting the management of highly leveraged firms under pressure to align their operations and fulfill their debt obligations.<sup>306</sup> The positive effect of high leverage for firms with poor performance has been empirically tested by Ofek (1993). He finds that the leverage before distress is significantly positively related to the probability of restructuring operations during distress.<sup>307</sup> Nevertheless, it should also be emphasized that there is a trade-off associated with high leverage. On the one hand, highly leveraged firms may respond faster to distress, but, on the other hand, they may also be faster to file for bankruptcy protection, as Ofek (1993) points out.<sup>308</sup>

By contrast, Kahl (2002) builds a model in which the creditors of a firm in financial distress postpone the liquidation decision, since they do not know whether the firm is efficient or not. The dynamic liquidation theory assumes that creditors are sufficiently uncertain about the firm's future performance and will learn about the viabili-

---

<sup>302</sup> As Figure 4 below shows, 41 out of 143 firms (29%) are primarily financially distressed as defined in chapter 4.2.3.

<sup>303</sup> See Harris and Raviv (1990), p. 323.

<sup>304</sup> See Jensen (1989), pp. 41-42. Similar arguments are put forward by Wruck (1990), pp. 431-433.

<sup>305</sup> See Jensen (1989), pp. 41-42. He uses the technical term insolvency to refer to the situation in which a firm is unable to fulfill its contractual payment obligations.

<sup>306</sup> See Jensen (1989), p. 41.

<sup>307</sup> See Ofek (1993), p. 14.

<sup>308</sup> See Ofek (1993), p. 15.

ty of the firm only over time. At a later date, creditors can make better informed decisions once new information has become available.<sup>309</sup> The crucial point is that under this theory it can be explained why firms emerge from financial distress seemingly with too much leverage.<sup>310</sup> As long as leverage remains high, creditors keep their claims and can quickly intervene and enforce liquidation if the firm does not recover.<sup>311</sup> Conversely, if creditors' uncertainty about the future firm performance is relatively small and the prospects are positive, they might even be willing to swap their debt claims into equity, which would reduce the leverage ratio. As a result, the firm may be less restricted in its investment behavior upon emergence, which could be beneficial for the post-bankruptcy performance.<sup>312</sup>

Empirical evidence supporting the theoretical predictions of Kahl (2002) comes from Gilson (1997), who finds that the leverage ratio of most firms emerging from Chapter 11 and of firms implementing an out-of-court debt restructuring is higher than the corresponding industry median leverage.<sup>313</sup> Similar findings are documented by LoPucki and Whitford (1993b).<sup>314</sup> Additionally, Heron, Lie, and Rodgers (2009) find that debt is sticky, i.e. that the pre-filing leverage ratio influences the post-bankruptcy leverage ratio. Their sample firms also emerge from Chapter 11 with leverage ratios above industry levels.<sup>315</sup> Contrary to the interpretation of Kahl (2002), Heron, Lie, and Rodgers (2009) refer to Roe (1983) and Bebchuk (1988) in interpreting these findings as inefficiencies inherent in the Chapter 11 process that prevent firms from adjusting their leverage to presumably more sustainable levels.<sup>316</sup> Kalay, Singhal, and Tashjian (2007) show that the pre-filing leverage ratio is significantly positively related to improvements in operating income during Chapter 11. They attribute this positive effect

---

<sup>309</sup> See Kahl (2002), pp. 136-137.

<sup>310</sup> Kahl (2002), p. 137, calls this "controlled liquidation".

<sup>311</sup> See Kahl (2002), p. 137.

<sup>312</sup> See Kahl (2002), p. 137.

<sup>313</sup> See Gilson (1997), pp. 165-166.

<sup>314</sup> See LoPucki and Whitford (1993b), p. 607.

<sup>315</sup> See Heron, Lie, and Rodgers (2009), p. 727 and p. 742.

<sup>316</sup> See Heron, Lie, and Rodgers (2009), p. 727 and p. 742. However, they also cannot completely rule out the dynamic liquidation theory of Kahl (2002).

to the automatic stay during Chapter 11 that allows bankrupt firms to suspend most of their debt payments. This is obviously more beneficial to highly leveraged firms.<sup>317</sup> Denis and Rodgers (2007) find that firms that reduce their leverage ratio during Chapter 11 exhibit a higher probability of emerging.<sup>318</sup> Likewise, firms that reduce their leverage ratio during Chapter 11 are more likely to show positive post-bankruptcy performance.<sup>319</sup> I therefore formulate the following hypothesis:

H6: Reducing the leverage ratio in Chapter 11 (out of Chapter 11) is positively related to the probability of post-bankruptcy success.

The reduction in leverage is measured as the change in total liabilities divided by total assets of at least 10% compared to the reference period. Total liabilities are taken rather than total debt in accordance with Denis and Rodgers (2007) and Kalay, Singhal, and Tashjian (2007).<sup>320</sup> My choice is also substantiated by Kalay, Singhal, and Tashjian (2007) who do not find any significant difference between employing a leverage ratio based on total debt or total liabilities.<sup>321</sup>

#### 4.2.2.2.2 *Issuing New Equity*

Issuing new equity for cash might seem as an easy way to resolve financing problems in financial distress and bankruptcy. A number of important issues must nevertheless be addressed in relation to this view.<sup>322</sup> First, a firm in bankruptcy typically lacks a successful track record needed for a convincing equity story. Second, the debt overhang problem introduced by Myers (1977) and extended by Gertner and Scharfstein (1991) discourages new equity investors due to likely wealth transfers at the expense of the new shareholders. However, as Jostarndt (2007) argues, investors may provide new equity to the firm if the net present value of the going concern is

---

<sup>317</sup> See Kalay, Singhal, and Tashjian (2007), p. 792. The typical exception for debt payments which are continued even under Chapter 11 relates to trade creditors as documented by Kalay, Singhal, and Tashjian (2007), p. 791.

<sup>318</sup> See Denis and Rodgers (2007), p. 113. The leverage ratio is measured as liabilities scaled by total assets.

<sup>319</sup> See Denis and Rodgers (2007), p. 117.

<sup>320</sup> See Denis and Rodgers (2007), p. 104, and Kalay, Singhal, and Tashjian (2007), p. 790.

<sup>321</sup> See Kalay, Singhal, and Tashjian (2007), p. 779.

<sup>322</sup> For a general literature review regarding security offerings, see Eckbo, Masulis, and Norli (2007). For more on the buyers of already issued stock of bankrupt firms, refer to Coelho, Taffler, and John (2010). Clark and Weinstein (1983) analyze the behavior of the common stock of bankrupt firms, albeit under the old U.S. bankruptcy regime before 1979 (the Chandler Act).

greater than any wealth transfers to the creditors.<sup>323</sup> Alternatively, new cash equity investments during Chapter 11 are more likely if creditors make concessions to the new shareholders that restrict any wealth transfers at the expense of new shareholders.<sup>324</sup> Third, from a transactional and organizational view, it seems less complicated to secure fresh money through a DIP financing arrangement. Nonetheless, new equity issues do occur during Chapter 11, but they more frequently take place in the post-bankruptcy phase to finance recovery or growth.<sup>325</sup> During Chapter 11, new equity issues typically take place shortly before or at the emergence from bankruptcy.<sup>326</sup> New shareholders (so-called vulture investors)<sup>327</sup> will invest even during bankruptcy, provided their investment will be reflected in the reorganization plan and their equity rights also apply to the reorganized entity.<sup>328</sup> Hotchkiss and Mooradian (1997) show that the presence of a vulture investor has a positive impact on the post-restructuring performance of financially distressed firms.<sup>329</sup> Consequently, one might argue that issuing new equity during Chapter 11 may serve as a signal that the equity investors trust in the viability of the firm. Accordingly, one might conjecture that firms receiving new equity during Chapter 11 will likely show a better post-bankruptcy performance. Once the company emerges from bankruptcy, issuing new equity to finance future growth is likely less burdensome than in the bankruptcy phase, since the relative importance of the debt overhang and wealth transfer problems should now diminish.<sup>330</sup> Buschmann (2006) finds a significant positive correlation between the issue of new equity and turnaround for his sample of distressed German firms, whereas Eichner

---

<sup>323</sup> See Jostarndt (2007), p. 131.

<sup>324</sup> See Jostarndt (2007), p. 131.

<sup>325</sup> Refer to the descriptive statistics on the frequency of restructuring actions in Table 15 below.

<sup>326</sup> Based on the findings in my sample.

<sup>327</sup> See e.g. Hotchkiss and Mooradian (1997).

<sup>328</sup> The investment motives of vulture investors are presented in Altman and Hotchkiss (2006), chapter 8. These include gaining active control of the target, as in the case of the investor W. L. Ross in the U.S. steel industry, who bought and controlled firms such as LTV, Acme Steel, Bethlehem Steel, Weirton and Georgetown Steel. In addition to buying old debt and already issued shares of the bankrupt firm, vulture investors also buy new shares in some cases.

<sup>329</sup> See Hotchkiss and Mooradian (1997), p. 401.

<sup>330</sup> See Eichner (2010), p. 110.

(2010) and Sudarsanam and Lai (2001) find only insignificant relations.<sup>331</sup> In sum, I formulate the following hypothesis:

H7: Issuing new equity for cash in Chapter 11 (out of Chapter 11) is positively related to the probability of post-bankruptcy success.

The issue of equity is operationalized as a dummy variable. Information concerning equity issues is hand-collected from company filings, as described in more detail in chapter 5.2 below. It is crucial that the new equity issue is completed rather than only announced and it must be conducted in return for cash in line with Jostarndt (2007).<sup>332</sup> Furthermore, equity issues can include private placements and public offerings as well as rights offerings for common or preferred stock.<sup>333</sup>

#### 4.2.2.2.3 DIP Financing

The drawbacks and benefits of DIP financing for bankrupt firms are discussed controversially in the literature. Some authors argue that DIP financing increases the problem of overinvestment as modeled by Gertner and Scharfstein (1991).<sup>334</sup> Others, such as Gilson, John, and Lang (1990), regard DIP financing as part of the solution to potential underinvestment due to the debt overhang problem.<sup>335</sup> Stulz and Johnson (1985) show in their model that secured debt (which DIP financing typically is) can help firms to invest in profitable projects in which they would not have been able to invest using equity or unsecured debt.<sup>336</sup> However, providing security to new lenders may result in wealth transfers in favor of the new secured lenders and to the detriment of the existing unsecured lenders.<sup>337</sup> Additionally, DIP financing may prevent bankrupt

---

<sup>331</sup> See Buschmann (2006), p. 190, Eichner (2010), p. 218, Sudarsanam and Lai (2001), p. 196.

<sup>332</sup> See Jostarndt (2007), p. 174. The firm only receives fresh money in the case of cash equity issues as opposed to debt-to-equity swaps which help to decrease leverage ratio but fail to provide the firm with fresh liquidity.

<sup>333</sup> Not included are warrants, convertible bonds, debt-to-equity swaps and executive compensation.

<sup>334</sup> See Gertner and Scharfstein (1991), p. 1191, and Dahiya et al. (2003), p. 260.

<sup>335</sup> See Gilson, John, and Lang (1990), p. 320.

<sup>336</sup> See Stulz and Johnson (1985), p. 501.

<sup>337</sup> See Bebchuk and Fried (1996), p. 870.



firms from selling assets at significant discounts if the divestment is made solely to get fresh money.<sup>338</sup>

Empirically, Dahiya et al. (2003) show that DIP-financed firms have a higher probability of emerging from Chapter 11 and that DIP financing leads to a shorter time spent in Chapter 11.<sup>339</sup> Accordingly, Dahiya et al. (2003) argue that DIP lenders act as a screening device by only investing in firms that are likely to produce positive net present value projects. Likewise, once DIP financing has been arranged, DIP lenders can be seen as monitoring how the firm progresses during Chapter 11.<sup>340</sup> Firms with unsatisfactory progress are also liquidated in a timely manner.<sup>341</sup> This is consistent with contributions of authors such as Skeel (2003), Adler, Capkun, and Weiss (2006) and Lemmon, Ma, and Tashjian (2009) who interpret DIP financing as a proxy for the strengths of creditor control.<sup>342</sup> Carapeto (2003) essentially confirms the findings of Dahiya et al. (2003) showing that DIP-financed firms exhibit a lower probability of liquidation.<sup>343</sup> Kalay, Singhal, and Tashjian (2007) find no significant impact of DIP financing on changes in operating performance during Chapter 11.<sup>344</sup> Since DIP financing can contribute to solving underinvestment and may be interpreted as a signal that the firm is likely to produce positive net present value projects, I formulate the following hypothesis:

H8: The receipt of DIP financing in Chapter 11 is positively related to the probability of post-bankruptcy success.

A two-step process was used to identify whether companies have secured DIP financing. First, in line with Dahiya et al. (2003), company filings such as 10-Ks, 8-Ks and annual reports were searched for key words such as debtor-in-possession financ-

---

<sup>338</sup> The same applies to the automatic stay.

<sup>339</sup> See Dahiya et al. (2003), pp. 259-261. The notion that DIP financing increases the probability of emergence is further confirmed by Carapeto (2003).

<sup>340</sup> See Dahiya et al. (2003), p. 278.

<sup>341</sup> See Dahiya et al. (2003), p. 278.

<sup>342</sup> See Skeel (2003), p. 919, Adler, Capkun, and Weiss (2006), p. 9, and Lemmon, Ma, and Tashjian (2009), pp. 9-10.

<sup>343</sup> See Carapeto (2003), p. 30.

<sup>344</sup> See Kalay, Singhal, and Tashjian (2007), p. 790.

ing, DIP financing and post-petition financing.<sup>345</sup> If this search did not yield any results, the LexisNexis database was searched for any news reporting DIP financing arrangements amended by searches in the Public Company Bankruptcy Filing Information in LexisNexis. Since DIP financing is available during the bankruptcy phase only, the hypothesis exclusively refers to the Chapter 11 phase.

#### 4.2.2.3 Managerial Restructuring

Managerial restructuring comprises the change in the top executive of a company's management. The top executive has been identified as either the CEO or the president following the convention put forward in Denis and Kruse (2000).<sup>346</sup> I am interested in whether the top executive in office at the time of the filing is replaced during the bankruptcy proceedings, after the firm emerges from Chapter 11 or not at all. This approach is comparable to the one taken by Hotchkiss (1995).<sup>347</sup>

In restructuring literature, Hofer (1980) argues that the replacement of the current management is a necessary precondition to successfully turn the firm around.<sup>348</sup> Sudarsanam and Lai (2001) state that a change in the top management may serve as a signal for change even when management cannot be made liable for distress.<sup>349</sup> Empirical studies documenting management turnover in distress situations are Gilson (1990) and Denis and Kruse (2000). Gilson (1990) finds that 46% of the CEOs of financially distressed or bankrupt U.S. firms are replaced within four years of the beginning of financial distress.<sup>350</sup> Denis and Kruse (2000) find that 27% of the top executives of poorly performing U.S. firms are replaced within three years of the year of poor performance.<sup>351</sup> For a sample of firms that defaulted on public debt, Hotchkiss and Mooradian (1997) report that the involvement of a vulture investor (e.g. as CEO or chair-

---

<sup>345</sup> See Dahiya et al. (2003), p. 264.

<sup>346</sup> See Denis and Kruse (2000), p. 407. The chairman of the board is considered indirectly in cases where the CEO is also the chairman of the board. Lai and Sudarsanam (1997), p. 208, define this circumstance as "*CEO duality*".

<sup>347</sup> See Hotchkiss (1995), p. 4.

<sup>348</sup> See Hofer (1980), p. 25.

<sup>349</sup> See Sudarsanam and Lai (2001), p. 184.

<sup>350</sup> See Gilson (1990), p. 370.

<sup>351</sup> See Denis and Kruse (2000), p. 408. They exclude routine turnovers such as due to e.g. retirement.

man) has a positive effect on post-restructuring performance.<sup>352</sup> Eichner (2010) documents a significant negative impact on the turnaround probability due to a disciplinary CEO change in the late phase of the restructuring process.<sup>353</sup> Buschmann (2006) finds no significant correlation between changing the management and turnaround success.<sup>354</sup>

Prior contributions from bankruptcy literature, such as Baird (1986), argue that U.S. bankruptcy law favors reorganization over liquidation.<sup>355</sup> Accordingly, the bankruptcy law might be biased toward the survival of inefficient firms in Chapter 11 that should have been liquidated. Hotchkiss (1995) suggests that the role of incumbent management could play a role in this bias.<sup>356</sup> This would be in line with Bradley and Rosenzweig (1992), who argue that incumbent management benefits from provisions of the Bankruptcy Code at the expense of stockholders and bondholders.<sup>357</sup> Datta and Iskandar-Datta (1995) support the hypothesis of Bradley and Rosenzweig (1992) that Chapter 11 indulges incumbent management.<sup>358</sup> One could also argue that incumbent managers tend to overinvest in risky projects during bankruptcy, hoping to turn the firm around. This was done in the well-known case of Eastern Airlines, where creditors' cash collateral was used to finance unprofitable business with court approval.<sup>359</sup> Hotchkiss (1995) observes that retaining the pre-filing management is associated with poor post-bankruptcy performance among her sample firms, which filed for bankruptcy between 1979 and 1988.<sup>360</sup>

Assuming that managers prefer to control larger firms, incumbent managers are likely to refrain from selling too many assets or subsidiaries during Chapter 11 as this

---

<sup>352</sup> See Hotchkiss and Mooradian (1997), p. 401. The involvement of a vulture investor is a reference to the vulture investor becoming either CEO or chairman or acquiring the majority of the voting stock.

<sup>353</sup> See Eichner (2010), p. 229. In agreement with Hotchkiss (1995), I do not distinguish between disciplinary (or forced) CEO turnover events and those not related to a disciplinary event (unforced).

<sup>354</sup> See Buschmann (2006), p. 195.

<sup>355</sup> See Baird (1986), p. 134.

<sup>356</sup> See Hotchkiss (1995), p. 4.

<sup>357</sup> See Bradley and Rosenzweig (1992), pp. 1049-1050. These provisions include the exclusive right to propose the plan of reorganization, see Hotchkiss (1995), p. 3.

<sup>358</sup> See Datta and Iskandar-Datta (1995), p. 15 and p. 27.

<sup>359</sup> See Weiss and Wruck (1998).

<sup>360</sup> See Hotchkiss (1995), p. 4.

might hamper an effective restructuring of the firm.<sup>361</sup> Somewhat surprisingly, Khanna and Poulsen (1995) do not find any significant differences between the management actions of firms filing for bankruptcy and those of firms in a control group that did not file for bankruptcy in the three years before filing for bankruptcy.<sup>362</sup> They conclude that bankruptcy should not be attributed to incompetent or self-serving managers.<sup>363</sup> Managers who have led firms into bankruptcy may have acted in a similar way to their counterparts whose firms did not go bankrupt. Accordingly, these managers did not necessarily do anything bad – but nor did they do anything good to prevent the firm from having to file for bankruptcy.

More recently, Skeel (2003) has argued that Chapter 11 has changed from being pro-debtor to being pro-creditor.<sup>364</sup> The reasons for this change in Chapter 11 practice, according to Skeel (2003), are (i) the changed terms of DIP financing arrangements that now allow creditors to effectively control the debtor in possession, and (ii) retention bonuses and performance-based compensation schemes during Chapter 11 that tempt key managers to stay onboard and honor the rapid resolution of Chapter 11 in accordance with the interest of the creditors.<sup>365</sup> To summarize the above, I propose the following hypothesis:

H9: Replacing the top executive who was in office at the time of filing in Chapter 11 (out of Chapter 11) is positively related to the probability of post-bankruptcy success.

The change in the top executive (CEO or president) is defined as the initial replacement of the person who was in office at the time of filing and is coded as a dum-

---

<sup>361</sup> See Hotchkiss et al. (2008), p. 33.

<sup>362</sup> See Khanna and Poulsen (1995), pp. 920-921.

<sup>363</sup> See e.g. Bolton and Scharfstein (1996), p. 5, on the ability of managers to divert cash flow from the firm.

<sup>364</sup> See Skeel (2003), p. 919. Similar arguments are put forward by Bharath, Panchapagesan, and Werner (2010), Adler, Capkun, and Weiss (2006) and Baird and Rasmussen (2003).

<sup>365</sup> While the terms of the performance-based compensation schemes vary, Skeel (2003) names the most common strategy, namely to honor rapid closing of the Chapter 11 process. Alternatively, if the business is to be sold, managers are paid in relation to the sale price. See Skeel (2003), p. 919 and pp. 926-928.

my variable.<sup>366</sup> Unlike Hotchkiss (1995), I have set the cutoff date for identifying the pre-filing top executive immediately before filing, instead of setting it at two years before filing.<sup>367</sup> This choice was made to ensure that the management turnover variable captures the change of the top executive who actually filed for bankruptcy. Setting the cutoff date at two years before filing does not consistently grasp this effect since the top executive may have changed before the filing.<sup>368</sup>

#### 4.2.2.4 Portfolio Restructuring

Portfolio restructuring is concerned with any significant divestment or acquisition that changes the asset portfolio of the firm as defined by Eichner (2010).<sup>369</sup>

##### 4.2.2.4.1 Divestments

Divestments in a distress situation are typically undertaken to generate the cash needed to repay debts or keep the business running, to focus on core business or to divest unprofitable business lines in accordance with the targets of the retrenchment stage described by Robbins and Pearce (1992).<sup>370</sup> Divestments during financial distress may be a substitute for new debt or equity issues, both of which might be difficult to realize in times of distress.<sup>371</sup>

However, as Asquith, Gertner, and Scharfstein (1994) argue, certain problems can arise while a firm is in financial distress. First, conflicts between shareholders and creditors may hinder divestments. According to Jensen and Meckling (1976), equity in a distressed firm is an option on the firm's assets that is out of the money. Shareholders thus benefit from riskier assets and are likely to lose some of the value of their option

---

<sup>366</sup> Two special cases in the sample stand out and require some further explanation. Sterling Chemicals temporarily had two co-CEOs during bankruptcy. In this case, I coded the appointment of the co-CEO as a change in top management, as it can be assumed that the old CEO would relinquish at least some of his responsibilities. After successful emergence, Calton re-hired the CEO who had filed for bankruptcy and then been dismissed during bankruptcy.

<sup>367</sup> See Hotchkiss (1995), p. 16, who states that her calculations are not dependent on the cutoff date, be it three years, two years or one year before filing.

<sup>368</sup> This means that a change in the top executive might be flagged as having occurred during Chapter 11 while the change in fact took place e.g. one and a half years before filing.

<sup>369</sup> See Eichner (2010), p. 53, who relies on Bowman and Singh (1993).

<sup>370</sup> See Robbins and Pearce (1992), p. 291. John, Lang, and Netter (1992), p. 892, show that firms in distress respond by sharpening their business focus. For a detailed literature review with regard to divestitures, see Eckbo and Thorburn (2008).

<sup>371</sup> See Hotchkiss (1993), p. 3 of the third essay.

if assets are sold and the proceeds are used to pay down debt.<sup>372</sup> In line with this proposition, Brown, James, and Mooradian (1994) find that the stock prices of financially distressed firms fall when the proceeds of asset sales are used to repay debt.<sup>373</sup> However, firms in bankruptcy may not face such strong creditor pressure to liquidate assets due to the automatic stay, as put forward by Hotchkiss (1993).<sup>374</sup> Furthermore, the proceeds of any divestments may not always be available for general business use, but may instead eventually be paid to creditors in line with the provisions of the reorganization plan.<sup>375</sup> Also, the need to liquidate assets may be limited for firms receiving debtor-in-possession financing, which might help them to avoid selling assets at discounts.<sup>376</sup> On the other hand, divesting non-core or unprofitable business during Chapter 11 may lay the basis for profitable growth after emergence. Second, as Shleifer and Vishny (1992) show, selling certain assets of a distressed firm in a distressed industry environment may lead to large fire-sale discounts, since the natural bidders for these assets – industry rivals – may themselves be constrained in their financial means.<sup>377</sup> Similarly, Hotchkiss and Mooradian (1998) document that bankrupt firms can be acquired at considerable discounts relative to non-bankrupt targets in the same industry.<sup>378</sup> Accordingly, it might also be beneficial to postpone divestments until the post-bankruptcy phase to avoid such substantial discounts, provided this is permitted by the liquidity situation of the bankrupt firm.

Many empirical studies substantiate a positive impact of divestments on turnaround probability or performance, such as Robbins and Pearce (1992), Asquith, Gert-

---

<sup>372</sup> See Asquith, Gertner, and Scharfstein (1994), p. 644.

<sup>373</sup> See Brown, James, and Mooradian (1994), p. 233.

<sup>374</sup> See Hotchkiss (1993), p. 9 of the third essay. The automatic stay ensures that e.g. interest payments need not be made during bankruptcy which can considerably alleviate a bankrupt firm's need for cash.

<sup>375</sup> See Hotchkiss (1993), p. 9 of the third essay. She states that proceeds from divestments during Chapter 11 are typically put into escrow. However, in some cases that have to be approved by the bankruptcy court, such cash collateral may be used to finance operations, a point that is referred to by Hotchkiss et al. (2008), p. 266. See, for example, Weiss and Wruck (1998), p. 56, and Ayotte and Morrison (2009), p. 523 concerning the use of cash collateral for funding continuing operations.

<sup>376</sup> See Hotchkiss (1993), p. 9 of the third essay.

<sup>377</sup> See Shleifer and Vishny (1992), p. 1343, and Asquith, Gertner, and Scharfstein (1994), pp. 645-646.

<sup>378</sup> See Hotchkiss and Mooradian (1998), p. 243.

ner, and Scharfstein (1994), Denis and Kruse (2000) and Eichner (2010).<sup>379</sup> John, Lang, and Netter (1992) show that divesting assets in response to distress is a method employed by the majority of their sample firms.<sup>380</sup> For bankrupt firms, Hotchkiss (1993) documents significant abnormal negative returns when firms sell core business during bankruptcy.<sup>381</sup> Denis and Rodgers (2007) find that firms that reduce assets (through divestments, for example) and liabilities while in Chapter 11 are more likely to reorganize as going concerns and to achieve positive post-bankruptcy profitability.<sup>382</sup> Analyzing plant-level data, Maksimovic and Phillips (1998) emphasize that industry conditions and plant productivity are important factors in the decision to sell or close a plant during bankruptcy.<sup>383</sup> Datta and Iskandar-Datta (1995) find that 63% of the sample firms divest during Chapter 11.<sup>384</sup> To summarize the considerations discussed above, I formulate the following hypothesis:

H10: Significant divestments effected in Chapter 11 (out of Chapter 11) are positively related to the probability of post-bankruptcy success.

For the purposes of this study, divestments are completed transactions involving the sale of business segments or subsidiaries including carveouts, spin-offs, buy-outs and similar transaction types. They are modeled as dummy variables and are only considered in cases where the transaction was closed.<sup>385</sup> Data on divestments is taken from the Mergerstat M&A database, as explained in more detail in chapter 5.2 below. In order to distinguish between portfolio divestments and smaller operational asset sales in line with Eichner (2010), I have only considered divestments of a significant size.<sup>386</sup>

---

<sup>379</sup> See Robbins and Pearce (1992), p. 303, Asquith, Gertner, and Scharfstein (1994), p. 647, Denis and Kruse (2000), p. 420, or Eichner (2010), p. 216. Conversely, Sudarsanam and Lai (2001), p. 196, and Buschmann (2006), p. 190, do not find a significant impact from asset sales.

<sup>380</sup> See John, Lang, and Netter (1992), p. 901.

<sup>381</sup> See Hotchkiss (1993), p. 13 of the third essay.

<sup>382</sup> See Denis and Rodgers (2007), p. 118.

<sup>383</sup> See Maksimovic and Phillips (1998), p. 1529.

<sup>384</sup> See Datta and Iskandar-Datta (1995), p. 19.

<sup>385</sup> Divestments are recognized in the year in which they are closed. Relying on the closing date rather than the signing or announcement date avoids the risk of considering transactions that may have been cancelled.

<sup>386</sup> See Eichner (2010), p. 99. Significant size is ensured by using the Mergerstat M&A database, which only covers transactions worth at least USD 1.0 million and representing at least a 10% interest.

#### 4.2.2.4.2 Acquisitions

While divestments and asset sales in the bankruptcy context have been analyzed by prior empirical research, acquisitions both during Chapter 11 and after emergence and their potential impact on post-bankruptcy performance have been omitted. Yet investing in profitable growth by acquiring other (parts of) companies, would appear to be a promising option for firms that emerge with an adjusted capital structure and potentially improved operations. Many contributions to restructuring literature, such as Schendel, Patton, and Riggs (1976), Slatter (1984), Robbins and Pearce (1992) and implicitly Arogyaswamy, Barker, and Yasai-Ardekani (1995), support the notion that acquisitions can add value, especially in the recovery phase of the turnaround process.<sup>387</sup> Acquisitions during the retrenchment phase or Chapter 11 do not seem to fit into the two-stage turnaround model of Robbins and Pearce (1992) who instead advocate divestments in the retrenchment phase.<sup>388</sup> Accordingly, I assume a negative relation between acquisitions effected during Chapter 11 and post-bankruptcy performance.<sup>389</sup>

Empirical studies on the impact of acquisitions on turnaround probability report insignificant results only, such as Eichner (2010), Buschmann (2006) and Sudarsanam and Lai (2001).<sup>390</sup> However, Sudarsanam and Lai (2001) note that recovery firms and non-recovery firms behave differently over time, with recovery firms focusing more on investments and acquisitions, while non-recovery firms are shown to be more preoccupied with operational and financial restructuring.<sup>391</sup> To summarize, I formulate the following hypothesis:

**H11: Significant acquisitions in Chapter 11 (out of Chapter 11) are negatively (positively) related to the probability of post-bankruptcy success.**

---

<sup>387</sup> See Schendel, Patton, and Riggs (1976), p. 8, on acquisitions in the upturn phase, Slatter (1984), pp. 120-121 on growth through acquisition, Robbins and Pearce (1992), p. 291, on acquisitions as strategies in the recovery stage, and Arogyaswamy, Barker, and Yasai-Ardekani (1995), p. 510, on strategic reorientation during the recovery phase.

<sup>388</sup> See Robbins and Pearce (1992), p. 291.

<sup>389</sup> One possibility in which an acquisition during Chapter 11 might be positively related to the likelihood of post-bankruptcy success occurs if the bankrupt firm is not restricted in its liquidity (i.e. it is not insolvent in the flow-based sense) and if the target improves the firm's profitability.

<sup>390</sup> See Eichner (2010), p. 229, Buschmann (2006), p. 181, and Sudarsanam and Lai (2001), p. 196.

<sup>391</sup> See Sudarsanam and Lai (2001), p. 197.



In line with Eichner (2010), an acquisition is operationalized as the mentioning of any completed majority-owned acquisition of another company or business unit through either an asset deal or a share deal.<sup>392</sup> The closing of the deal (rather than the signing or the mere announcement) is crucial to assign the acquisition to a specific year.<sup>393</sup> Only majority-owned transactions are considered, since these transactions can potentially alter the portfolio of the company. This is not typically the case with minority-owned transactions, which are primarily considered to be financial investments. Significant transactions are defined following the same criteria as for divestments.

### 4.2.3 Context Factors as Control Variables

This chapter briefly introduces the control variables used and explains their use by referring to prior research. Table 10 below summarizes the definitions and operationalization of the control variables, which represent context factors in the sense of Pettigrew (1987b).

**Table 10: Definitions of Control Variables**

Category	Variable	Definition
<b>Bankruptcy Proceedings</b>	Prepack	Mentioning that the bankruptcy filing was a prepack in the UCLA-LoPucki BRD
	Duration	Time from filing to emergence from Chapter 11, in months. In the event of a § 363 sale, emergence is defined as the date of consummation of the sale (closing)
<b>Main Distress Source</b>	Economic Distress	Industry-adjusted operating margin [Operating income/sales scaled by industry median] below zero in F-1
	Financial Distress	<ul style="list-style-type: none"> <li>• Operating income less capital expenditures insufficient to cover interest expenses in F-1</li> <li>• Leverage ratio [Total liabilities/total assets] above one in F-1</li> <li>• Filing related to asbestos claims</li> <li>• Not economically distressed</li> </ul>
<b>Firm and Industry Characteristics</b>	Firm Size	Firm size in F-1 measured as $\ln(\text{total assets})$ or $\ln(\text{sales})$
	Leverage Ratio	Leverage ratio in F-1 measured as $(\text{total liabilities}/\text{total assets})$
	Median Industry Performance	Measured as the median return on assets or return on sales in F-1 for all firms within the same SIC group

Source: Author's own illustration.

<sup>392</sup> See Eichner (2010), p. 138.

<sup>393</sup> The same rationale applies as for the divestments shown above.

Two control variables are used in relation to the bankruptcy proceedings: prepacks and duration. Prepacks have been analyzed by Heron, Lie, and Rodgers (2009), Tashjian, Lease, and McConnell (1996), Chatterjee, Dhillon, and Ramirez (1996) and Betker (1995), for example. Not surprisingly, prepacks spend less time on average in Chapter 11.<sup>394</sup> Chatterjee, Dhillon, and Ramirez (1996) show that economically viable firms with liquidity problems file prepackaged bankruptcies more often, while economically distressed firms file for traditional Chapter 11, and economically viable firms with no liquidity problems tend to employ an out-of-court restructuring.<sup>395</sup> Nevertheless, empirical evidence concerning the post-bankruptcy performance of prepacks is relatively sparse. Lubben (2008) finds that prepacks exhibit a higher probability of refiling.<sup>396</sup> Conversely, Alderson and Betker (1995b) argue that prepacks should exhibit better post-bankruptcy performance than usual Chapter 11 reorganizations, since they resemble out-of-court debt restructurings which tend to be more frequently chosen by efficient firms.<sup>397</sup> Their empirical analysis supports this view, as the average excess return for prepacks is significantly higher.<sup>398</sup> Despite the inconclusive evidence, I expect a positive relation between filing a prepackaged bankruptcy and post-bankruptcy performance because prepacks typically leave Chapter 11 much more quickly. This should reduce the costs associated with bankruptcy, such as direct costs incurred by employing lawyers, consultants and accountants and indirect costs as a result of any potential business disruption costs. To summarize the above, I formulate the following hypothesis:

H12: Filing a prepackaged bankruptcy is positively related to the probability of post-bankruptcy success.

---

<sup>394</sup> See Heron, Lie, and Rodgers (2009), p. 742, and Tashjian, Lease, and McConnell (1996), p. 142.

<sup>395</sup> See Chatterjee, Dhillon, and Ramirez (1996), p. 5

<sup>396</sup> See Lubben (2008), p. 268 and p. 281.

<sup>397</sup> See Alderson and Betker (1995b), pp. 13-14.

<sup>398</sup> See Alderson and Betker (1995b), p. 15.

Prepacks are operationalized as a dummy variable equal to one if a firm files a prepackaged bankruptcy as documented in the UCLA-LoPucki Bankruptcy Research Database, and zero otherwise.<sup>399</sup>

The time spent in Chapter 11 is also frequently controlled for. Denis and Rodgers (2007) find that “*firms spend less time in Chapter 11 the smaller they are*”<sup>400</sup>. Potentially, this could indicate that larger firms make case administration more complicated. Firms in higher median operating margin industries leave Chapter 11 faster. Additionally, the better the pre-filing industry-adjusted operating performance the shorter the duration of Chapter 11.<sup>401</sup> Concerning the influence on post-bankruptcy performance, Denis and Rodgers (2007) report inconclusive results.<sup>402</sup> Bharath, Panchapagesan, and Werner (2010) find that larger firms spend more time in Chapter 11.<sup>403</sup> As documented by Tashjian, Lease, and McConnell (1996), prepacks spend less time in Chapter 11.<sup>404</sup> Consequently, the relationship between the time spent in Chapter 11 and post-bankruptcy performance does not yield a clear picture. I therefore propose that they are not related to each other:

H13: The time spent in Chapter 11 is not related to the probability of post-bankruptcy success.

The time spent in Chapter 11 (the duration) is measured in months from the filing date to the date of emergence. In the event that the bankruptcy proceeding results in a § 363 sale, the date of consummation of the sale is taken as the date of emergence.

In terms of the main distress source, I distinguish between economic and financial distress. One of the goals of an efficient bankruptcy regime is to filter efficient (or economically viable) firms from inefficient (economically nonviable) firms, as intro-

---

<sup>399</sup> In the UCLA-LoPucki Bankruptcy Research Database, some cases are marked as prenegotiated which corresponds to the “*post-voted*” prepacks as defined by Tashjian, Lease, and McConnell (1996), p. 138. These are not considered as pure prepacks in this study.

<sup>400</sup> Denis and Rodgers (2007), p. 102.

<sup>401</sup> See Denis and Rodgers (2007), p. 102. Only firms in weak industries do not benefit from faster resolution of Chapter 11, even when their pre-filing industry-adjusted operating performance is good.

<sup>402</sup> See Denis and Rodgers (2007), p. 116, who show that duration has a significantly negative influence on the probability of future distress. However, for all other definitions of post-bankruptcy success, duration is found to be insignificantly related with post-bankruptcy performance.

<sup>403</sup> See Bharath, Panchapagesan, and Werner (2010), p. 26 and p. 49.

<sup>404</sup> See Tashjian, Lease, and McConnell (1996), p. 142.

duced in chapter 2.1 above. Two proxies that are frequently associated with the probability of survival are economic and financial distress. I use a simple, but stringent definition of economic versus financial distress that builds on Andrade and Kaplan (1998).<sup>405</sup> The clear distinction between financial and economic distress is that a firm in financial distress for which the primary cause is excessive leverage can still exhibit positive operating performance.<sup>406</sup> Consequently, sound operating performance by a firm experiencing pure financial distress translates, *ceteris paribus*, into sound free cash flow performance once leverage – and indirectly interest payments too – has been adjusted to a more favorable (lower) level.<sup>407</sup> Accordingly, I define economic distress as an industry-adjusted return on assets below zero in the last year before filing.<sup>408</sup> Conversely, a firm in pure financial distress before filing is defined as (i) not being in economic distress, and (ii) exhibiting either negative free cash flows or a leverage ratio above one, or (iii) having filed to settle litigation claims with regard to asbestos.<sup>409</sup> Asbestos cases are included as financially distressed cases since, as White (2004) points out, the majority of former asbestos-producing firms would be profitable if it were not for their asbestos liabilities.<sup>410</sup> This perfectly matches the definition of financial distress used in this study, which comprises both the flow and the stock-based definitions of insolvency as discussed by Wruck (1990).<sup>411</sup> Hotchkiss (1995) presumes that firms in pure financial distress may be expected to exhibit better post-bankruptcy performance than economically distressed firms.<sup>412</sup> This view is supported by the finding of Denis and Rodgers (2007) that higher pre-bankruptcy industry-adjusted operating margins and improvements in margins during Chapter 11 are associated with a higher

---

<sup>405</sup> See Andrade and Kaplan (1998), pp. 1444-1445.

<sup>406</sup> Similar arguments are put forward by Hotchkiss (1995), p. 20.

<sup>407</sup> This is the case for the sample of highly leveraged buyouts in Andrade and Kaplan (1998).

<sup>408</sup> I scale the metric by total assets to account for differences in size and I subtract the respective industry median to compare firm performance to its direct industry peers. Similar, but not industry-adjusted metrics have been applied by Chatterjee, Dhillon, and Ramirez (1996), p. 13, who rely on Hotchkiss (1995).

<sup>409</sup> In total, six firms in the emerged public sample filed mainly to resolve litigation claims arising from asbestos. See White (2004) for a detailed analysis of asbestos-related bankruptcies.

<sup>410</sup> See White (2004), p. 196.

<sup>411</sup> See Wruck (1990), pp. 421-422.

<sup>412</sup> See Hotchkiss (1995), p. 20.

probability of post-bankruptcy success.<sup>413</sup> Heron, Lie, and Rodgers (2009) conclude that pure financial distress can be resolved more quickly than economic distress.<sup>414</sup> As Asquith, Gertner, and Scharfstein (1994) point out, firms may be both economically and financially distressed at the same time.<sup>415</sup> To avoid any inconsistencies, firms that are simultaneously in economic and financial distress are categorized as economically distressed.<sup>416</sup> Asquith, Gertner, and Scharfstein (1994) study different sources of financial distress and define three of them: leverage, firm operating performance and industry operating performance.<sup>417</sup> I have refrained from using their convincing definition of the sources of financial distress for the following reason: Asquith, Gertner, and Scharfstein (1994) base their definition of financial distress on an interest coverage ratio only. Accordingly, they focus solely on the flow-based definition of financial distress.<sup>418</sup> For the bankruptcy context, this definition alone is not sufficient, since some firms that enter bankruptcy are not insolvent in a flow-based sense.<sup>419</sup> This definition would fail to include filings that relate to the stock-based insolvency definition or filings related to asbestos claims. The latter firms filed for bankruptcy protection to resolve their actual and potential future liabilities due to asbestos litigation claims.<sup>420</sup>

---

<sup>413</sup> See Denis and Rodgers (2007), p. 116.

<sup>414</sup> See Heron, Lie, and Rodgers (2009), p. 727 and p. 742, who regard firms with positive operating performance before filing for bankruptcy as financially distressed.

<sup>415</sup> See Asquith, Gertner, and Scharfstein (1994), p. 628.

<sup>416</sup> This follows Asquith, Gertner, and Scharfstein (1994), p. 632, who define economic distress (either poor firm or poor industry operating performance) as a source of financial distress.

<sup>417</sup> See Asquith, Gertner, and Scharfstein (1994), p. 632.

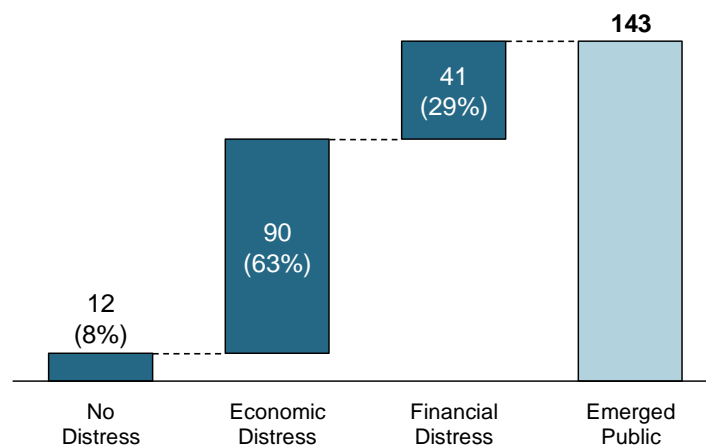
<sup>418</sup> Excessive leverage affects the interest coverage ratio only indirectly (through higher interest payments), but not directly.

<sup>419</sup> Instead, these firms might exhibit excessive leverage or a negative net worth. See also the discussion in Wruck (1990), p. 422.

<sup>420</sup> Six firms in the emerged public sample filed mainly to resolve litigation claims arising from asbestos.

### Figure 4: Economic vs. Financial Distress of Emerged Public Sample Firms in F-1

The figure shows the number of firms from the emerged public sample that are categorized as either economically or financially distressed or not distressed one year before filing (F-1).



Source: Author's own illustration.

Finally, firm and industry characteristics prevailing one year before filing for bankruptcy are also controlled for. One context factor that is frequently controlled for is the leverage ratio one year before filing. The leverage ratio thus reflects the prevalent capital structure of the firm. As Zingales (1998) shows, the level of the leverage ratio can have a negative impact on a firm's chances of survival.<sup>421</sup> This could be attributed to the debt overhang problem introduced by Myers (1977). Harris and Raviv (1990) show in their model that more levered firms exhibit a lower chance of reorganization after default.<sup>422</sup> Conversely, high leverage may also have benefits as argued by Jensen (1986) and Jensen (1989). High leverage may serve as an effective monitoring and disciplining tool that gives managers an incentive to run the firm efficiently and to restructure faster if the orderly payment of contractual debt obligations is at risk.<sup>423</sup> Furthermore, high leverage may serve as a catalyst for a timely bankruptcy filing. This can preserve relatively more firm value compared to a less levered firm whose firm value will have fallen more dramatically when filing for bankruptcy.<sup>424</sup>

<sup>421</sup> See Zingales (1998), p. 906.

<sup>422</sup> See Harris and Raviv (1990), p. 323.

<sup>423</sup> See Jensen (1986), p. 324.

<sup>424</sup> See Jensen (1989), pp. 41-42.

In the context of bankruptcy, several empirical papers analyze the impact of leverage. Kalay, Singhal, and Tashjian (2007) find that leverage has a significant positive effect on improvements in operating income during Chapter 11, which they explain with the automatic stay.<sup>425</sup> Denis and Rodgers (2007) find only inconclusive results concerning the influence of pre-filing leverage on post-bankruptcy performance.<sup>426</sup> Accordingly, I expect that the pre-filing leverage ratio will not affect the probability of post-bankruptcy success:

H14: The pre-filing leverage ratio is unrelated to the probability of post-bankruptcy success.

In line with Denis and Rodgers (2007) and Hotchkiss (1995), I define the pre-filing leverage ratio as total liabilities over total assets prevailing one year before filing.<sup>427</sup>

The pre-filing size of the company is also typically used as a control variable. The relation between size and post-bankruptcy performance has mostly been found to be positive as, for instance, in Denis and Rodgers (2007), Dawley, Hoffman, and Brockman (2003) and Hotchkiss (1995).<sup>428</sup> Franks and Torous (1989) posit that larger companies are better able to cope with the complexities of the reorganization process.<sup>429</sup> Moreover, the larger the firm, the more slack resources can generally be drawn on.<sup>430</sup> This has been emphasized by Dawley, Hoffman, and Lamont (2002) and Hannan and Freeman (1984), for example.<sup>431</sup> LoPucki and Whitford (1993b) document high confirmation rates among large public U.S. firms in bankruptcy and conclude that there seems to be a relation between size (i.e. large public firms) and confirmation of

---

<sup>425</sup> See Kalay, Singhal, and Tashjian (2007), pp. 790-791.

<sup>426</sup> See Denis and Rodgers (2007), p. 116.

<sup>427</sup> See Denis and Rodgers (2007), p. 109, and Hotchkiss (1995), p. 7.

<sup>428</sup> See Denis and Rodgers (2007), p. 115, Dawley, Hoffman, and Brockman (2003) p. 417, and Hotchkiss (1995), p. 17.

<sup>429</sup> See Franks and Torous (1989), p. 749.

<sup>430</sup> In the sense put forward by Arogyaswamy, Barker, and Yasai-Ardekani (1995), pp. 498-499.

<sup>431</sup> See Dawley, Hoffman, and Lamont (2002), p. 700, and Hannan and Freeman (1984), p. 159.

the reorganization plan.<sup>432</sup> I therefore conclude that pre-filing firm size should be positively related to the probability of post-bankruptcy success:

H15: The pre-filing size of the bankrupt firm is positively related to the probability of post-bankruptcy success.

A typical proxy for size is the natural logarithm of total assets or sales. Size is measured at the end of the last available fiscal year before filing (F-1). The logarithm is taken to account for the skewness inherent in the cross-section of total assets.<sup>433</sup>

Besides firm characteristics, industry characteristics too can play a part in determining the outcome of Chapter 11 and, ultimately, post-bankruptcy performance. Maksimovic and Phillips (1998) examine plant-level data and show that the industrial environment plays an important part for both the frequency of bankruptcy filing and economic decisions during bankruptcy, such as asset sales and plant closures.<sup>434</sup> Denis and Rodgers (2007) and Hotchkiss (1995) find mixed results regarding the relation with post-bankruptcy performance.<sup>435</sup> Shleifer and Vishny (1992) show that, in times of industry distress, asset sales by distressed firms may trigger fire-sale discounts.<sup>436</sup> As a consequence, the state of the industry must be controlled for:

H16: The pre-filing median industry performance is positively related to the probability of post-bankruptcy success.

Pre-filing median industry performance is calculated as the median return on assets or sales for the industry group with the same SIC code.<sup>437</sup>

---

<sup>432</sup> See LoPucki and Whitford (1993b), pp. 600-601.

<sup>433</sup> See Bandopadhyaya and Jaggia (2001), p. 209, for example.

<sup>434</sup> See Maksimovic and Phillips (1998), pp. 1529-1530.

<sup>435</sup> See Denis and Rodgers (2007), p. 116, and Hotchkiss (1995), p. 18.

<sup>436</sup> See Shleifer and Vishny (1992), p. 1364.

<sup>437</sup> Refer to chapter 4.2.1 for a detailed explanation of how industry medians are calculated.



## 5 Methodology and Data

### 5.1 Statistical Methodology

#### 5.1.1 Choice of Regression Model

The choice of my regression model is briefly motivated in this chapter. For the analysis of post-bankruptcy performance, I use maximum likelihood estimation of a logistic regression model, as this can be considered the standard regression model in post-bankruptcy literature that relies on accounting data.<sup>438</sup> Using logistic regression yields two benefits. One is better comparability with existing literature. The other is that this model is more robust than multivariate discriminant analysis, for example.<sup>439</sup> Besides the logistic regression model, the probit regression model is a valid alternative.<sup>440</sup> Long (1997) concludes that “[t]he choice between the logit and probit models is largely one of convenience and convention, since the substantive results are generally indistinguishable.”<sup>441</sup>

In addition to the benefits mentioned above, the logistic regression model is of special value particularly when researching post-bankruptcy performance – a point made by Hotchkiss (1993).<sup>442</sup> It seems preferable to use a binary dependent variable, such as in the logistic or probit model, to model performance groups, as some companies leave the sample in the post-bankruptcy phase for different reasons, resulting in

---

<sup>438</sup> For an introduction to binary dependent variable regression models in general, see Greene (2012) or Long (1997), for example. For the logistic regression model in particular, see Backhaus et al. (2006), for example. Denis and Rodgers (2007) and Hotchkiss (1995) are among those studies that use logistic regression models for their post-bankruptcy performance analysis. In this study, I generally use the logistic regression model as opposed to the logit regression model using odds ratios.

<sup>439</sup> See Backhaus et al. (2006), p. 426, or Ohlson (1980), pp. 111-112.

<sup>440</sup> The main difference between the logistic and probit models lies in the distributional assumption for the error term. In the logistic model, errors are assumed to be logistically distributed, whereas in the probit model, errors are assumed to be normally distributed. See Long (1997), p. 42.

<sup>441</sup> Long (1997), p. 83. Similar arguments are put forward by Menard (2001), p. 68.

<sup>442</sup> See Hotchkiss (1993), p. 21 of the first essay.

the problem of missing data.<sup>443</sup> This problem can be mitigated by using performance groups modeled as a binary dependent variable.<sup>444</sup>

### 5.1.2 Test for Sample Selection Bias

In the following, I test the analysis of post-bankruptcy performance for a potential sample selection bias.<sup>445</sup> This bias could arise if those firms that emerge from Chapter 11 are not randomly drawn from the underlying population of bankrupt firms.<sup>446</sup> In this case, the firms forming the basis for the final sample are determined by a selection process. The potential bias follows from the research design, which focuses on the behavior of those firms that emerge as public firms from Chapter 11 and, accordingly, whose post-bankruptcy data is observed. Data for those firms that do not emerge from Chapter 11 is, by definition, not observed. This can also be understood as a kind of sample attrition.<sup>447</sup> If a sample selection bias is not controlled for, this can lead to inconsistent estimates of the factors influencing post-bankruptcy performance.<sup>448</sup> As a test for sample selection bias, I use an extension of the classic Heckman two-stage model called the probit model with sample selection.<sup>449</sup> Unlike the classic two-stage Heckman model, which uses a probit model in the first stage and an ordinary least squares model in the second stage, the probit model with sample selection uses probit models in both stages.<sup>450</sup> Since the logistic and probit models typically yield similar results and since this will be demonstrated for my final model below, ap-

---

<sup>443</sup> This may be due to refiling, liquidating, going private or merging.

<sup>444</sup> See Hotchkiss (1993), p. 21 of the first essay. Additionally, she states that differences in accounting practices are also mitigated. These differences frequently occur after emergence in connection with the write-down of assets to their fair market values when fresh-start reporting is adopted in accordance with SOP 90-7.

<sup>445</sup> The sample selection bias has also been called sample selectivity, see Davidson and MacKinnon (1993), p. 542. In this study, selectivity bias, sample selection bias or short-hand selection bias are used synonymously. Seminal contributions with regard to sample selection bias in economics are Heckman (1974), Heckman (1976), and Heckman (1979).

<sup>446</sup> See Wooldridge (2010), p. 790.

<sup>447</sup> See Wooldridge (2010), p. 813.

<sup>448</sup> See Wooldridge (2010), p. 805.

<sup>449</sup> See Wooldridge (2010), pp. 813-814. Among the first contributions with respect to probit models with sample selection are van de Ven and van Praag (1981) and Dubin and Rivers (1989).

<sup>450</sup> See Wooldridge (2010), p. 814.

plying the probit model with sample selection instead of a logistic model should not make much difference to the results.<sup>451</sup>

To make it easier to understand how the probit model with sample selection is applied, I will introduce it in the context of the analysis of post-bankruptcy performance.<sup>452</sup> The first stage is a selection equation as in (1). The selection equation determines which firms survive the Chapter 11 process and emerge from bankruptcy. The second stage in (2) is the outcome equation that models post-bankruptcy performance.  $\mathbf{w}_i$  and  $\mathbf{x}_i$  are vectors of observations of independent variables for firm  $i$ .  $\boldsymbol{\gamma}$  and  $\boldsymbol{\beta}$  are parameter vectors. Finally,  $u_i$  and  $\varepsilon_i$  are error terms for firm  $i$ , which are assumed to be independent of  $\boldsymbol{\gamma}$  and  $\boldsymbol{\beta}$  and exhibit a bivariate normal distribution, as shown in (3).

$$z_i = \mathbf{w}_i' \boldsymbol{\gamma} + u_i \quad (1)$$

$$y_i = \mathbf{x}_i' \boldsymbol{\beta} + \varepsilon_i \quad (2)$$

$$\begin{pmatrix} u_i \\ \varepsilon_i \end{pmatrix} \sim N \left\{ \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{bmatrix} 1 & \rho \\ \rho & 1 \end{bmatrix} \right\} \quad (3)$$

Post-bankruptcy performance for firm  $i$  is observable only if the firm emerges from Chapter 11. Formally,

$$y_i = \begin{cases} \text{observed} & \text{if } z_i > 0 \\ \text{unobserved} & \text{if } z_i \leq 0 \end{cases}$$

I am interested in the expected value of  $y_i$  conditional on selection ( $z_i > 0$ ), which is formally expressed as

$$E[y_i | z_i > 0]. \quad (4)$$

Replacing  $z_i$  with  $\mathbf{w}_i' \boldsymbol{\gamma} + u_i$  from equation (1) and rearranging yields

$$E[y_i | u_i > -\mathbf{w}_i' \boldsymbol{\gamma}]. \quad (5)$$

Taking the expected value in (5) results in

$$\mathbf{x}_i' \boldsymbol{\beta} + E[\varepsilon_i | u_i > -\mathbf{w}_i' \boldsymbol{\gamma}]. \quad (6)$$

<sup>451</sup> Using a probit model to test for sample selection bias instead of a logistic model can be considered standard, as can be inferred from Wooldridge (2010), for example.

<sup>452</sup> This paragraph draws heavily on Greene (2012), pp. 912-916, and Wooldridge (2010), pp. 813-814.

Equation (6) can be rewritten as

$$\mathbf{x}'_i\boldsymbol{\beta} + \rho\lambda_i \quad (7)$$

where

$$\lambda_i = \frac{\phi(\mathbf{w}'_i\boldsymbol{\gamma})}{\Phi(-\mathbf{w}'_i\boldsymbol{\gamma})} = \frac{\phi(\mathbf{w}'_i\boldsymbol{\gamma})}{1 - \Phi(\mathbf{w}'_i\boldsymbol{\gamma})}$$

is the inverse Mills ratio, with  $\phi$  being the normal probability density function and  $\Phi$  being the normal cumulative distribution function.<sup>453</sup> It is generally recommended to have at least one variable driving selection in the first stage equation that does not appear in the outcome equation of the second stage.<sup>454</sup> As a result, it is suggested to use an instrumental variable as an exclusion restriction.<sup>455</sup>

Prior post-bankruptcy performance literature mostly ignored a potential sample selection bias. Only recently, Kalay, Singhal, and Tashjian (2007) have discussed a potential sample selection bias which they eventually dismiss based on insignificant differences in risk-adjusted returns between reorganized firms, on the one hand, and liquidated and acquired firms, on the other hand.<sup>456</sup> Alderson and Betker (1999) concern themselves with a potential selection bias in their study of post-bankruptcy performance, albeit without explicitly testing for it.<sup>457</sup> In the context of bankruptcy costs that materialize in different Chapters of the Bankruptcy Code, Bris, Welch, and Zhu (2006) present a two-stage model accounting for a potential selection bias.<sup>458</sup>

<sup>453</sup> See Davidson and MacKinnon (1993), p. 544, and Heckman (1979), p. 156.

<sup>454</sup> See Wooldridge (2010), p. 814.

<sup>455</sup> Refer generally to Li and Prabhala (2007) or Vella (1998) for a discussion of the use of exclusion restrictions in models testing for or correcting selection bias.

<sup>456</sup> See Kalay, Singhal, and Tashjian (2007), p. 775 and p. 794. A similar procedure is applied by Lemmon, Ma, and Tashjian (2009), pp. 57-58.

<sup>457</sup> See Alderson and Betker (1999), p. 77.

<sup>458</sup> See Bris, Welch, and Zhu (2006), p. 1260.

## 5.2 Data Sources

The basic data source for bankrupt firms is the UCLA-LoPucki Bankruptcy Research Database (BRD).<sup>459</sup> Since October 1979, the BRD has comprised all U.S. bankruptcy cases for firms with assets of at least USD 100 million measured in 1980 U.S. dollars at the time of filing, and for firms that are required to file 10-Ks with the SEC (i.e. public companies).<sup>460</sup> The BRD itself collects filings from several sources, including the SEC, the Bankruptcy Yearbook & Almanac and the Wall Street Journal. As a consequence, the BRD can be considered one of the most comprehensive data sources for large bankruptcy cases in the U.S. By contrast, Denis and Rodgers (2007) and Hotchkiss (1995) use SEC annual reports to obtain data for public companies filing for Chapter 11. This data source is no longer available, since the SEC terminated systematic publication of Chapter 11 cases starting with its 2004 annual report.<sup>461</sup>

Accounting data is taken from Worldscope, which is accessed through Thomson One Banker. After Compustat, Worldscope is one of the two leading international databases for accounting and financial data.<sup>462</sup> Ulbricht and Weiner (2005) find that Worldscope performs just as well as Compustat for U.S. firms.<sup>463</sup> Accordingly, despite the fact that Worldscope data has only rarely been used for research into U.S. firms, there seems to be no plausible reason against it.<sup>464</sup> In line with Denis and Rodgers (2007) and Hotchkiss (1995), accounting data from Worldscope has been amended by hand-collected data taken from company filings (such as 10-Ks, 10-Qs and annual

---

<sup>459</sup> Lynn M. LoPucki provided the database free of charge which is gratefully acknowledged. The BRD version used in this study dates from November 2010. An updated version was retrieved in November 2011.

<sup>460</sup> Accordingly, the BRD includes all large cases since the Bankruptcy Reform Act of 1978 which was enacted on October 1, 1979. In the BRD, a case is defined as a bankruptcy filing in a bankruptcy court in the U.S. A case refers to a debtor group, which is defined as a group consolidated for accounting purposes, as stated in the last 10-K before filing. Asset values in the BRD are taken from the last 10-K before filing and are deflated to 1980 U.S. dollars using the Consumer Price Index (CPI).

<sup>461</sup> On inquiry, the SEC stated that it would no longer publish the Chapter 11 cases in which it entered appearance, as bankruptcy proceedings did not directly relate to the main duties of the SEC. The last time that the SEC published the Chapter 11 cases in which it entered appearance was thus in its annual report in 2003. This is in line with the role of the SEC in bankruptcy proceedings as reported in Altman and Hotchkiss (2006), p. 33.

<sup>462</sup> See Ulbricht and Weiner (2005), p. 1.

<sup>463</sup> See Ulbricht and Weiner (2005), pp. 26-27.

<sup>464</sup> See Ulbricht and Weiner (2005), p. 27.

reports).<sup>465</sup> These company filings were retrieved from several sources, including SEC's EDGAR<sup>466</sup>, EDGAR online via LexisNexis, SEC online via LexisNexis and respective company websites.<sup>467</sup> In a few instances where accounting data was unavailable from all the aforementioned sources, annual report data was taken from Standard & Poor's Daily News accessed via LexisNexis.<sup>468</sup> In rare cases, apparent data entry errors in Worldscope were corrected using data from company filings to avoid any bias.

**Table 11: Data Sources**

Data Source	Content
UCLA-LoPucki Bankruptcy Research Database	List of and information on all large public U.S. bankruptcies since 1979, accessible at <a href="http://lopucki.law.ucla.edu">lopucki.law.ucla.edu</a>
Worldscope	Accounting data for public companies, accessed through Thomson One Banker
EDGAR	Public company filings such as 10-K, 10-Q, 8-K, annual reports to shareholders, proxy statements or registration statements, accessible at <a href="http://www.sec.gov/edgar/searchedgar/webusers.htm">www.sec.gov/edgar/searchedgar/webusers.htm</a>
EDGAR online	Public company filings such as 10-K, 10-Q, 8-K, annual reports to shareholders, proxy statements or registration statements, accessed through LexisNexis
SEC online	Public company filings such as 10-K, 10-Q, 8-K, annual reports to shareholders, proxy statements or registration statements, accessed through LexisNexis
Mergerstat M&A Database	Detailed information on publicly announced mergers, acquisitions and divestitures of U.S. firms, accessed through LexisNexis
Public Company Bankruptcy Filing Information	Detailed information on public U.S. bankruptcies, accessed through LexisNexis
Standard & Poor's Daily News	Financial news on public U.S. companies including annual reports as of 1989, accessed through LexisNexis
LexisNexis	Meta search through LexisNexis' All Company Information showing company information and business news for all public U.S. companies

Source: Author's own illustration.

<sup>465</sup> As can be seen in the Worldscope Database Datatype Definitions Guide from 2007, data in Worldscope is adjusted in line with Worldscope's standard data definitions to enhance intercompany comparability. The values included in the Worldscope database therefore do not necessarily correspond to the reported values in the 10-K or the annual report. To account for this adjustment, I have, wherever possible, employed the same data adjustments to the reported values as documented in the Worldscope Database Datatype Definitions Guide from 2007. The combination of adjusted accounting values from standard databases such as Worldscope or Compustat and hand-collected as-reported values taken from 10-Ks or annual reports can be regarded as standard in the post-bankruptcy literature. See, for instance, Denis and Rodgers (2007), Hotchkiss (1995) or Lemmon, Ma, and Tashjian (2009).

<sup>466</sup> EDGAR stands for the Electronic Data Gathering, Analysis, and Retrieval system, which is maintained by the SEC. Through EDGAR, access is granted to a variety of forms that public U.S. companies are required to file with the SEC. Electronic filings via EDGAR were phased in over a three-year period from 1994 through May 6, 1996, according to EDGAR's website at [www.sec.gov/edgar/aboutedgar.htm](http://www.sec.gov/edgar/aboutedgar.htm). As a result, filings before fiscal 1993 are generally not available in EDGAR.

<sup>467</sup> Prior to 1993, data coverage of EDGAR online and SEC online is better than that in the SEC's EDGAR.

<sup>468</sup> This occurred mainly for the period before 1994 when electronic filings in EDGAR were not yet compulsory. For additional information on the phase-in period of EDGAR, see Griffin (2003).

More qualitative information about new equity issues, DIP financing arrangements or changes in top management was gathered by hand from company filings from the same data sources as above. To make sure that all DIP financing arrangements were considered, I also used a systematic keyword search to check LexisNexis for any company information or news stories indicating DIP financing.<sup>469</sup>

Information about mergers, acquisitions and divestitures was gathered from the Mergerstat M&A database, accessed through LexisNexis to obtain consistent and reliable information on these transactions.<sup>470</sup> The Mergerstat M&A database was systematically searched for acquisitions and divestitures. This database covers all publicly announced transactions in which the equity value is greater than USD 1.0 million and the interest amounts to at least 10%.<sup>471</sup> This ensures that only transactions of relevant size are considered.

Data on individual SIC codes for the bankrupt firms was taken from Worldscope and amended by year-specific data from company filings or EDGAR. Chapter 11 outcomes were taken from the UCLA-LoPucki BRD and cross-checked with data from company filings, the Mergerstat M&A database and the Public Company Bankruptcy Filing Information database in LexisNexis.

## 5.3 Sample Selection

### 5.3.1 Sample Selection Process

The sample was taken from the UCLA-LoPucki Bankruptcy Research Database, which covers all large bankruptcy filings of public U.S. firms since 1979.<sup>472</sup> The selected period is 1993-2005, with the year of filing determining whether a firm is included in the sample or not. The initial year was chosen as 1993, as this is the first year

---

<sup>469</sup> See chapter 4.2.2.2 for a detailed description.

<sup>470</sup> Despite the fact that firms usually report material transactions in the notes to the 10-K and in 8-K filings, I rely on the consistent coverage of firm transactions in the Mergerstat M&A database.

<sup>471</sup> See source description for Mergerstat M&A database in LexisNexis.

<sup>472</sup> Refer to chapter 5.2 for a detailed description of the requirements to be included in the UCLA-LoPucki BRD.

for which company filings are available in EDGAR.<sup>473</sup> Prior to fiscal 1993, data availability is weaker, although some filings are available in EDGAR online and SEC online. In addition, the Mergerstat M&A database started full coverage of M&A deals in 1993. The last year was 2005 to allow for sufficient post-bankruptcy data in the three years following emergence.<sup>474</sup> This left me with 529 firms. In line with previous research, 46 companies belonging to the financial service sector (SIC codes between 6000 and 6999) were excluded from the sample.<sup>475</sup> The reason for exclusion is that financial service firms have their own particular bankruptcy regulations (such as the FDIC), as stated by Kalay, Singhal, and Tashjian (2007) and Dawley, Hoffman, and Brockman (2003), for example.<sup>476</sup> Moreover, these firms' balance sheets and statements of operations differ significantly from other companies, which makes comparison difficult. In addition, I discarded 7 firms whose cases were dismissed. This reduced the sample by 53 firms to 476. Next, the firms needed to emerge from Chapter 11 if their post-bankruptcy performance was to be analyzed. 172 firms did not emerge reducing the sample to 304 firms.<sup>477</sup> Of those that did emerge, 161 had to be discarded due to limitations on data availability in either the year of emergence (E) or the first full post-bankruptcy year (E+1).<sup>478</sup> This resulted in a sample of 143 firms that emerged as independent public firms and for which data was available for at least two post-bankruptcy years. A further 15 firms had to be excluded, yielding the final sample of 128 firms.<sup>479</sup> The detailed sample selection process is shown in Figure 5.

---

<sup>473</sup> Assuming that calendar year equals the fiscal year, filings for the fiscal year 1993 were the first filings to be included in EDGAR during 1994.

<sup>474</sup> Adding on average two years in Chapter 11 to the year of filing plus the three post-bankruptcy years, results in 2005 being the last possible year for my sample. The average duration of two years builds on findings from Denis and Rodgers (2007) and Hotchkiss (1995) who find a median duration of 18 and 17 months in Chapter 11.

<sup>475</sup> See Kalay, Singhal, and Tashjian (2007), p. 775, Dahiya et al. (2003), p. 264, and Dawley, Hoffman, and Brockman (2003), p. 418.

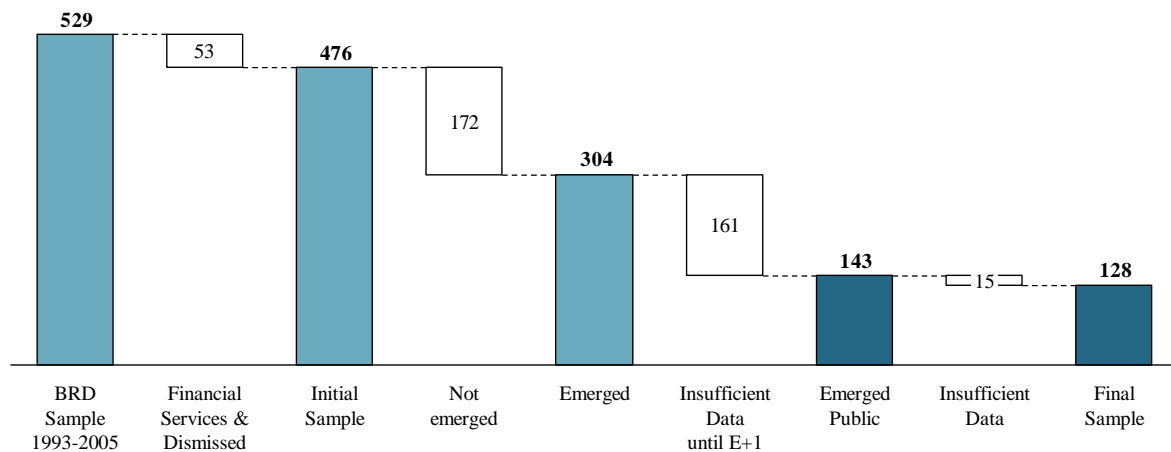
<sup>476</sup> See Kalay, Singhal, and Tashjian (2007), p. 775, and Dawley, Hoffman, and Brockman (2003), p. 418.

<sup>477</sup> Of these 172 firms, 111 were liquidated, 60 merged and 1 case is still pending (as of fiscal 2010 W.R. Grace was still in Chapter 11).

<sup>478</sup> Data availability is deemed insufficient if data for less than two years is available as of the year of emergence, in line with Hotchkiss (1993), p. 14 of the first essay. Of these 161 firms, 105 firms went private, 20 were merged, 9 refiled, 6 liquidated and 21 lacked sufficient data for other reasons. Some of these firms did indeed emerge as public entities. However, they went private or merged before filing the first 10-K after the year of emergence (see also Lemmon, Ma, and Tashjian (2009), p. 57).

<sup>479</sup> Of these 15 firms, 13 were merged or went private in E+2 and 2 firms (Calpine and Solutia) had been out of Chapter 11 for less than three full fiscal years in fiscal 2010. This is in line with Hotchkiss (1995), p. 9. In principle, the 13 firms referred to above that merged or went private in E+2 have sufficient post-bankruptcy data (at least two years). However, since I prefer to judge the post-bankruptcy performance of firms that merged or went private based on their performance in the last available year before leaving the sample, this would only leave data for a single year. For consistency, these 13 firms were therefore excluded from further analysis.



**Figure 5: Sample Selection Process**

Source: Author's own illustration.

In line with Hotchkiss (1995), I also included cases that filed for bankruptcy more than once during the selected time period.<sup>480</sup> This practice contrasts with Denis and Rodgers (2007), who do not include firms that filed twice during the same time period.<sup>481</sup> To check the robustness of my findings, I excluded the five second filings (the repeated bankruptcy cases) in an additional analysis reported in chapter 6.2.1 below.

### 5.3.2 Sample Size Requirements and Treatment of Missing Data

The final sample consists of 128 firms that emerged as reorganized public entities from Chapter 11 and had sufficient post-bankruptcy data available. In terms of the minimum sample size for a logistic regression, Backhaus et al. (2006) state that at least 25 observations per category of the dependent variable are required.<sup>482</sup> This criterion is met. Long (1997) concludes that a sample size below 100 observations could be prob-

<sup>480</sup> See Hotchkiss (1995), p. 15. In total, five firms in my sample occur twice since they refiled for bankruptcy and again qualified for inclusion in the sample.

<sup>481</sup> See Denis and Rodgers (2007), p. 104.

<sup>482</sup> See Backhaus et al. (2006), p. 480.

lematic.<sup>483</sup> Accordingly, I conclude that the final sample size of 128 can be deemed sufficient for the intended analysis.

Data availability is naturally an issue in bankruptcy research, since not all firms filing for Chapter 11 emerge as public companies with sufficient post-bankruptcy data, as Lemmon, Ma, and Tashjian (2009) and Denis and Rodgers (2007), for example, point out.<sup>484</sup> To avoid losing too many cases from the sample and undermining its representativeness, I impute the last value carried forward in some cases.<sup>485</sup> These cases refer to the last available financial statements before filing for bankruptcy. Where data from the year F-1 is not available, I rely on data from F-2. Similarly, for some firms that merged or went private after emergence, no data was available for E+3.<sup>486</sup> In these cases, I regress post-bankruptcy success in E+2 (which is the last year with available data) on the restructuring actions undertaken until E+1. As a result, I judge firms that merged or went private on the basis of the last year's performance before they merged or went private in contrast to Hotchkiss (1993), who treats merging firms categorically as successes.<sup>487</sup> Additionally, using performance groups (success vs. no success) in the logistic regression model mitigates the influence of any missing data, in line with Hotchkiss (1993).<sup>488</sup>

## 5.4 Descriptive Statistics

This chapter provides a detailed description of the selected sample. Where possible, the sample is compared to prior studies and to the universe of bankrupt public U.S. firms. The universe of all bankruptcies of public U.S. firms is taken from the 2010 Bankruptcy Yearbook & Almanac.<sup>489</sup>

---

<sup>483</sup> See Long (1997), p. 54.

<sup>484</sup> See Lemmon, Ma, and Tashjian (2009), p. 57, and Denis and Rodgers (2007), p. 113.

<sup>485</sup> See Denis and Rodgers (2007), p. 110, who employ a similar method for handling missing data during bankruptcy. Eichner (2010), p. 149, uses the same method to fill gaps in the time series of his distressed sample.

<sup>486</sup> The same applies to four firms that remained public through E+3, but for which data for E+3 was available neither from Worldscope nor from company filings.

<sup>487</sup> See Hotchkiss (1993), p. 21 of the first essay.

<sup>488</sup> See Hotchkiss (1993), p. 21 of the first essay.

<sup>489</sup> See the 2010 Bankruptcy Yearbook & Almanac, p. 34.

Table 12 below shows the distribution of sample firms broken down according to the year of filing. The distribution of my sample firms roughly follows the distribution of the public bankruptcy population for the respective period. At the end of the 1990s, when the Internet bubble began to burst, an increase in the number of filings is observed. The initial sample taken from the UCLA-LoPucki Bankruptcy Research Database accounts for almost 30% of the total population of bankrupt public firms.<sup>490</sup> The emerged public and final sample represent at least 9% and 8%, respectively, of the total population. Compared to the papers by Denis and Rodgers (2007) and Hotchkiss (1995), whose sample periods range from 1985-1994 and from 1979-1989, my study can challenge certain prior findings in light of a more recent period. A similar time horizon (1991-2004) is scrutinized by Lemmon, Ma, and Tashjian (2009).

---

<sup>490</sup> It must be remembered, that financial service firms are excluded from the initial sample. Accordingly, 30% represents a lower bound of the total population, in which financial service firms are still included. The same holds true for the emerged public and the final sample.

**Table 12: Sample Distribution by Year of Filing**

	Final Sample		Emerged Public		Initial Sample		All Public Companies	
	N	%	N	%	N	%	N	%
1993	12	9.4	12	8.4	21	4.4	86	5.1
1994	5	3.9	6	4.2	11	2.3	70	4.1
1995	6	4.7	8	5.6	16	3.4	85	5.0
1996	3	2.3	3	2.1	15	3.2	86	5.1
1997	4	3.1	5	3.5	14	2.9	83	4.9
1998	3	2.3	3	2.1	22	4.6	122	7.2
1999	12	9.4	13	9.1	39	8.2	145	8.6
2000	15	11.7	17	11.9	71	14.9	179	10.6
2001	22	17.2	23	16.1	91	19.1	263	15.6
2002	17	13.3	20	14.0	74	15.5	220	13.0
2003	19	14.8	21	14.7	53	11.1	172	10.2
2004	7	5.5	7	4.9	27	5.7	92	5.4
2005	3	2.3	5	3.5	22	4.6	86	5.1
Total	128	100.0	143	100.0	476	100.0	1,689	100.0

Source: The final sample, the emerged public sample and the initial sample are taken from the UCLA-LoPucki BRD. Data regarding all public companies is taken from the 2010 Bankruptcy Yearbook & Almanac.<sup>491</sup>

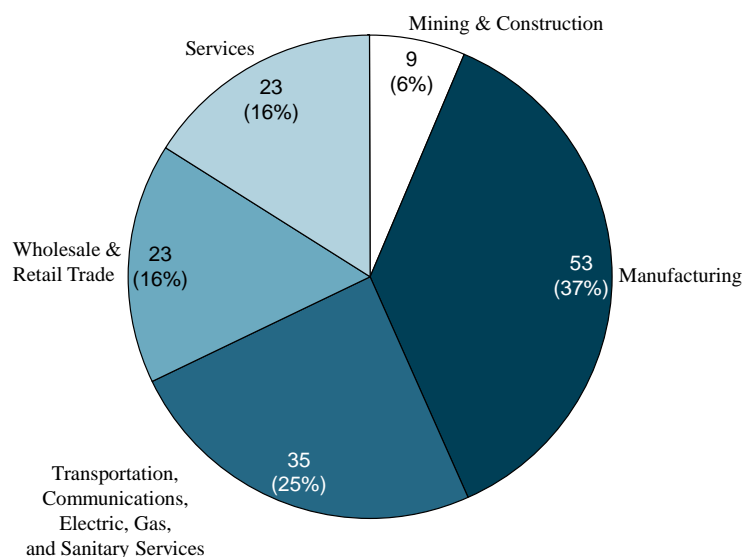
The industry distribution across the emerged public sample is shown in Figure 6 below. Compared to the sample used by Hotchkiss (1993), dating from 1979-1989, certain differences are apparent.<sup>492</sup> On the one hand, mining accounts for 20% of the Hotchkiss (1993) sample, while its 6% share in my sample is significantly smaller. On the other hand, transportation, communication, electric, gas, and sanitary services (24% vs. 6%) and services (16% vs. 10%) represent higher shares of my sample. Apart from these differences, manufacturing is by far the largest industry sector in both samples.

<sup>491</sup> See the 2010 Bankruptcy Yearbook & Almanac, p. 34.

<sup>492</sup> Hotchkiss (1993) includes financial service firms with SIC code 6 in her analysis. For my analysis, financial service firms are excluded as explained in chapter 5.3.

### Figure 6: Industry Distribution of Emerged Public Sample Firms in F-1

Industry classification relies on primary 1-digit SIC codes for the emerged public sample. Classifications are taken from the last year before filing (F-1). Mining & construction is SIC code 1, manufacturing covers SIC codes 2 and 3, transportation, communications, electric, gas, and sanitary services are SIC code 4, wholesale & retail trade is SIC code 5, services are SIC codes 7 and 8. Financial services with SIC code 6, are excluded from the analysis. The number of firms in the emerged public sample is 143.



Source: Author's own illustration.

Compared to the total population of public U.S. companies in Worldscope from 2005, manufacturing is by far the largest industry group (42%), followed by services (28%), transportation, communications, electric, gas, and sanitary services (12%), the wholesale and retail trade (10%), and finally mining and construction (8%).<sup>493</sup> Consequently, in my sample of bankrupt firms that emerged public, the ranking of industry groups mirrors the total population, except that services are underrepresented and transportation, communications, electric, gas, and sanitary services are overrepresented.

<sup>493</sup> For this comparison, the total population of public U.S. companies listed in Worldscope was adjusted to exclude agriculture, forestry, and fishing (SIC code 0), financial services (SIC code 6), and public administration (SIC code 9) in order to provide for a meaningful comparison.

**Table 13: Key Characteristics of Sample Firms in F-1**

Originally, the initial sample consisted of 476 firms. For 19 firms data was unavailable resulting in the number of observations being 457. Likewise, firms that did not emerge publicly originally numbered 333. Due to data restrictions, only 314 firms remained. Firm characteristics were taken from the last available year before filing. Operating income is defined as sales-COGS-SG&A before deducting depreciation and amortization. ROA is the return on assets, defined as operating income scaled by total assets. ROS is the return on sales, defined as operating income scaled by sales. The leverage ratio is defined as total liabilities over total assets. \*\*\*, \*\*, \* denote two-tailed significance levels of 1%, 5% and 10%, respectively, of a difference-in-means (medians) test between emerged public and non-emerged public firms using a t-test (Wilcoxon rank sum test).

	Initial Sample		Emerged Public		Non-Emerged Public	
	Mean	Median	Mean	Median	Mean	Median
Total Assets [USD m]	1901.358	566.276	2225.373	813.594	1753.796	470.618***
Sales [USD m]	1622.872	546.664	1706.616	712.852	1584.734	493.820***
Operating Income [USD m]	130.452	37.049	158.387	63.841	117.731	26.917***
ROA	0.06	0.07	0.08	0.08	0.04**	0.06***
ROS	-0.25	0.06	-0.23	0.07	-0.26	0.05***
Leverage Ratio	1.03	0.92	1.11	1.02	1.00**	0.90***
Number of Firms	457		143		314	

Source: Author's own illustration, influenced by Hotchkiss (1995), p. 7.

Key characteristics of the initial sample firms and both the emerged public and non-emerged public groups are shown in Table 13 above. Compared to prior studies, my sample firms are substantially larger both in terms of total assets and sales which is due to the inclusion rules of my main data source, the UCLA-LoPucki BRD.<sup>494</sup> Firms emerging from Chapter 11 as public entities were significantly larger one year before filing than those firms that did not emerge as public entities. This holds true in terms of both median total assets and median sales which confirms the findings of Hotchkiss (1995).<sup>495</sup> This finding is corroborated by Denis and Rodgers (2007), who find that firm size is significantly associated with a higher probability of emerging as independent public firms.<sup>496</sup> Similarly, firms that emerged as public entities exhibited significantly higher performance before filing for bankruptcy. This is independent of the performance metric used, be it median operating income, the median return on assets or the median return on sales. Conversely, those firms that did not eventually emerge as

<sup>494</sup> Refer to chapter 5.2 for the inclusion rules of the UCLA-LoPucki BRD. The emerged public firms in Hotchkiss (1995), p. 7, exhibit mean (median) total assets of USD 285 million (21) and sales of USD 420 million (30). The reorganized firms in Denis and Rodgers (2007), p. 109, show median total assets of USD 159 million. The sample firms in Lemmon, Ma, and Tashjian (2009), p. 40, show mean (median) total assets of USD 955 million (257).

<sup>495</sup> See Hotchkiss (1995), p. 7.

<sup>496</sup> See Denis and Rodgers (2007), p. 112.

public entities showed a significantly lower leverage ratio. This finding lends support to the hypothesis of Jensen (1989) that high leverage may preserve value.<sup>497</sup> However, a median (mean) leverage ratio of 90% (100%) can still be considered relatively high. Lemmon, Ma, and Tashjian (2009) find similar values in their sample.<sup>498</sup> In additional analyses, Lemmon, Ma, and Tashjian (2009) find that firms primarily in economic distress one year before filing for bankruptcy exhibit a significantly lower leverage ratio than firms in financial distress.<sup>499</sup> Consequently, the significantly lower leverage ratio one year before filing for firms that did not emerge as public entities could be interpreted as an indication of economic distress rather than financial distress. This also partially confirms the findings of Denis and Rodgers (2007), who show that firms that are initially acquired exhibit a significantly lower leverage ratio than firms that initially reorganize.<sup>500</sup> By contrast, Hotchkiss (1995) finds that firms that emerged as public entities showed a significantly lower leverage ratio compared to other outcomes.<sup>501</sup>

---

<sup>497</sup> See Jensen (1989), pp. 41-43.

<sup>498</sup> See Lemmon, Ma, and Tashjian (2009), p. 40.

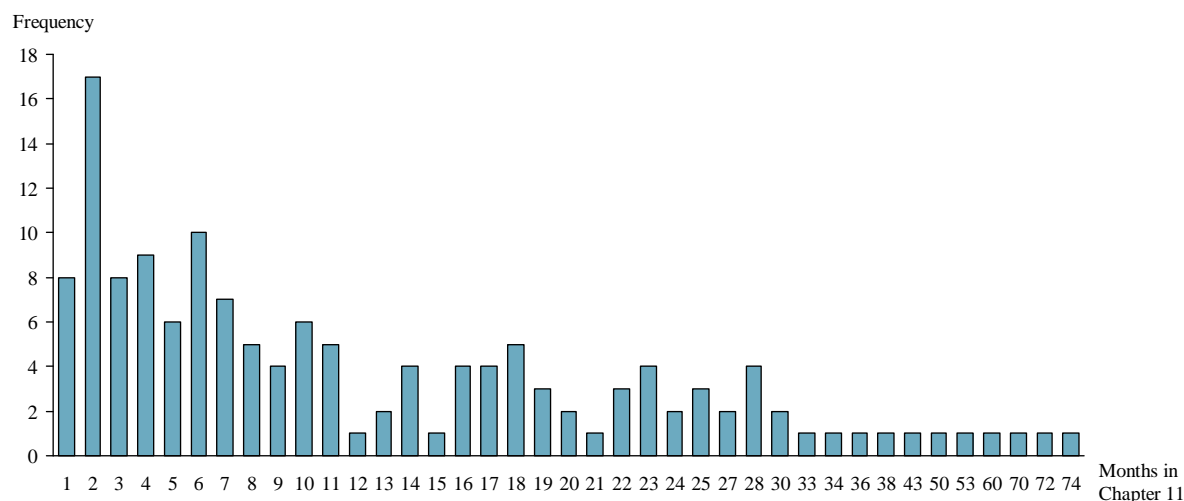
<sup>499</sup> See Lemmon, Ma, and Tashjian (2009), pp. 40-42.

<sup>500</sup> See Denis and Rodgers (2007), p. 109.

<sup>501</sup> See Hotchkiss (1995), p. 7.

### Figure 7: Duration in Chapter 11

The time spent in Chapter 11 (duration) is measured in months, from the filing until emergence for the 143 firms that emerged as public entities. Emergence can be consummation of either a reorganization plan or a transaction pursuant to § 363.



Source: Author's own illustration.

Figure 7 shows the time spent in Chapter 11. The median (mean) firm stays in Chapter 11 for 9 (13.6) months. This is considerably shorter than the prior findings of Denis and Rodgers (2007), who cite 19.9 months for the median reorganized firm, and of Hotchkiss (1995), who cites 17.2 months for the median firm that emerges as a public entity.<sup>502</sup> Even when prepacks that are assumed to be much quicker are discarded, the picture does not change materially.<sup>503</sup> Skeel (2003) argues that changes in the governance of bankrupt firms induced by creditors through DIP financing agreements and new managerial compensation programs now honor the fast resolution of bankruptcy compared to the 1980s.<sup>504</sup> Additionally, since the early 1990s, relatively more reorganization cases have resulted in § 363 sales in which most of the debtor's assets are sold off before the court-supervised reorganization is formally completed.<sup>505</sup> My

<sup>502</sup> See Denis and Rodgers (2007), p. 105, and Hotchkiss (1995), p. 7. While Denis and Rodgers (2007) take the date of emergence as their reference point, Hotchkiss (1995) relies on the date when the reorganization plan is confirmed rather than when it is consummated. The median time spent for the Hotchkiss (1995) sample might therefore go up slightly if adjusted to the date of emergence as the reference point.

<sup>503</sup> See e.g. Tashjian, Lease, and McConnell (1996), pp. 140-142.

<sup>504</sup> See Skeel (2003), p. 918 and p. 950.

<sup>505</sup> See Skeel (2003), p. 918.



findings are substantiated by Bharath, Panchapagesan, and Werner (2010), who also document a shorter average duration in Chapter 11 for the period after 2000.<sup>506</sup>

Table 14 below traces the median performance of the emerged public sample firms from three years before filing (F-3) through three years after emergence (E+3). The median return on sales resembles more or less a V-shaped curve, with performance declining toward the filing and improving as of emergence. This pattern is roughly the same for all the performance metrics shown. The sample firms do not statistically differ from the industry median firm three years before filing in terms of the return on sales, and they are back on a par with their industry peers two years after emergence. This could be interpreted that it takes at least two years on average to recover from bankruptcy and to return to average industry performance. For the free cash flow-based return, the sample firms' performance is statistically worse than the industry median firm three years before filing. However, as of two years after emergence, the sample firms' performance does not appear to be significantly different from industry median performance. Consequently, those firms that survive the whole process as independently operating public entities seem to be indistinguishable from the industry median firm between two and three years after emergence. This contrasts with the earlier findings of Hotchkiss (1995) whose sample firms perform significantly worse than the industry median firm in all post-bankruptcy years.<sup>507</sup>

---

<sup>506</sup> See Bharath, Panchapagesan, and Werner (2010), p. 28 and p. 37. They find that the median (mean) reorganized firm has stayed in Chapter 11 for 12 (16) months in the period since 2000.

<sup>507</sup> See Hotchkiss (1995), pp. 9-10. She uses operating income scaled by either assets or sales as performance metric. In unreported analyses, Hotchkiss (1995) uses a free cash flow-based performance metric which yields similar results.

**Table 14: Performance of Emerged Public Sample Firms from F-3 to E+3**

ROS is the return on sales, defined as operating income scaled by sales. FCF is free cash flow. N is the number of firms. The leverage ratio is total liabilities over total assets. Industry-adjusted values are calculated by subtracting the respective industry median as described in chapter 4.2.1. \*\*\*, \*\*, \* denote two-tailed significance levels of 1%, 5% and 10%, respectively, of a Wilcoxon signed rank test for the median being different from zero. Differences in the number of firms relative to the final sample of 128 in E+3 result from firms having left the sample before the end of E+3. These firms are nevertheless included in the final sample, following the rationale provided in chapter 5.3.2.

FY	N	ROS		FCF/Sales		Leverage Ratio	
		Median	Ind.-adj. Median	Median	Ind.-adj. Median	Median	Ind.-adj. Median
F-3	141	0.115***	0.000	0.007	-0.016***	0.778***	0.180***
F-2	143	0.100***	-0.000	-0.001**	-0.030***	0.843***	0.237***
F-1	143	0.074***	-0.021**	-0.038***	-0.068***	1.021***	0.411***
F	138	0.067***	-0.041***	-0.029***	-0.062***	1.055***	0.461***
E	141	0.096***	-0.020**	0.011*	-0.011*	0.734***	0.110***
E+1	143	0.094***	-0.016**	0.007	-0.018**	0.762***	0.134***
E+2	120	0.094***	-0.015	0.006*	-0.019	0.726***	0.096***
E+3	101	0.105***	-0.000	0.013**	-0.003	0.749***	0.147***

Source: Author's own illustration, influenced by Hotchkiss (1995), p. 10.

The median leverage ratio for emerged public firms increases toward filing and decreases as a result of reorganization. However, in line with the theoretical explanation of Kahl (2002), the leverage ratio upon emergence remains significantly above the respective industry level.<sup>508</sup>

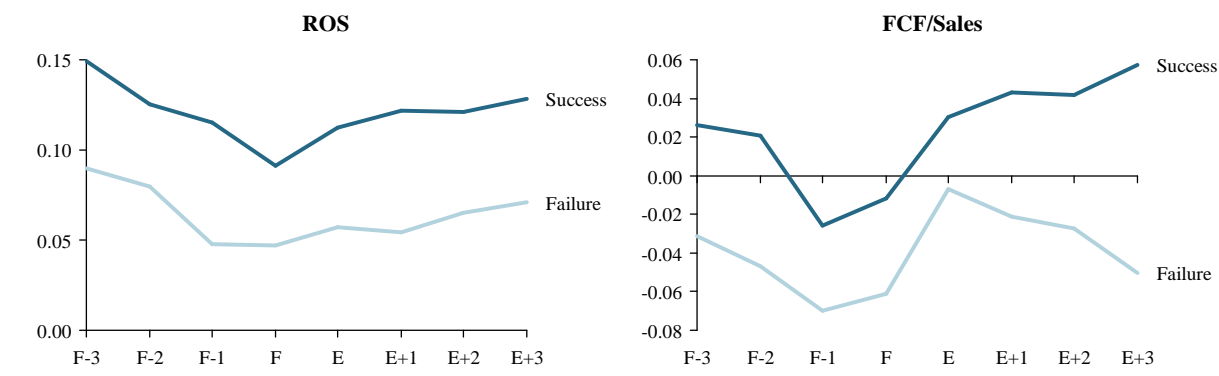
The post-bankruptcy performance reported in Table 14 and plotted in Figure 8 should be interpreted as the upper bound of the performance range due to potential survivorship bias.<sup>509</sup> The performance of the firms that left the sample due to another filing for bankruptcy or due to liquidation may arguably have exhibited poor post-bankruptcy performance. For firms that left the sample because they went private or were acquired, this might not necessarily hold true in every case, as firms may be taken over for reasons other than poor performance, such as strategic fit with the buyer.

<sup>508</sup> See Kahl (2002), p. 136.

<sup>509</sup> The same applies to the descriptive results reported in Hotchkiss (1995), p. 9.

### Figure 8: Performance of Emerged Public Sample Firms from F-3 to E+3 by Performance Groups

The figure shows median values for the return on sales, measured by operating income scaled by sales (at left), and free cash flow scaled by sales (at right). Both values are separated into performance groups representing post-bankruptcy success and failure. The sample consists of 143 firms that emerged as independent public entities. Due to survivorship bias, the values shown for the failed firms should be interpreted as the upper bound of performance.



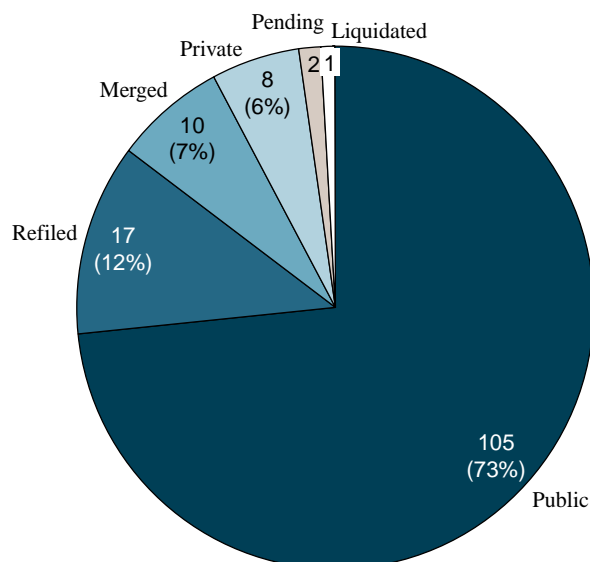
Source: Author's own illustration.

As Figure 8 shows, successful and unsuccessful firms differ in terms of the level of performance regarding the return on sales. This holds true for each stage from the pre-bankruptcy phase to the post-bankruptcy phase. Looking at the free cash flow return, this difference becomes even more pronounced in the post-bankruptcy phase. While the level of performance continues to differ in all phases, the difference between successful and unsuccessful firms becomes more evident when measured in terms of the free cash flow return on sales. This seems to support my choice of the free cash flow-based performance metric, as motivated in chapter 4.2.1 above. One potential interpretation of this persistent difference in the performance level may be that unsuccessful firms file for bankruptcy protection too late or do not do enough to realize effective decline-stemming actions.<sup>510</sup>

<sup>510</sup> This may be in line with the argument put forward by Adler, Capkun, and Weiss (2006), p. 3, that the changed bankruptcy practice emphasizing creditor control after 2001 can lead to incentives for management to delay the bankruptcy filing. They document that such a delayed filing destroys firm value.

### Figure 9: Post-Bankruptcy Outcomes of Emerged Public Sample Firms in E+3

The pie chart shows the post-bankruptcy outcomes for the emerged public sample firms in E+3. Post-bankruptcy outcomes follow the definitions in Table 3. The post-bankruptcy outcomes of two firms (Calpine and Solutia) were still pending as of fiscal 2010, as they have not yet completed three fiscal years since emergence. The number of firms in the emerged public sample is 143.



Source: Author's own illustration.

Compared to Denis and Rodgers (2007), relatively more firms (73%) in my sample remain public through E+3. Denis and Rodgers (2007) find that 58% of their sample firms remain public through E+3, while 27% go private or merge and 15% refile or liquidate.<sup>511</sup> The percentage of firms refiling for bankruptcy or being liquidated in Denis and Rodgers (2007) is comparable to my finding of 13% of the emerged public sample firms. Hotchkiss (1995) documents that 20% of her emerged public firms refile or are liquidated within five years of confirmation of the reorganization plan.<sup>512</sup> For a smaller sample, LoPucki and Whitford (1993b) find that 32% of the sample firms refile for bankruptcy.<sup>513</sup>

<sup>511</sup> See Denis and Rodgers (2007), p. 115. The percentage for firms that went private or merged is calculated as the difference between the total sample of 141 emerging public firms, the 82 firms listed on Compustat in E+3 and the 21 firms that either refiled or were liquidated, since it is not explicitly stated in the text. It may well be that the 27% (38 out of 141) is the upper bound of firms going private or merging, since firms leaving the sample of Denis and Rodgers (2007) due to limitations in data availability might also be included in this figure.

<sup>512</sup> See Hotchkiss (1995), p. 15. Her findings are not exactly comparably to my findings due to the time horizon of five years after confirmation. Presumably, her figure would be somewhat lower for the three year time horizon which I apply.

<sup>513</sup> See LoPucki and Whitford (1993b), p. 608.

## 6 Analysis and Research Findings

### 6.1 Univariate Analysis

I start with a univariate analysis of factors that potentially influence post-bankruptcy performance. Guided by the four generic restructuring strategies introduced by Lai and Sudarsanam (1997) and adjusted by Eichner (2010), the individual restructuring actions along the two-phased bankruptcy process are analyzed individually for firms categorized as either successes or failures. The performance metric employed is the free cash flow scaled by sales in E+3.<sup>514</sup> This chapter discusses the significant differences between successful and unsuccessful firms.

As Table 15 below shows, two operational restructuring actions differ significantly across the two groups. On the one hand, unsuccessful firms reduce the number of employees significantly more frequently than successful firms while in Chapter 11. 75% of the firms that fail reduce the number of employees, while only 57% of the successful firms do so. On the other hand, failed firms reduce their capital expenditures during Chapter 11 more frequently than successful firms. This might be explained by unsuccessful firms' greater need for liquidity, possibly a result of less frequent DIP financing. DIP financing is the only significantly different action for financial restructuring strategies. Successful firms receive DIP financing more often (78%) compared to their unsuccessful counterparts (52%). This supports the hypothesis that DIP lenders are effective in their screening of viable and nonviable firms as put forward by Dahiya et al. (2003).<sup>515</sup>

---

<sup>514</sup> Refer to chapter 4.2.1.

<sup>515</sup> See Dahiya et al. (2003), p. 278.

**Table 15: Univariate Analysis of Post-Bankruptcy Success – Independ. Variables**

Post-bankruptcy success (failure) is defined as free cash flow scaled by sales above or equal to (below) zero in E+3. Restructuring actions during Chapter 11 (in) and after emergence (out) are tracked from one year before filing (F-1) through two years after emergence (E+2). Restructuring actions are defined as in Table 9. The t-test tests the difference in means between the success group and the failure group. The Chi<sup>2</sup>-statistic tests for homogeneity among both groups. N is the number of firms, sd is the standard deviation. \*\*\*, \*\*, \* denote two-tailed significance levels of 1%, 5% and 10%, respectively.

	Post-Bankr. Success		Post-Bankr. Failure		t-Test	Chi <sup>2</sup> -Test	
	N=67		N=61				
	Mean	sd	Mean	sd	p-value	p-value	
<b>Operational Restructuring</b>							
Sales Increase (in)	0.22	0.42	0.13	0.34	0.175	0.169	
Sales Increase (out)	0.40	0.49	0.34	0.48	0.497	0.493	
Cost Reduction (in)	0.13	0.34	0.25	0.43	0.108	0.105	
Cost Reduction (out)	0.10	0.31	0.13	0.34	0.643	0.640	
Personnel Reduction (in)	0.57	0.50	0.75	0.43	0.026	0.025	**
Personnel Reduction (out)	0.34	0.48	0.46	0.50	0.184	0.181	
Capex Increase (in)	0.31	0.47	0.20	0.40	0.134	0.129	
Capex Increase (out)	0.63	0.49	0.64	0.48	0.885	0.884	
Capex Reduction (in)	0.60	0.49	0.77	0.42	0.036	0.034	**
Capex Reduction (out)	0.22	0.42	0.26	0.44	0.616	0.613	
<b>Financial Restructuring</b>							
Leverage Reduction (in)	0.76	0.43	0.72	0.45	0.610	0.607	
Leverage Reduction (out)	0.27	0.45	0.21	0.41	0.468	0.463	
Equity Issue (in)	0.07	0.26	0.05	0.22	0.556	0.550	
Equity Issue (out)	0.33	0.47	0.43	0.50	0.257	0.253	
DIP Financing	0.78	0.42	0.52	0.50	0.003	0.003	***
<b>Managerial Restructuring</b>							
Top Executive Change (in)	0.28	0.45	0.18	0.39	0.171	0.166	
Top Executive Change (out)	0.51	0.50	0.44	0.50	0.467	0.463	
<b>Portfolio Restructuring</b>							
Acquisition (in)	0.07	0.26	0.05	0.22	0.556	0.550	
Acquisition (out)	0.43	0.50	0.21	0.41	0.008	0.008	***
Divestment (in)	0.28	0.45	0.21	0.41	0.362	0.356	
Divestment (out)	0.48	0.50	0.23	0.42	0.003	0.003	***

Source: Author's own illustration.

Managerial restructuring in the form of the replacement of the top executive does not differ substantially between the two groups. However, successful firms appear to be more active than unsuccessful firms in engaging in mergers, acquisitions and divestments. Specifically, successful firms acquire and divest more frequently after emerging from Chapter 11. For the failed firms, transactions are almost evenly distributed over the bankruptcy and the post-bankruptcy phases. On the other hand, successful companies seem to postpone relatively more transactions until the post-bankruptcy phase. This could be very beneficial, helping successful firms to potentially avoid or mitigate the fire-sale discounts as described by Shleifer and Vishny (1992)

or the bankruptcy discounts as found by Hotchkiss and Mooradian (1998) and Jory and Madura (2009). By contrast, changes in the primary SIC code (not reported), i.e. shifting the strategic focus of the company, plays only a minor role both in explaining differences between the two groups and in terms of the frequency with which such restructuring actions occur. This supports prior findings by Hotchkiss (1995), who reports no significant influence of a change in the primary SIC code on post-bankruptcy performance.<sup>516</sup>

Alternatively, taking industry-adjusted free cash flow scaled by sales as the dependent variable in Table 15, the results of the univariate analysis change only marginally. DIP financing and the reduction of capital expenditures during Chapter 11 no longer differ significantly across the two performance groups, while for the control variables the picture remains essentially unchanged.

**Table 16: Univariate Analysis of Post-Bankruptcy Success – Control Variables**

Post-bankruptcy success (failure) is defined as free cash flow scaled by sales above or equal to (below) zero in E+3. Control variables are taken from the last available year before filing (F-1), except in the cases of prepack which, by definition, is from the year of filing (F) and duration. Control variables are defined as in Table 10. The t-test tests the difference in means between the success group and the failure group. The Chi<sup>2</sup>-statistic tests for homogeneity among both groups. N is the number of firms, sd is the standard deviation. \*\*\*, \*\*, \* denote two-tailed significance levels of 1%, 5% and 10%, respectively.

	Post-Bankr. Success		Post-Bankr. Failure		t-Test		Chi <sup>2</sup> -Test	
	N=67		N=61		p-value		p-value	
	Mean	sd	Mean	sd				
Prepack	0.13	0.34	0.23	0.42	0.164		0.161	
Duration (months)	15.48	16.12	11.90	11.52	0.155		0.146	
Economic Distress	0.48	0.50	0.75	0.43	0.001	***	0.001	***
Financial Distress	0.40	0.49	0.18	0.39	0.006	***	0.005	***
Size (assets)	7.03	1.24	6.64	0.93	0.050	*	0.047	**
Size (sales)	7.03	1.17	6.26	1.32	0.001	***	0.000	***
Leverage Ratio	1.14	0.44	1.06	0.40	0.279		0.270	
Industry ROA	0.10	0.06	0.10	0.07	0.916		0.915	
Industry ROS	0.12	0.10	0.14	0.12	0.328		0.322	

Source: Author's own illustration.

With regard to the control variables, successful firms appear to be significantly larger before filing for bankruptcy. This holds for size measured as the natural log of either total assets or sales and complements the prior findings by Denis and Rodgers

<sup>516</sup> See Hotchkiss (1995), p. 18.

(2007), who find that firms that emerge as reorganized entities are significantly larger than those firms that are liquidated or acquired.<sup>517</sup> Furthermore, successful firms less frequently find themselves in economic distress, while unsuccessful firms are less frequently in financial distress one year before filing. This finding adds to prior evidence of Lemmon, Ma, and Tashjian (2009) that economically distressed firms are often liquidated or acquired during Chapter 11, while the majority of financially distressed firms emerge from Chapter 11 as reorganized entities.<sup>518</sup>

## 6.2 Multivariate Analysis

### 6.2.1 Final Model

Based on the findings in the univariate analysis, I proceed with the multivariate analysis. For the variable selection of the preliminary multivariate model, I follow the recommendation by Bendel and Afifi (1977) and Mickey and Greenland (1989) to use a p-value of at most 0.25 in the univariate analysis.<sup>519</sup> A stricter inclusion rule such as  $p < 0.10$  could neglect any multivariate effects that only become observable once the variables are taken together. Besides this rather mechanistic rule, I include further variables that are deemed relevant in line with Hosmer and Lemeshow (2000).<sup>520</sup> As a consequence, *leverage reduction (out)*, *equity issue (out)* and *top executive change (out)* are also included in the preliminary model. The preliminary model is shown in Table 17.

---

<sup>517</sup> See Denis and Rodgers (2007), p. 109.

<sup>518</sup> See Lemmon, Ma, and Tashjian (2009), p. 2.

<sup>519</sup> This methodology has also been suggested by Hosmer and Lemeshow (2000), p. 95.

<sup>520</sup> See Hosmer and Lemeshow (2000), p. 95.



**Table 17: Multivariate Logistic Regression of Post-Bankruptcy Performance - Preliminary Model based on Univariate Analysis**

In model (I), post-bankruptcy success (failure) is defined as free cash flow scaled by sales above or equal to (below) zero in E+3. In model (II), the performance metric is adjusted by the respective industry median. Restructuring actions are defined as in Table 9 and control variables are defined as in Table 10. \*\*\*, \*\*, \* denote two-tailed significance levels of 1%, 5% and 10%, respectively.

	(I)		(II)	
	Free Cash Flow/Sales		Ind.-adj. Free Cash Flow/Sales	
	Coefficient	p-value	Coefficient	p-value
Sales Increase (in)	0.960	0.194	-0.087	0.901
Cost Reduction (in)	-0.112	0.879	1.515 **	0.035
Personnel Reduction (in)	-1.701 ***	0.006	-1.106 **	0.046
Personnel Reduction (out)	-0.793	0.151	-0.011	0.983
Capex Increase (in)	-0.478	0.669	-1.739 *	0.089
Capex Reduction (in)	-1.143	0.268	-2.236 **	0.020
Leverage Reduction (out)	1.698 ***	0.009	0.828	0.175
Equity Issue (out)	-0.757	0.142	0.620	0.213
DIP Financing	1.392 **	0.037	0.212	0.722
Top Executive Change (in)	0.915	0.206	1.275 *	0.082
Top Executive Change (out)	1.154 *	0.066	1.060 *	0.090
Acquisition (out)	0.966 *	0.094	0.636	0.199
Divestment (out)	1.339 **	0.015	0.813	0.106
Prepack	-0.472	0.524	0.893	0.206
Duration	-0.011	0.621	0.008	0.691
Economic Distress	-1.190	0.198	-3.090 ***	0.001
Financial Distress	0.206	0.828	-1.524 *	0.085
Size (sales)	0.606 **	0.021	0.391 *	0.088
Constant	-3.465	0.134	-0.733	0.718
LR-Chi <sup>2</sup>	62.849 ***	0.000	46.978 ***	0.000
Nagelkerke pseudo-R <sup>2</sup>	0.518		0.419	
McFadden pseudo-R <sup>2</sup>	0.355		0.277	
Number of Firms	128		128	

Source: Author's own illustration.

In the following, I focus on post-bankruptcy success modeled by free cash flow scaled by sales, as in model (I) in Table 17, since it exhibits a considerably greater explanatory power, as documented by a higher Nagelkerke pseudo-R<sup>2</sup>.<sup>521</sup> The final model is built by excluding variables from the preliminary model that exhibit relatively high p-values and whose exclusion does not significantly reduce the overall explanatory power of the model.<sup>522</sup> This procedure ensures the parsimony of the model in line with Hosmer and Lemeshow (2000).<sup>523</sup> Table 18 shows the resulting final model for both

<sup>521</sup> See Backhaus et al. (2006), pp. 449-450, stating that a value above 0.5 for the Nagelkerke pseudo-R<sup>2</sup> can be considered as an indicator of a good explanatory power of the model.

<sup>522</sup> This follows the general guidelines for model-building strategies put forward by Hosmer and Lemeshow (2000), pp. 95-99.

<sup>523</sup> See Hosmer and Lemeshow (2000), p. 92. Striving for a parsimonious model is motivated by the fact that a model with less independent variables that still explains the data well, will likely be more numerically stable. Conversely, the higher the number of independent variables in the model, the higher the estimated standard errors will be, which could cause the estimated coefficients to be less efficient.

the firm-specific and the industry-adjusted free cash flow performance metrics. Overall, for both models in Table 18 I can reject the null that all coefficients in the model are simultaneously equal to zero as the likelihood ratio (LR) chi-squared test is significant at the 1% level. As a result, I conclude that the independent variables in the final model jointly exhibit significant explanatory power compared to the model with the intercept only.<sup>524</sup> The Nagelkerke pseudo- $R^2$  of 0.513 indicates that the final model has good explanatory power.<sup>525</sup> For the sake of completeness, McFadden's pseudo- $R^2$  is also reported. However, since the McFadden pseudo- $R^2$  can never reach the value of one, I prefer the Nagelkerke pseudo- $R^2$ , which is normalized between zero and one.<sup>526</sup> Repeating the multivariate analysis of Table 18 below using probit rather than logistic regression yields similar results, which are reported in the appendix in Table 29.

In the following, I discuss the results for individual restructuring actions that showed a significant impact on the post-bankruptcy success probability.<sup>527</sup> A substantial reduction in the number of employees during Chapter 11 is significantly negatively related to the probability of post-bankruptcy success. Consequently, this finding runs counter to the hypothesized influence on post-bankruptcy success of personnel reductions during Chapter 11. This is in contrast to prior findings of Khanna and Poulsen (1995), who document positive announcement effects for layoffs, albeit before the bankruptcy filing.<sup>528</sup> Conversely, my findings seem to corroborate earlier findings of Slatter (1984) and Sudarsanam and Lai (2001) for distressed UK samples, namely that non-recovery firms engage more frequently in cost-cutting strategies including layoffs.<sup>529</sup> While 57% of the successful firms in my sample also effect headcount reductions during Chapter 11, unsuccessful firms reduce the number of employees in 75%

---

<sup>524</sup> Refer to Backhaus et al. (2006), pp. 445-450, for more details about general model fit criteria for the logistic regression model.

<sup>525</sup> See Backhaus et al. (2006), pp. 449-450. Stata reports Cragg & Uhler's pseudo- $R^2$  as part of the `-fitstat-` post-estimation command which corresponds to the Nagelkerke pseudo- $R^2$  shown here. Refer generally to Long and Freese (2001) or Backhaus et al. (2006).

<sup>526</sup> This follows the recommendation by Backhaus et al. (2006), p. 449. Refer also to Long and Freese (2001), pp. 84-85.

<sup>527</sup> Generally, it should be borne in mind that the logistic regression model emphasizes the differences between firms classified as successes and those classified as failures. As a result, when both successful and failed firms engage in the same restructuring actions, the model will show no significant difference between the two. In this case, the respective restructuring action cannot be considered to be a differentiating factor between the two groups, although this restructuring action might add value in particular cases.

<sup>528</sup> See Khanna and Poulsen (1995), pp. 927-928.

<sup>529</sup> See Slatter (1984), p. 120, and Sudarsanam and Lai (2001), p. 197.

of the cases. One possible explanation for this finding may be linked to the problem that the best employees of a bankrupt firm may be among the first to leave the company, as they are likely to receive attractive offers on the job market.<sup>530</sup> This may even be independent of layoffs. As a result, the bankrupt firm may be left with less qualified and less motivated employees to complete the restructuring which could outweigh the short-term benefits of cutting labor costs.<sup>531</sup> Additionally, layoffs can trigger severance payments that might aggravate the bankrupt firm's liquidity problems.<sup>532</sup> On the other hand, reducing the number of employees in the post-bankruptcy phase is not significantly related to the probability of post-bankruptcy success. Cutting capital expenditures during Chapter 11 is negatively related to the success probability, albeit not significantly at conventional levels. However, as the robustness analysis in chapter 6.3.5 below shows, substantial reductions in capital expenditures during Chapter 11 are significantly negatively related to the likelihood of post-bankruptcy success.<sup>533</sup>

Reducing the leverage ratio in the post-bankruptcy phase is significantly positively related to the probability of post-bankruptcy success, lending support to the initial hypothesis elaborated above. This finding could be integrated in the dynamic liquidation model of Kahl (2002), in which creditors choose to keep leverage high upon emergence in order to better control the firm. Successful firms are now able to reduce the leverage ratio to a lower and arguably more sustainable level that reduces the influence of creditors and mitigates investment distortions due to a potential debt overhang problem.<sup>534</sup> The debt overhang problem can prevent the emerged firm from collecting fresh money to finance new investments in the post-bankruptcy phase. My results do not support those of Denis and Rodgers (2007), who find that firms reducing their leverage ratios in Chapter 11 are more likely to exhibit post-bankruptcy suc-

---

<sup>530</sup> This could be understood as an adverse selection problem that leaves the firm with less skilled and less motivated employees.

<sup>531</sup> Similar arguments are put forward by Filatotchev and Toms (2006), p. 426.

<sup>532</sup> See Dickerson (2003) for more details of retention and severance programs during bankruptcy from a legal perspective. See also Ofek (1993), p. 24.

<sup>533</sup> Substantial reductions in capital expenditures are represented by a cutoff level of 15% or 20% instead of the 10% level.

<sup>534</sup> Assuming that firms that emerge with a high leverage ratio (e.g. above industry level) are perceived by potential investors as being on the brink of financial distress.

cess.<sup>535</sup> Since almost 75% of my sample firms reduce their leverage ratios in Chapter 11 (76% of the successful firms and 72% of the unsuccessful firms), reducing the leverage ratio in Chapter 11 does not seem to discriminate well between successful and unsuccessful firms, which is shown by the univariate analysis in Table 15 above.

**Table 18: Multivariate Logistic Regression of Post-Bankruptcy Performance - Final Model**

In model (I), post-bankruptcy success (failure) is defined as free cash flow scaled by sales above or equal to (below) zero in E+3. In model (II), the performance metric is adjusted by the respective industry median. Restructuring actions are defined as in Table 9 and control variables are defined as in Table 10. \*\*\*, \*\*, \* denote two-tailed significance levels of 1%, 5% and 10%, respectively.

	(I)		(II)	
	Free Cash Flow/Sales		Ind.-adj. Free Cash Flow/Sales	
	Coefficient	p-value	Coefficient	p-value
Sales Increase (in)	0.871	0.216	0.398	0.505
Personnel Reduction (in)	-1.761 ***	0.005	-0.797	0.106
Personnel Reduction (out)	-0.775	0.154	-0.262	0.591
Capex Reduction (in)	-0.801	0.127	-0.562	0.235
Leverage Reduction (out)	1.696 ***	0.008	0.661	0.229
Equity Issue (out)	-0.715	0.160	0.584	0.215
DIP Financing	1.547 ***	0.009	-0.095	0.852
Top Executive Change (in)	0.919	0.197	0.789	0.220
Top Executive Change (out)	1.222 **	0.043	1.007 *	0.073
Acquisition (out)	0.978 *	0.081	0.681	0.144
Divestment (out)	1.319 **	0.015	0.693	0.141
Economic Distress	-1.340 **	0.013	-1.367 ***	0.003
Size (sales)	0.587 **	0.016	0.384 *	0.062
Constant	-3.897 **	0.038	-2.926 *	0.068
LR-Chi <sup>2</sup>	62.115 ***	0.000	35.641 ***	0.001
Nagelkerke pseudo-R <sup>2</sup>	0.513		0.331	
McFadden pseudo-R <sup>2</sup>	0.351		0.210	
Number of Firms	128		128	

Source: Author's own illustration.

Receiving DIP financing during Chapter 11 increases the likelihood of post-bankruptcy success. This extends the findings of prior research such as Dahiya et al. (2003) and Carapeto (2003), who find that DIP-financed firms are more likely to emerge from bankruptcy. Accordingly, DIP investors not only provide useful screening and monitoring of bankrupt firms during Chapter 11, but they also provide useful information for the post-bankruptcy phase. Since DIP financing is positively related to

<sup>535</sup> See Denis and Rodgers (2007), p. 101 and p. 116.

the success probability and less than one third of the firms increase their capital expenditures during Chapter 11, this might be interpreted as being consistent with no systematic overinvestment during Chapter 11.<sup>536</sup> This lends support to the argument put forward by Dahiya et al. (2003).<sup>537</sup>

Replacing the pre-filing top executive after emergence from Chapter 11 increases the likelihood of post-bankruptcy success. This complements the finding of Hotchkiss (1995) that retaining the pre-filing management leads to a higher probability of post-bankruptcy failure. Furthermore, my univariate findings do not seem to support the hypothesis that Chapter 11 is too lenient toward incumbent management, as put forward by Bradley and Rosenzweig (1992). On the one hand, many managers lose their job during or shortly after emergence, as the turnover rate for pre-filing management of successful (unsuccessful) firms shows: Until two years after emergence, the turnover rate is 79% (62%). This compares to a turnover rate of 70% for the sample of Hotchkiss (1995).<sup>538</sup> LoPucki and Whitford (1993a) note that, in 91% of their sample cases, the CEO is replaced within six months after emergence.<sup>539</sup> These top executive turnover rates are higher compared to those documented by Kaplan and Minton (2008) and Kaplan (1994) for large U.S. firms, which are not limited to financial distress or bankruptcy.<sup>540</sup> On the other hand, agency problems between management and the creditors during Chapter 11 can be mitigated by using pay-for-performance compensation schemes as argued by Skeel (2003).<sup>541</sup> He notes that, although managers could be

---

<sup>536</sup> This interpretation is supported by arguments that corporate bankruptcy practice has changed to a more creditor-friendly regime in recent years, as put forward by scholars such as Baird and Rasmussen (2009), p. 30, and Skeel (2003), p. 919. Restrictive covenants to the DIP financing agreement might prevent shareholders and management from overinvesting and risk-shifting to the detriment of creditors.

<sup>537</sup> See Dahiya et al. (2003), p. 259. However, this conclusion hinges on the assumption that firms invested in risky projects that showed positive net present values both *ex ante* and *ex post*. This assumption is important to exclude any risky projects that had negative expected net present values *ex ante*, but which turned out positive *ex post*. In such a case, the risk-shifting incentives (i.e. the overinvestment problem) would have worked out for shareholders and management in the end, while creditors had to bear the downside risks of these investments.

<sup>538</sup> See Hotchkiss (1995), p. 16. She measures management turnover from two years before bankruptcy through the bankruptcy process which is at least two years shorter than my measurement. It thus seems plausible to assume that this figure would be higher if measured until two years after emergence.

<sup>539</sup> See LoPucki and Whitford (1993a), p. 723, albeit in a sample with 43 observations only.

<sup>540</sup> See Kaplan and Minton (2008), p. 32, who note that the average annual CEO turnover rate between 1992 and 2005 is 16% for publicly traded U.S. firms. The annual turnover rate increased from 13% for the period 1992-1997 to 17% for the period 1998-2005. Kaplan (1994), p. 517, documents an average annual top executive turnover rate of 12% for large U.S. industrial firms in 1980.

<sup>541</sup> See Skeel (2003), p. 926.

blamed for steering the firm into bankruptcy, recently they have been offered retention bonuses and pay-for-performance salaries more often. The retention bonuses are designed to ensure that managers “*stay with the sinking ship*”.<sup>542</sup> Paying managers that are typically made responsible for the bankruptcy seems contradictory from the creditors’ perspective at first. However, these managers know the company best, and it could also be hard to find adequate replacement at short notice.<sup>543</sup> According to Skeel (2003), the salary of key managers during Chapter 11 is often designed to reward the fast resolution of Chapter 11, which can maximize the value available for distribution among the creditors under the given circumstances, be it through consummating a reorganization plan or a § 363 sale.<sup>544</sup> Another potential reason for changing the top executive after emergence could be that a different skill set is required to return the company to a growth path in the post-bankruptcy phase.<sup>545</sup> Changing the top executive during Chapter 11 is not significantly related to the post-bankruptcy performance which corresponds to the findings of Kalay, Singhal, and Tashjian (2007).<sup>546</sup>

Consummating a considerable divestment or a considerable acquisition in the post-bankruptcy phase significantly increases the likelihood of post-bankruptcy success. Looking at the relative frequencies in Table 15 above, firms are more active with respect to M&A activities in the post-bankruptcy phase. Compared to firms in financial distress (not bankrupt), bankrupt firms seem to be less dependent on making divestments to generate cash, since they can rely on DIP financing, while, at the same time, the automatic stay may alleviate the pressure to sell assets, as Hotchkiss (1993) argues.<sup>547</sup> As a consequence, most bankrupt firms seem to postpone their divestments until the post-bankruptcy phase to avoid having to accept fire-sale discounts when the

---

<sup>542</sup> Skeel (2003), p. 926.

<sup>543</sup> See Skeel (2003), p. 927, and Hotchkiss (1995), p. 19.

<sup>544</sup> See Skeel (2003), pp. 926-928. Gilson and Vetsuypens (1993), p. 439, document that only 10% of their distressed or bankrupt sample firms linked management compensation to the value of the creditors’ claims during the 1980s.

<sup>545</sup> For instance, a strategic change may be needed to get the company back on course for growth after emerging from Chapter 11. This may be easier with a new top executive whose skills enable strategic change, as suggested by Barker and Barr (2002), p. 977. Additionally, the composition of the top management team may also influence firm performance as documented by Keck (1997), p. 143. She finds that the skill set of heterogeneous top management teams better suits the requirements of difficult times.

<sup>546</sup> See Kalay, Singhal, and Tashjian (2007), p. 790.

<sup>547</sup> See Hotchkiss (1993), p. 9 of the third essay.

whole industry might also be in distress as documented by Shleifer and Vishny (1992), or any bankruptcy discounts as documented by Hotchkiss and Mooradian (1998) and Jory and Madura (2009).<sup>548</sup> Accordingly, unlike in the turnaround model of Robbins and Pearce (1992) the majority of bankrupt firms seems to postpone divestments until the post-bankruptcy phase. My findings complement those of Denis and Rodgers (2007), who show that firms that reduce their assets during Chapter 11 (which can be achieved by selling business lines or subsidiaries) exhibit a higher probability of post-bankruptcy success.<sup>549</sup> Similarly, consummating a sizeable acquisition in the post-bankruptcy phase also significantly increases the likelihood of post-bankruptcy success which is in line with the turnaround model of Robbins and Pearce (1992). Aimed at realizing long-term profitability and growth in market share, acquisitions are an integral part of the recovery phase.<sup>550</sup> This aligns with the observation of Sudarsanam and Lai (2001) that successful firms focus on investments and acquisitions, whereas unsuccessful firms continue to be preoccupied by operational and financial restructuring.<sup>551</sup>

Both of the control variables included in the final sample exhibit a significant influence on the likelihood of post-bankruptcy success. Pre-filing size is significantly positively related to the likelihood of post-bankruptcy success, which supports the findings of Hotchkiss (1995) and Denis and Rodgers (2007).<sup>552</sup> Accordingly, this seems to agree with the hypothesized relation between size as a proxy for slack resources and the survival chances of a firm in the process of organizational change.<sup>553</sup> Economic distress one year before filing significantly reduces the likelihood of post-bankruptcy success. This lends support to the proposition of Hotchkiss (1995) that the

---

<sup>548</sup> See Hotchkiss and Mooradian (1998), p. 243, who note that bankrupt firms are acquired at a 45% discount relative to non-bankrupt targets in the same industry. Jory and Madura (2009), p. 748 and p. 758, conclude from positive valuation effects of the acquiring firm that the market for bankrupt assets is imperfect and that bankrupt assets are bought at a discount.

<sup>549</sup> See Denis and Rodgers (2007), p. 101.

<sup>550</sup> See Robbins and Pearce (1992), p. 291.

<sup>551</sup> See Sudarsanam and Lai (2001), p. 197.

<sup>552</sup> Hotchkiss (1995), p. 17, finds that larger firms are less likely to exhibit negative operating income after emergence and Denis and Rodgers (2007), p. 116, show that larger firms have significantly higher chances of survival after emergence. In both cases, firm size is measured as the log of total assets one year before filing. I measured size as the natural log of sales one year before filing (F-1).

<sup>553</sup> See generally Hannan and Freeman (1984).

level of economic distress may be negatively related to the post-bankruptcy performance.<sup>554</sup> Finally, this finding seems to support the assumption of a relatively efficient filtering process in Chapter 11 as discussed in chapter 2.1 above.

Excluding the five firms that filed for bankruptcy twice and repeating the logit regression of the final model (I) in Table 18 yields largely similar results, which are not reported.<sup>555</sup> Furthermore, to address potential industry effects that could influence the robustness of my cross-industry findings, I included industry dummy variables in the logistic regression of the final model (I) in Table 18 in unreported analyses.<sup>556</sup> None of the included dummy variables was significant at conventional levels. Accordingly, being part of a specific industry is not significantly related to the probability of post-bankruptcy success.

### 6.2.2 Final Model with Interaction Terms

In the following, three interaction terms are included in the analysis.<sup>557</sup> The first term is included to check whether the increase in sales is caused mainly by organic growth or by external growth through acquisitions. Accordingly, I define a new variable *Sales Increase\*Acquisition* for the bankruptcy phase to control for this effect.<sup>558</sup> The remaining terms refer to personnel reductions (both during Chapter 11 and after emergence) that could be influenced by major divestments. Thus, I define the variable *Personnel Reduction\*Divestment* to control for this in both process stages.

The results of model (I) in Table 19 reveal that inorganic increases in sales during Chapter 11 are significantly negatively related to the probability of post-bankruptcy success. By contrast, increasing the level of sales organically during Chapter 11 shows a significant positive influence on the probability of post-bankruptcy suc-

---

<sup>554</sup> See Hotchkiss (1995), p. 20.

<sup>555</sup> The excluded firms are Anchor Glass Container, Grand Union, Penn Traffic, Thermadyne Holdings and USG. The first filing of these firms is still included for this robustness test. The only coefficient that moves from insignificant to significant at the 10% level is *Sales Increase (in)*.

<sup>556</sup> The dummy variables indicated industry membership on the SIC1 level measured one year before filing (F-1).

<sup>557</sup> This follows the recommendation by Hosmer and Lemeshow (2000), p. 98.

<sup>558</sup> The interaction term is defined for the bankruptcy phase only, since the final model contains the restructuring action *Sales Increase (in)* only.



cess. Taken together, these results emphasize that increasing sales *per se* is not sufficient to bring about post-bankruptcy success. Increased sales levels induced by acquisitions during Chapter 11 appear to be mistimed. One possible reason for this negative relation could be that management is distracted by other, more urgent topics, which could undermine proper integration of the acquired business during Chapter 11. Models (II) and (III) in Table 19 exhibit no significant relation of the interaction terms that involve divestments.

**Table 19: Multivariate Logistic Regression of Post-Bankruptcy Performance – Final Model with Interaction Terms**

Post-bankruptcy success (failure) is defined as free cash flow scaled by sales above or equal to (below) zero in E+3. Restructuring actions are defined as in Table 9 and control variables are defined as in Table 10. \*\*\*, \*\*, \* denote two-tailed significance levels of 1%, 5% and 10%, respectively.

	(I)			(II)			(III)		
	Coef.		p-val.	Coef.		p-val.	Coef.		p-val.
Sales Increase (in)	1.357	*	0.079	0.896		0.202	1.028		0.164
Personnel Reduction (in)	-2.131	***	0.002	-1.853	***	0.005	-1.768	***	0.005
Personnel Reduction (out)	-0.502		0.369	-0.747		0.172	-1.177		0.108
Capex Reduction (in)	-0.832		0.121	-0.742		0.169	-0.764		0.147
Leverage Reduction (out)	1.899	***	0.005	1.643	**	0.012	1.749	***	0.007
Equity Issue (out)	-0.656		0.201	-0.725		0.156	-0.718		0.159
DIP Financing	1.841	***	0.004	1.565	***	0.009	1.647	***	0.007
Top Executive Change (in)	0.939		0.197	0.901		0.206	0.921		0.196
Top Executive Change (out)	1.214	*	0.050	1.221	**	0.043	1.218	**	0.046
Acquisition (out)	1.253	**	0.036	0.930		0.104	0.989	*	0.080
Divestment (out)	1.163	**	0.036	1.279	**	0.020	0.884		0.219
Economic Distress	-1.489	***	0.007	-1.408	**	0.013	-1.403	**	0.010
Size (sales)	0.733	***	0.007	0.551	**	0.031	0.585	**	0.018
Constant	-4.917	***	0.016	-3.642	*	0.063	-3.879	**	0.041
Sales Increase*Acquisition (in)	-4.168	**	0.038						
Personnel Reduction*Divestment (in)				0.315		0.659			
Personnel Reduction*Divestment (out)							0.964		0.389
LR-Chi <sup>2</sup>	66.078	***	0.000	62.309	***	0.000	62.864	***	0.000
Nagelkerke pseudo-R <sup>2</sup>	0.538			0.514			0.518		
McFadden pseudo-R <sup>2</sup>	0.373			0.352			0.355		
Number of Firms	128			128			128		

Source: Author's own illustration.

### 6.2.3 Models by Restructuring Strategies

Table 20 shows the final model for each of the four generic restructuring strategies in isolation. The results remain largely unchanged compared to the final model.

The only notable exception being that a reduction in capital expenditures becomes significant at the 10% level in the operational restructuring model (I). Thus, when only considering operational restructuring, a reduction in capital expenditures during Chapter 11 negatively impacts the post-bankruptcy success probability. While the sign of the coefficient remains unchanged, the relation is no longer significant at conventional levels in the final model. Concerning the explanatory power of each restructuring models alone, all models are significant, judging from their LR- $\chi^2$  statistic. Operational restructuring exhibits the greatest explanatory power in terms of the Nagelkerke pseudo- $R^2$ , followed by portfolio restructuring, financial restructuring and managerial restructuring.<sup>559</sup> While the difference between the last three restructuring strategies is relatively small, operational restructuring is the most important restructuring category in bringing about post-bankruptcy success. Eichner (2010) finds similar results for his distressed sample.<sup>560</sup> Table 30 in the appendix brings all restructuring strategies together step-by-step in a cumulative model that is provided as additional information.

---

<sup>559</sup> Refer to Backhaus et al. (2006), p. 449, for the definition and interpretation of the Nagelkerke pseudo- $R^2$ .

<sup>560</sup> See Eichner (2010), p. 225.

**Table 20: Multivariate Logistic Regression of Post-Bankruptcy Performance by Restructuring Strategies**

Post-bankruptcy success (failure) is defined as free cash flow scaled by sales above or equal to (below) zero in E+3. Restructuring actions are defined as in Table 9 and control variables are defined as in Table 10. \*\*\*, \*\*, \* denote two-tailed significance levels of 1%, 5% and 10%, respectively.

	(I) Operational		(II) Financial		(III) Managerial		(IV) Portfolio		
	Coef.	p-val.	Coef.	p-val.	Coef.	p-val.	Coef.	p-val.	
Sales Increase (in)	0.705	0.246							
Personnel Reduction (in)	-0.839	*	0.071						
Personnel Reduction (out)	-0.264		0.537						
Capex Reduction (in)	-0.783	*	0.078						
Leverage Reduction (out)			0.827	*	0.085				
Equity Issue (out)			-0.558		0.184				
DIP Financing			0.889	**	0.044				
Top Executive Change (in)					0.963	*	0.082		
Top Executive Change (out)					0.844	*	0.073		
Acquisition (out)							0.736	*	
Divestment (out)							0.960	**	
Economic Distress	-1.369	***	0.001	-1.222	***	0.004	-1.171	***	0.004
Size (sales)	0.579	***	0.003	0.494	***	0.009	0.540	***	0.002
Constant	-1.830		0.186	-3.035	**	0.024	-3.416	***	0.008
LR-Chi <sup>2</sup>	33.486	***	0.000	29.465	***	0.000	25.876	***	0.000
Nagelkerke pseudo-R <sup>2</sup>	0.307			0.274			0.244		0.277
McFadden pseudo-R <sup>2</sup>	0.189			0.166			0.146		0.168
Number of Firms	128			128			128		128

Source: Author's own illustration, influenced by Eichner (2010), p. 225.

#### 6.2.4 Effect of Discrete Changes

To provide further insights, I report the effect of discrete changes on the probability of post-bankruptcy success. This can be viewed as a sensitivity analysis. While a sensitivity analysis for an ordinary least squares regression model is straightforward, it becomes less clear-cut when using a binary dependent variable such as in the logistic model. This is due to the nonlinearity of the logistic distribution.<sup>561</sup> Following the recommendation of Long and Freese (2001), I examine discrete changes rather than marginal changes, as this better fits the nonlinear nature of the logistic model.<sup>562</sup> A discrete change is defined as the change in the predicted probability of post-bankruptcy success induced by a given finite change in any one independent variable.<sup>563</sup> This change is

<sup>561</sup> See Hoetker (2007), p. 334.

<sup>562</sup> See Long and Freese (2001), p. 129.

<sup>563</sup> See Long and Freese (2001), pp. 129-130.

dependent on (i) the initial level of the independent variable to be changed, (ii) the amount of change in the independent variable, and (iii) the values of all remaining independent variables, which are held constant at specified values.<sup>564</sup> Typically, all other independent variables are set to their mean. However, since most of my independent variables are defined as binary variables, the mean values lack any intuitive meaning. Consequently, I rely on Hoetker (2007) and define several models based on the final model in Table 18 with varying values for the independent variables that can be deemed “*theoretically interesting and empirically relevant*”<sup>565</sup>.

In total, I define five different models, all of which build on the different restructuring strategies put forward by Hofer (1980).<sup>566</sup> He defines four operating turnaround strategies comprising revenue-generating, cost-cutting, asset reduction and combination strategies and one strategic turnaround strategy.<sup>567</sup> I broadly follow the distinctions made by Hofer (1980) in defining the different models, setting the independent variables to one (marked with an ‘x’ in Table 21) or to zero (not marked). The values shown in Table 21 signify the change in the predicted probability of post-bankruptcy success when the respective binary (continuous) independent variable is changed from zero to one (from its minimum to its maximum). The only continuous independent variable in the models is the size of the companies which is initially set to the sample median. Changes in size are induced by changing the size of the company from the minimum to the maximum size, which illustrates the total scope of the influence of firm size.

---

<sup>564</sup> See Long and Freese (2001), p. 130.

<sup>565</sup> Hoetker (2007), p. 335.

<sup>566</sup> See Hofer (1980), pp. 26-29.

<sup>567</sup> See Hofer (1980), p. 20.

**Table 21: Effects of Discrete Changes on Predicted Success Probabilities**

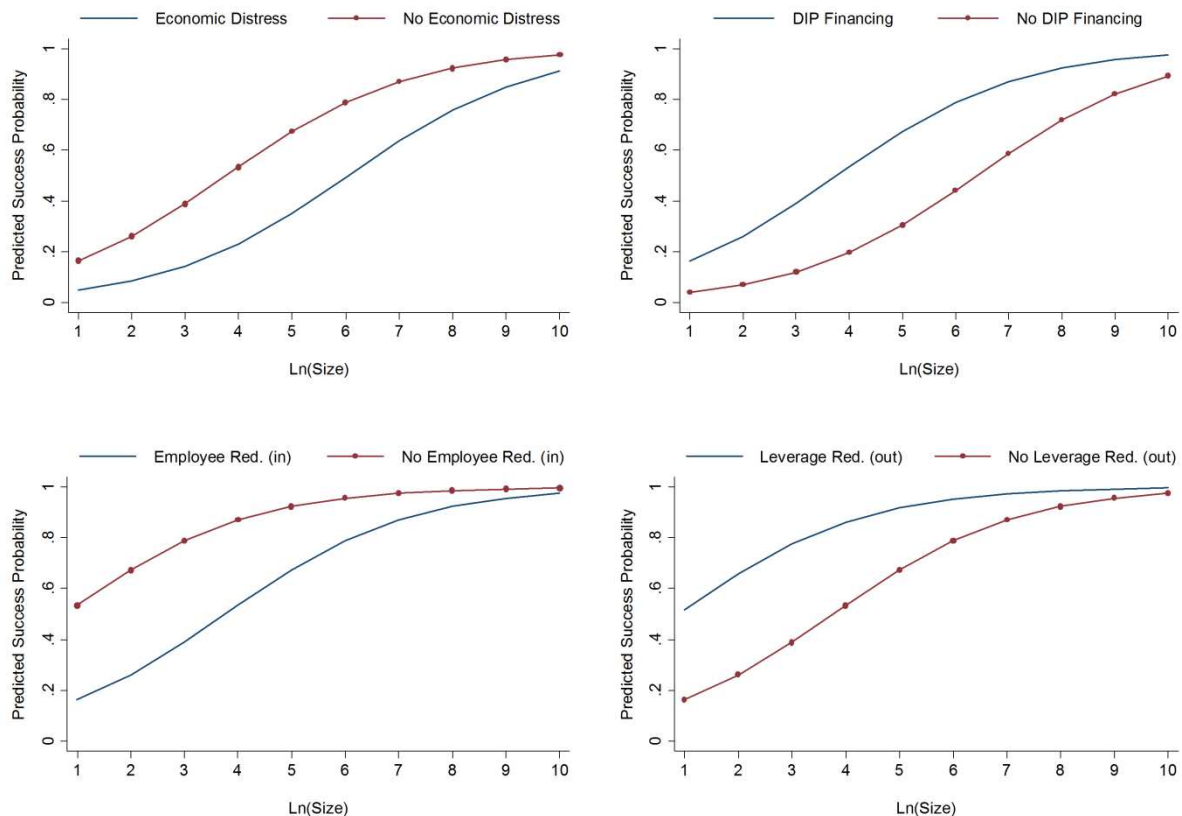
All models are based on the final model (I) shown in Table 18. The five turnaround strategies broadly refer to the categories described by Hofer (1980). For all variables except for Size (sales), the discrete changes in the predicted probability of post-bankruptcy success are reported that result from moving that variable from 0 to 1 and holding all other variables constant at either 1 (marked by 'x' in the left column) or 0 (no mark in the left column). For Size (sales), I report the change in the predicted probability of post-bankruptcy success, which results from moving from the minimum to the maximum size in the sample while holding all other variables constant as described above. Size (sales) is initially set to the sample median size measured as  $\ln(\text{sales})$  in F-1. The effects of the discrete changes are calculated using the `-prchange-` command in Stata written by J. Scott Long and Jeremy Freese and described in Long and Freese (2001), pp. 127-132.

	(I)	(II)	(III)	(IV)	(V)
	Revenue Growth	Cost Cutting	Asset Reduction	Combination	Strategic Turnaround
Sales Increase (in)	x 0.027	0.197	0.021	x 0.154	0.008
Personnel Reduction (in)	-0.088	x -0.331	-0.147	x -0.130	-0.059
Personnel Reduction (out)	-0.023	-0.189	-0.040	-0.133	-0.015
Capex Reduction (in)	-0.024	x -0.183	x -0.020	x -0.082	-0.016
Leverage Reduction (out)	0.017	0.324	0.030	0.128	0.011
Equity Issue (out)	x -0.010	-0.175	-0.036	x -0.076	x -0.007
DIP Financing	x 0.069	x 0.341	x 0.117	x 0.314	x 0.046
Top Executive Change (in)	0.012	0.206	0.022	0.090	0.008
Top Executive Change (out)	x 0.046	x 0.284	x 0.079	x 0.234	x 0.030
Acquisition (out)	x 0.032	0.217	0.023	0.094	x 0.021
Divestment (out)	0.015	0.274	x 0.089	x 0.257	x 0.034
Economic Distress	-0.054	-0.306	-0.092	-0.263	-0.035
Size (sales)	0.464	0.853	0.612	0.860	0.357
Predicted Probability of Success Pr(y = 1 X)	0.980	0.543	0.963	0.838	0.987

Source: Author's own illustration.

### Figure 10: Sensitivity Graphs of Predicted Success Probabilities

The graph shows sensitivity graphs of the predicted post-bankruptcy success probabilities as a function of firm size, measured as  $\ln(\text{sales})$  in F-1 for four different independent variables: economic Distress, DIP Financing, Employee Reduction (in) and Leverage Reduction (out). The different probabilities are calculated based on the combination model (IV) in Table 21. Accordingly, while size and the specified independent variable are set to different values, all other independent variables from the final model in Table 18 remain at their values as defined in the combination model (IV). The effects of the discrete changes are calculated using the `-prvalue-` and `-praccum-` commands in Stata written by J. Scott Long and Jeremy Freese and described in Long and Freese (2001), pp. 91-96 and pp. 278-281.



Source: Author's own illustration, influenced by Long and Freese (2001), pp. 125-127.

The results reveal that a restructuring strategy that focuses exclusively on retrenchment and cost cutting does not yield a high predicted probability of post-bankruptcy success.<sup>568</sup> Instead, the other restructuring strategies presented show much higher predicted probabilities of post-bankruptcy success. This could indicate that restructuring strategies should be balanced between retrenchment and growth-oriented restructuring actions. Furthermore, it is worth mentioning that the pre-filing size of the

<sup>568</sup> It should be emphasized that the predicted probabilities of success are determined by the model. Accordingly, the model predicts that the restructuring strategy *revenue growth* will yield a success probability of 98%. In this case, this would have been classified as a clear-cut success, since the cutoff value in the logistic model separating successes and failures is 0.5. The relatively high level of the success probability should be put into perspective relative to the 'real' success probability, which is unobserved and that will arguably be lower.

company can have a significant positive impact on the probability of post-bankruptcy success. This large impact is also shown in Figure 10, where the predicted probability of post-bankruptcy success is plotted against the pre-filing size of the company for different values of selected independent variables.

### 6.3 Robustness of Findings and Regression Diagnostics

#### 6.3.1 Test for Sample Selection Bias

As discussed and motivated in chapter 5.1.2 above, the results of the multivariate analysis need to be tested for any sample selection bias. This can be done by employing a two-stage probit model with sample selection as suggested by Wooldridge (2010).<sup>569</sup> In the first stage, the selection process is modeled for the initial sample of 457 firms with sufficient data. In the second stage, I include the inverse Mills ratio derived from the first stage in the final model, which is presented in more detail in this chapter.

The selection process, i.e. whether a firm emerges from Chapter 11, is modeled in line with prior research. Selection is modeled in two ways, as shown in Table 23 below. In model (I), selection refers to emergence from Chapter 11 whereas in model (II) selection refers to emerging as a public firm. Factors potentially influencing survival in Chapter 11 are described in Table 22 below. Since selection must be driven by an instrumental variable that is correlated with the selection and uncorrelated with post-bankruptcy performance, I present three potential instruments. First, filing in the bankruptcy court of the Southern District of New York (SDNY) can be viewed as an instrument in the selection process. As described in Hotchkiss (1995), the SDNY is known for its tendency to be pro-debtor in bankruptcy proceedings.<sup>570</sup> This could arguably lead to a higher relative number of firms emerging as reorganized going con-

---

<sup>569</sup> See Wooldridge (2010), p. 814.

<sup>570</sup> See Hotchkiss (1995), p. 19. This has been documented by Weiss and Wruck (1998), LoPucki and Whitford (1991) and Weiss (1990). More recently, Bharath, Panchapagesan, and Werner (2010) used a SDNY dummy variable to control for any effects of the filing in the presumably pro-debtor district of SDNY. Apart from the SDNY, Delaware too had been known to tend to being pro-debtor. However, this has lately been called into question by Lubben (2008).

cerns not related to post-bankruptcy performance. The selection model (I) in Table 23 below lends support to this view, since filing in the SDNY is significantly positively related to the probability of emerging from Chapter 11. In unreported results, the two other potential instruments, forum shopping and involuntary filing, do not exhibit any significant relationship with emergence and are consequently discarded.<sup>571</sup>

**Table 22: Definition of Factors Potentially Influencing Survival in Chapter 11**

Factor	Definition
SDNY	Filing took place in the bankruptcy court of the Southern District of New York, which is susceptible of being pro-debtor. The district filed is taken from the UCLA-LoPucki BRD
Forum Shopping	Filing intentionally moved to a bankruptcy court away from the debtor's headquarters as mentioned in the UCLA-LoPucki BRD
Involuntary Filing	Filing was initiated by the creditors as mentioned in the UCLA-LoPucki BRD
Prepack	Mentioning that the bankruptcy filing was a prepack in the UCLA-LoPucki BRD
DIP Financing	Mentioning of the provision of debtor-in-possession financing during Chapter 11. Use of collateral as a means of financing is not treated as DIP financing
ROA	Return on assets in F-1 measured as (operating income/total assets)
Median Industry ROA	Industry median return on assets in F-1 for all firms within the same SIC group
Leverage Ratio	Leverage ratio in F-1 measured as (total liabilities/total assets)
Size (assets)	Firm size in F-1 measured as ln(total assets)

Source: Author's own illustration.

Apart from the exclusion restriction, several other variables are included in the selection equation that are inclined to have an influence on post-bankruptcy performance. In accordance with Denis and Rodgers (2007), size measured as the natural logarithm of total assets one year before filing is included.<sup>572</sup> This has been found to be positively related to the probability of emerging as a reorganized entity. The same applies to the leverage ratio and the return on assets one year before filing.<sup>573</sup> The median industry return on assets is also included to account for any industry effects one year before filing as suggested by Denis and Rodgers (2007).<sup>574</sup> However, since the median

<sup>571</sup> See Table 22 for a detailed definition of forum shopping and involuntary filing. Of the final sample firms only five bankruptcy filings were officially initiated by creditors, i.e. involuntary filings. This low number might explain why the variable did not show any significant relationship with emergence.

<sup>572</sup> See Denis and Rodgers (2007), p. 112.

<sup>573</sup> See Denis and Rodgers (2007), p. 109.

<sup>574</sup> See Denis and Rodgers (2007), p. 112.



industry return on assets does not show any significant relationship to the probability of emerging in unreported results, it is discarded from further analysis to ensure a parsimonious model. Finally, I include two dummy variables in the selection model indicating whether a firm received DIP financing or whether the filing was prepackaged. Dahiya et al. (2003) find DIP-financed firms to be more likely to emerge from Chapter 11.<sup>575</sup> Since prepackaged bankruptcies are already voted upon by the creditors, it can be assumed that these firms are more likely to emerge from Chapter 11 as reorganized entities. This assumption is corroborated by the findings of Tashjian, Lease, and McConnell (1996), since all of their sample prepacks emerged from Chapter 11.<sup>576</sup>

**Table 23: Determinants of Emergence in Chapter 11 – First Stage Probit Model with Sample Selection**

In model (I), the dependent variable equals one if the firm emerged from Chapter 11. In model (II), the dependent variable equals one if the firm emerged public from Chapter 11. The independent variables are defined as in Table 22. \*\*\*, \*\*, \* denote two-tailed significance levels of 1%, 5% and 10%, respectively.

	(I)			(II)		
	Emerged			Emerged Public		
	Coefficient		p-value	Coefficient		p-value
SDNY	0.369	**	0.048	0.184		0.270
Prepack	1.264	***	0.000	0.823	***	0.000
DIP Financing	0.429	***	0.002	0.005		0.971
ROA	1.348	***	0.004	1.180	***	0.007
Leverage Ratio	0.695	***	0.000	0.163		0.158
Size (assets)	0.089		0.149	0.149	**	0.010
Constant	-1.396	***	0.002	-1.638	***	0.000
LR-Chi <sup>2</sup>	75.796	***	0.000	34.935	***	0.000
Nagelkerke pseudo-R <sup>2</sup>	0.210			0.100		
McFadden pseudo-R <sup>2</sup>	0.128			0.057		
Number of Firms	457			457		

Source: Author's own illustration.

Focusing on model (I), the results show that all variables except size exhibit a significant relationship with the probability of emerging. The LR-Chi<sup>2</sup> test shows that at least one of the regression coefficients is not equal to zero and, accordingly, that the model performs better than the intercept-only model. Both pseudo-R<sup>2</sup> figures indicate

<sup>575</sup> See Dahiya et al. (2003), p. 259, who argue that DIP financing can help firms to invest in positive net present value projects facilitating emergence from Chapter 11.

<sup>576</sup> See Tashjian, Lease, and McConnell (1996), p. 140.

that the model (I) performs better compared to model (II). The selection process in Chapter 11 seems to be less ambiguous compared to the selection process of emerging public. This seems plausible since not emerging as a public firm (i.e. being merged or going private) may be motivated by a variety of reasons not necessarily linked to firm performance.<sup>577</sup> Conversely, the reasons for not emerging at all from Chapter 11 are most likely linked to firm performance.<sup>578</sup>

**Table 24: Multivariate Analysis of Post-Bankruptcy Performance – Second Stage Probit Model with Sample Selection**

In model (I), post-bankruptcy success (failure) is defined as free cash flow scaled by sales above or equal to (below) zero in E+3. In model (II), the performance metric is adjusted by the respective industry median. Restructuring actions are defined as in Table 9 and control variables are defined as in Table 10. The inverse Mills ratio is calculated from the residuals of the regressions shown in Table 23. \*\*\*, \*\*, \* denote two-tailed significance levels of 1%, 5% and 10%, respectively.

	(I)		(II)	
	Free Cash Flow/Sales		Ind.-adj. Free Cash Flow/Sales	
	Coefficient	p-value	Coefficient	p-value
Sales Increase (in)	0.510	0.200	0.227	0.522
Personnel Reduction (in)	-1.005 ***	0.004	-0.460	0.117
Personnel Reduction (out)	-0.496	0.116	-0.162	0.578
Capex Reduction (in)	-0.441	0.141	-0.334	0.236
Leverage Reduction (out)	0.984 ***	0.008	0.397	0.225
Equity Issue (out)	-0.425	0.152	0.328	0.236
DIP Financing	0.848 **	0.011	-0.059	0.846
Top Executive Change (in)	0.540	0.189	0.425	0.256
Top Executive Change (out)	0.685 **	0.043	0.566 *	0.076
Acquisition (out)	0.553 *	0.086	0.389	0.164
Divestment (out)	0.778 **	0.013	0.415	0.137
Economic Distress	-0.770 **	0.012	-0.813 ***	0.003
Size (sales)	0.337 **	0.017	0.239 *	0.050
Inverse Mills Ratio	0.033	0.956	-0.242	0.632
Constant	-2.211 **	0.048	-1.666 *	0.095
LR-Chi <sup>2</sup>	61.991 ***	0.000	35.881 ***	0.001
Nagelkerke pseudo-R <sup>2</sup>	0.512		0.333	
McFadden pseudo-R <sup>2</sup>	0.350		0.212	
Number of Firms	128		128	

Source: Author's own illustration.

<sup>577</sup> The decision to stay public or go private may, for instance, be related to the type of the buyer of the bankrupt firm. One example would be a leveraged buyout by a private equity fund. Private equity funds typically prefer taking their target firm private. See Guo, Hotchkiss, and Song (2011), for example. The motives for going private have been found to be related to sources of gains for the stockholders, such as tax savings, redistribution from debtholders or the reduction of agency costs associated with free cash flow, as shown by Lehn and Poulsen (1989).

<sup>578</sup> This becomes clear when one recalls that the ultimate test of whether a firm should survive and emerge from Chapter 11 compares the liquidation value and the going-concern value of the firm. The going-concern value represents its discounted expected future cash flows.

In the second stage, the inverse Mills ratio, as defined in chapter 5.1.2 above, is included in the outcome equation to test for any sample selection bias. Under the assumption that the exclusion restriction holds, the null hypothesis of no sample selection bias cannot be rejected, since the coefficient of the inverse Mills ratio is insignificant at conventional significance levels.<sup>579</sup> Accordingly, sample selection bias does not seem to be an issue for my analysis.

### 6.3.2 Test for Endogeneity Bias

Another issue that needs to be addressed concerns the exogeneity assumption for all independent variables. An independent variable is exogenous if it is uncorrelated with the error term.<sup>580</sup> If this assumption does not hold, the parameter estimate will be biased and inconsistent.<sup>581</sup> This is, for instance, the case when the dependent variable and an independent variable are determined simultaneously and interdependently, i.e. where the dependent variable influences the allegedly exogenous independent variable.<sup>582</sup> To test for any endogeneity bias among the independent variables, I use the two-stage Rivers-Vuong test suggested by Rivers and Vuong (1988).<sup>583</sup> This test is, for instance, employed by Kahl (2001) to test the exogeneity of the Chapter 11 dummy variable in his survival analysis of financially distressed firms.<sup>584</sup> The test is performed for all independent variables in the final model shown in Table 18 for which it cannot be ruled out that these are endogenous. Accordingly, I scrutinize all independent variables from the post-bankruptcy phase which are measured from E through E+2. The independent variables in the bankruptcy phase measured from F-1 through E and the control variables measured in F-1 can be considered exogenous, as they are

---

<sup>579</sup> This follows Wooldridge (2010), p. 814.

<sup>580</sup> See Hayashi (2000), p. 187.

<sup>581</sup> See Hayashi (2000), p. 188.

<sup>582</sup> See Proppe (2009), p. 255. Other reasons for endogeneity include omitting important independent variables and errors in measuring independent variables.

<sup>583</sup> Wooldridge (2010), pp. 586-587, recommends using the Rivers-Vuong test as an exogeneity test for binary (probit) dependent variable models. The Rivers-Vuong test is similar to the Durbin-Wu-Hausman test as described in Davidson and MacKinnon (1993), pp. 237-242, and employed by e.g. Eichner (2010), p. 173, Jostarndt and Sautner (2010), p. 29, and Jostarndt (2007), p. 102.

<sup>584</sup> See Kahl (2001), pp. 22-25.

measured at least three years before the dependent variable is measured in E+3.<sup>585</sup> To comply with the assumptions of the Rivers-Vuong test, I perform two probit regressions instead of two logistic regressions.<sup>586</sup>

In the first stage, I regress each suspicious independent variable on all other exogenous independent variables, control variables and appropriate instrumental variables. In the second stage, the residuals of the first stage regressions are included in the original regression to test for any endogeneity bias. Finally, a likelihood ratio test is performed to test the null hypothesis that the residuals from the first stage are jointly equal to zero. Accordingly, the final model with the residuals included is compared to the final model without the residuals.<sup>587</sup> If the null hypothesis can be rejected at conventional significance levels, this indicates that there is at least one endogenous independent variable. In total, six independent variables are tested for an endogeneity bias. For each of the tested independent variables, I need to employ suitable instruments which are required to be exogenous.<sup>588</sup> Due to the longitudinal design of my data, I can use restructuring actions from the bankruptcy phase as instruments for the relevant post-bankruptcy actions, since they can be considered exogenous due to the long time lag until E+3.<sup>589</sup> A similar rationale is applied by Jostarndt and Sautner (2010).<sup>590</sup> I instrument *Top Executive Change (out)* by *Duration*, i.e. the time spent in Chapter 11, since I cannot use *Top Executive Change (in)* as an instrument. This is due to the operationalization of the variable since *Top Executive Change (out)* will always be zero if *Top Executive Change (in)* is equal to one. The rationale for choosing *Duration* as an instrument for *Top Executive Change (out)* is that creditors favor a faster resolution of bankruptcy, all else equal, and, accordingly, the longer Chapter 11 takes the more likely a change in the top executive may become due to the dissatisfaction of creditors.<sup>591</sup>

---

<sup>585</sup> This is in line with Eichner (2010), p. 173, and Jostarndt (2007), p. 102.

<sup>586</sup> See Wooldridge (2010), pp. 586-587.

<sup>587</sup> For the sake of completeness, it should be noted that these two regression models are nested models and that they both refer to the same sample, as required by Long and Freese (2001), pp. 79-80.

<sup>588</sup> See Wooldridge (2010), p. 587.

<sup>589</sup> This follows Maddala (1992), p. 357.

<sup>590</sup> See Jostarndt and Sautner (2010), p. 29, and also Jostarndt (2007), p. 102.

<sup>591</sup> See Skeel (2003), p. 928.

For both portfolio restructuring actions *Acquisition (out)* and *Divestment (out)*, I instrument both variables from the bankruptcy phase, *Acquisition (in)* and *Divestment (in)*. Finally, I use *Leverage Reduction (in)* and *DIP Financing* as instruments for *Leverage Reduction (out)*. *DIP Financing* can be interpreted as a proxy for the presence of creditor control.<sup>592</sup> If creditor control prevails, a reduction in the leverage ratio might be less likely. This is in line with the dynamic liquidation theory of Kahl (2002). The results are shown in Table 25 and Table 26 below. The likelihood ratio chi-squared statistic of 5.57 with a p-value of 0.473 testing that all coefficients of the residuals are jointly equal to zero indicates that there is insufficient evidence to reject the null hypothesis of exogeneity. Accordingly, I conclude that there is no endogeneity bias in my analysis.

**Table 25: Two-Stage Rivers-Vuong Probit Regressions (Part I)**

The potentially endogenous independent variables are regressed on all other exogenous independent variables and control variables in models (I) through (IV). \*\*\*, \*\*, \* denote two-tailed significance levels of 1%, 5% and 10%, respectively.

	(I) Personnel Reduction (out)		(II) Leverage Reduction (out)		(III) Equity Issue (out)		(IV) Top Executive Change (out)	
	Coef.	P-value	Coef.	P-value	Coef.	P-value	Coef.	P-value
Leverage Reduction (in)			-0.226	0.435				
Equity Issue (in)					-0.955	0.102		
Duration							-0.036	*** 0.002
Sales Increase (in)	0.476	0.133	-0.567	0.176	0.055	0.859	0.610	* 0.063
Personnel Reduction (in)	0.720	*** 0.008	0.544	* 0.074	-0.145	0.563	0.305	0.240
Capex Reduction (in)	0.032	0.898	-0.501	* 0.071	-0.083	0.740	0.133	0.598
DIP Financing	-0.410	0.121	-0.620	** 0.035	-0.042	0.873	-0.088	0.736
Top Executive Change (in)	-0.061	0.827	0.259	0.389	-0.018	0.950		
Economic Distress	0.075	0.757	-0.073	0.783	-0.365	0.129	-0.187	0.437
Size (sales)	-0.071	0.468	-0.127	0.234	-0.090	0.345	-0.014	0.888
Constant	-0.148	0.834	0.684	0.373	0.718	0.295	0.275	0.692
LR-Chi <sup>2</sup>	11.787	0.108	15.948	** 0.043	6.302	0.613	16.768	** 0.019
Nagelkerke pseudo-R <sup>2</sup>	0.119		0.175		0.065		0.164	
McFadden pseudo-R <sup>2</sup>	0.069		0.113		0.037		0.095	
Number of Firms	128		128		128		128	

Source: Author's own illustration, influenced by Jostarndt and Sautner (2010), pp. 30-31.

<sup>592</sup> See Lemmon, Ma, and Tashjian (2009), pp. 9-10.

**Table 26: Two-Stage Rivers-Vuong Probit Regressions (Part II)**

The potentially endogenous independent variables are regressed on all other exogenous independent variables and control variables in models (V) and (VI). Model (VII) represents the final model with the residuals from regressions (I) through (VI) added as independent variables. The residuals are marked by (res). \*\*\*, \*\*, \* denote two-tailed significance levels of 1%, 5% and 10%, respectively.

	(V)		(VI)		(VII)	
	Acquisition (out)		Divestment (out)		Final Model (res)	
	Coef.	p-value	Coef.	p-value	Coef.	p-value
Acquisition (in)	1.160 *	0.060	-0.203	0.694		
Divestment (in)	0.200	0.555	0.527 *	0.093		
Sales Increase (in)	0.583 *	0.073	0.310	0.329	1.629 *	0.079
Personnel Reduction (in)	-0.098	0.726	-0.177	0.509	1.466	0.228
Personnel Reduction (out)					-9.811 **	0.045
Capex Reduction (in)	0.419	0.135	-0.007	0.979	-0.814	0.119
Leverage Reduction (out)					-2.216	0.452
Equity Issue (out)					0.134	0.962
DIP Financing	-0.101	0.716	-0.132	0.627	-0.864	0.314
Top Executive Change (in)	0.023	0.941	0.288	0.316	0.664	0.216
Top Executive Change (out)					1.447	0.232
Acquisition (out)					0.253	0.854
Divestment (out)					0.775	0.667
Personnel Reduction (res)					4.263 *	0.057
Leverage Reduction (res)					1.379	0.251
Equity Issue (res)					-0.240	0.857
Top Executive Change (res)					-0.347	0.541
Acquisition (res)					0.173	0.766
Divestment (res)					0.051	0.950
Economic Distress	-0.756 ***	0.003	-0.435 *	0.078	-0.548	0.371
Size (sales)	0.085	0.447	0.085	0.430	0.081	0.749
Constant	-0.974	0.219	-0.719	0.339	2.922	0.407
LR-Chi <sup>2</sup>	21.038 **	0.013	10.283	0.328	67.562 ***	0.000
LR-Chi <sup>2</sup> (model w/ residuals vs. model w/o residuals)					5.570	0.473
Nagelkerke pseudo-R <sup>2</sup>	0.211		0.106		0.547	
McFadden pseudo-R <sup>2</sup>	0.130		0.062		0.381	
Number of Firms	128		128		128	

Source: Author's own illustration, influenced by Jostarndt and Sautner (2010), pp. 30-31.

### 6.3.3 Collinearity among Independent Variables

Collinearity refers to correlation between independent variables. As Menard (2001) points out with regard to logistic regression models, the higher the collinearity the higher the standard errors for the coefficients will be.<sup>593</sup> As a reference point, Menard (2001) names an R<sup>2</sup> of 0.8 above which collinearity may pose serious prob-

<sup>593</sup> See Menard (2001), p. 76.

lems.<sup>594</sup> One widely used indicator of the level of collinearity is the variance inflation indicator (VIF).<sup>595</sup> The higher the VIF, the higher the collinearity and the higher the standard errors of the coefficients will be. According to Menard (2001), the critical value for the VIF is five.<sup>596</sup>

### Table 27: Collinearity Diagnostics

The table shows the variance inflation factors and the  $R^2$  for all independent variables of the final model (I). The  $R^2$  values refer to a model in which one of the independent variables is regressed on all other independent variables.

	Variance Inflation Factor (VIF)	$R^2$
Sales Increase (in)	1.17	0.1470
Personnel Reduction (in)	1.22	0.1803
Personnel Reduction (out)	1.28	0.2201
Capex Reduction (in)	1.08	0.0751
Leverage Reduction (out)	1.14	0.1212
Equity Issue (out)	1.16	0.1378
DIP Financing	1.24	0.1959
Top Executive Change (in)	1.51	0.3385
Top Executive Change (out)	1.49	0.3298
Acquisition (out)	1.18	0.1507
Divestment (out)	1.18	0.1493
Economic Distress	1.17	0.1439
Size (sales)	1.22	0.1830
Mean Variance Inflation Factor	1.23	
Number of Firms	128	

Source: Author's own illustration.

Table 27 above reports the collinearity diagnostics for all independent variables used in the final model (I) shown in Table 18. The values of the variance inflation factors below two and the  $R^2$  values below 0.35 indicate no serious cause for concern about collinearity among the chosen independent variables. For the sake of completeness, I report the correlation matrix of the independent variables in the final model in the appendix in Table 31. None of the correlation coefficients shows a value above |0.6|, while only one, namely *Top Executive Change (out)*, shows a correlation coefficient of -0.53 with *Top Executive Change (in)*. This is caused by the construction of the variable, as I am interested in the initial change in the top executive only. As a re-

<sup>594</sup> See Menard (2001), p. 76.  $R^2$  refers to a model in which one of the independent variables is regressed on all other independent variables. Backhaus et al. (2006), p. 91, state that an  $R^2$  close to one indicates high collinearity.

<sup>595</sup> See Backhaus et al. (2006), p. 91.

<sup>596</sup> See Menard (2001), p. 76, who refers to the critical value of the tolerance statistic, which is the inverse of the variance inflation factor.

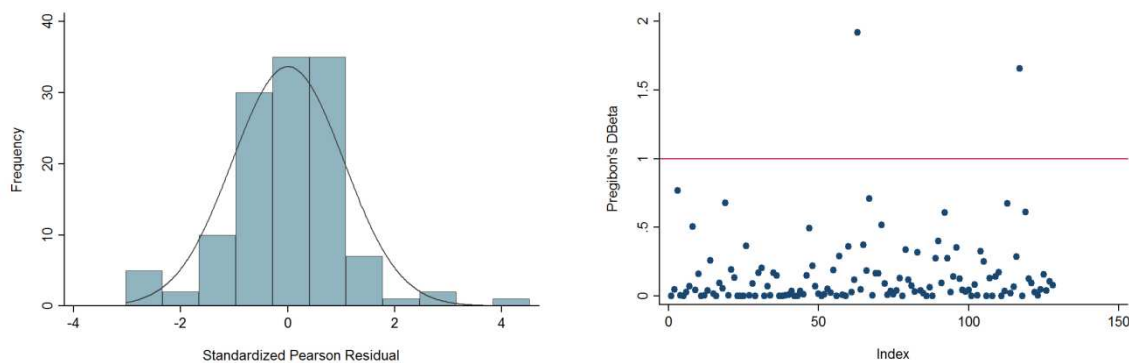
sult, if a firm changes its CEO during Chapter 11, the variable *Top Executive Change (out)* will always be zero.

### 6.3.4 Normality of Residuals and Influential Cases

Following the recommendation in Menard (2001), I conduct a thorough analysis of residuals with regard to the normality of residuals and potentially influential cases.<sup>597</sup> To test the normality of residuals, I calculate the standardized Pearson residuals and plot their frequency in a histogram in comparison to the normal distribution shown in Figure 11 below.<sup>598</sup> Accordingly, I conclude that the residuals are approximately normally distributed, although a few cases are above +2 or below -2.<sup>599</sup>

#### Figure 11: Distribution of Residuals and Influential Cases

The figure shows the frequency distribution of the standardized Pearson residuals plotted against a normal distribution (at left) and an index plot of Pregibon's Delta-Beta (at right) for the final sample of 128 firms.



Source: Author's own illustration.

However, more important than the normality of residuals are potentially influential cases.<sup>600</sup> Influential cases and the impact on the regression coefficients if these influential cases are omitted can be tested using Pregibon's Delta-Beta (DBeta).<sup>601</sup> The

<sup>597</sup> See Menard (2001) for a detailed account of logistic regression diagnostics, especially on pp. 80-89. Influential cases are outliers (cases with large residuals) that have a relatively large effect on the estimated parameters.

<sup>598</sup> The standardized Pearson residuals are calculated in accordance with Menard (2001), p. 82.

<sup>599</sup> The critical value above +2 and below -2 is derived from the normal distribution where approximately 95% of cases should fall between the range of +2 to -2. Compare to Menard (2001), p. 82.

<sup>600</sup> See Long and Freese (2001), pp. 116-117.

<sup>601</sup> See Menard (2001), pp. 84-85, and more generally Pregibon (1981).



right-hand side scatter plot in Figure 11 shows two potentially influential cases that have values above one for Pregibon's Delta-Beta.<sup>602</sup> In an unreported analysis, I excluded these two potentially influential cases from the final model. The results did not materially change, however, whereas the pseudo-R<sup>2</sup> values were inflated. Consequently, I conclude that the final model including the two outliers fits the observed data sufficiently well and is not compromised by non-normality in residuals or influential outliers.

### 6.3.5 Robustness of Cutoff Levels of Independent Variables

As shown in chapter 4.2.2, some of the independent variables are dichotomized using specific cutoff levels or thresholds in line with prior literature. In the final model (I), I employ a cutoff level of 10% to capture only substantial changes in sales growth, cost reduction, changes in the number of employees, changes to capital expenditures and reductions in leverage. Despite the endorsement of prior contributions, the cutoff level of 10% might nevertheless appear somewhat arbitrary. To address this potential issue, I test the robustness of the regression results of the final model (I) by using thresholds of 15% and 20% to separate significant changes from less significant changes.<sup>603</sup> This robustness test is supported by Atanassov and Kim (2009) and Eichner (2010).<sup>604</sup>

I find similar results for sales growth, the reduction in the number of employees after emerging and the reduction of leverage after emergence. This supports the robustness of my prior results. The picture changes somewhat in relation to reducing the number of employees in Chapter 11 and reducing capital expenditures during Chapter 11. While the sign of the coefficient remains unchanged for both variables irrespective of the cutoff level, *Capex Reduction (in)* shows a significantly negative influence on the success probability at the 5% significance level once the threshold is set to 15%

<sup>602</sup> Menard (2001), p. 91, recommends that cases with values above one for Pregibon's Delta-Beta should be critically examined.

<sup>603</sup> I change the cutoff level for one of the respective independent variables, while all other cutoff levels are kept constant at 10% as in the final model (I).

<sup>604</sup> See Atanassov and Kim (2009), pp. 353-354, and Eichner (2010), p. 136. While Atanassov and Kim (2009) make the level of the alternative thresholds transparent, Eichner (2010) remains vague.

or 20%.<sup>605</sup> This allows for a differentiated interpretation of the impact of reductions in capital expenditures, since larger reductions during Chapter 11 show a significantly negative impact on the probability of success. Firms that need to substantially cut their capital expenditures during Chapter 11 despite the liquidity-saving automatic stay and the possibility of DIP financing may face more severe problems. The notion that failed firms reduce their capital expenditures significantly more often than successful firms do is consistent with risk-shifting as modeled by Gertner and Scharfstein (1991). In this case, creditors shift the risk to shareholders and management. Accordingly, the firm underinvests, which could lead to two differing interpretations. First, negative net present value projects are avoided, and second, the future cash flow potential of the firm is undermined. Underinvestment by unsuccessful firms may be a result of the recent shift in bankruptcy practice toward a more creditor-friendly stance as argued by authors such as Skeel (2003), Baird and Rasmussen (2003), Adler, Capkun, and Weiss (2006) and Bharath, Panchapagesan, and Werner (2010). Once the cutoff level for *Personnel Reduction (in)* changes from 10% to 15% or 20%, the coefficient is no longer significantly related to the success probability.<sup>606</sup> Although the negative sign remains, the influence of substantially reducing personnel during Chapter 11 can no longer be deemed robust. This could be related to the relative size of the layoffs. However, a closer analysis of this aspect is left for future research.

---

<sup>605</sup> Eichner (2010), p. 138, even employs a cutoff level of 25% for changes in capital expenditures.

<sup>606</sup> A cutoff level of 20% is consistent with Atanassov and Kim (2009), p. 353.

## 7 Conclusions

### 7.1 Main Findings and Concluding Remarks

The current study examines restructuring strategies and the post-bankruptcy performance of a sample of large public U.S. firms that filed for bankruptcy between 1993 and 2005. In a multivariate logistic model, post-bankruptcy success is regressed on selected restructuring actions taken in either the bankruptcy phase or the post-bankruptcy phase. The study contributes to existing post-bankruptcy performance literature in three ways. First, this is the first post-bankruptcy performance study to explicitly take account of the process aspect of the bankruptcy and the post-bankruptcy phase. This seems important, given that both phases are very different in terms of the institutional framework. Moreover, doing so allows the restructuring actions to be analyzed in a much more differentiated manner compared to prior studies. Second, building on the framework put forward by Lai and Sudarsanam (1997), the scope of the analyzed restructuring strategies has been extended compared to prior contributions. This provides for a comprehensive analysis of restructuring and its impact on post-bankruptcy performance. Third, the current study extends post-bankruptcy performance literature by explicitly taking into account a potential sample selection bias that most prior studies have ignored.<sup>607</sup> Using a two-stage probit model with sample selection, I cannot reject the null hypothesis of no sample selection bias. Furthermore, several tests support the general robustness of my findings. Using the two-stage Rivers-Vuong test, I explicitly test for an endogeneity bias of potentially endogenous independent variables, but I am again unable to reject the null hypothesis of exogeneity.<sup>608</sup>

---

<sup>607</sup> The test for sample selection bias follows Wooldridge (2010), pp. 813-814.

<sup>608</sup> Tests for collinearity among independent variables, normality of residuals, examination of potentially influential cases and sensitivity analysis with regard to the cutoff levels of the binary independent variables complement my robustness tests.

With regard to the main findings of the study, the good news is that restructuring is found to have a significant impact on the post-bankruptcy performance of firms.<sup>609</sup> Looking at the four different restructuring strategies – operational, financial, managerial and portfolio restructuring – at least one individual restructuring action from these strategies is significantly related to the probability of post-bankruptcy success. Organic sales growth during Chapter 11 is significantly positively related to the probability of post-bankruptcy success, while inorganic sales growth induced by acquisitions during Chapter 11 is found to be significantly negatively related to the success probability. Reducing the number of employees during Chapter 11 is negatively related to the probability of post-bankruptcy success.<sup>610</sup> Both successful and unsuccessful firms reduce the number of employees while under Chapter 11 protection. This seems to confirm the prior results obtained by Sudarsanam and Lai (2001) for a sample of distressed UK firms. One interpretation could be that, layoffs aside, the adverse selection problem where the most talented and skilled employees quickly leave, is more pronounced for unsuccessful firms. Substantially reducing capital expenditures by 15% or 20% during Chapter 11 is significantly negatively related to the probability of success. In spite of the automatic stay and the possibility of DIP financing, both of which should ease potential liquidity strains during Chapter 11, firms that substantially reduce their capital expenditures might be confronted with more serious problems. Additionally, unsuccessful firms reduce their capital expenditures significantly more frequently than successful firms do which is consistent with underinvestment and risk-shifting toward shareholders and management. Of the different financial restructuring strategies, receiving DIP financing during Chapter 11 increases the likelihood of post-bankruptcy success. This insight extends the findings of Dahiya et al. (2003), who note that DIP-financed firms are more likely to emerge from Chapter 11.<sup>611</sup> DIP financing can alleviate liquidity problems the bankrupt firm might have. It can also be seen as an

---

<sup>609</sup> This is documented by the significant likelihood ratio chi-squared test, indicating that the final model performs better than the intercept-only model.

<sup>610</sup> However, robustness tests showed that a significant impact materializes only with a cutoff level of 10%.

<sup>611</sup> See Dahiya et al. (2003), p. 259.

effective screening and monitoring device, as put forward by Dahiya et al. (2003). Likewise, reducing leverage after emerging from Chapter 11 is significantly positively related to the probability of post-bankruptcy success. Since the sample firms exhibit above-industry leverage ratios on average when they emerge from Chapter 11, successful firms seem effectively to be bringing leverage down toward average industry levels. This is likely to reduce the creditors' influence, as modeled in the dynamic liquidation theory of Kahl (2002), which should in turn ease potential constraints on the firm's investment policy.<sup>612</sup>

Changing the pre-filing top executive after emerging from Chapter 11 is significantly positively associated with the probability of post-bankruptcy success. This complements the prior findings of Hotchkiss (1995), who asserts that retaining pre-filing management is related to poor post-bankruptcy performance.<sup>613</sup> At the same time, my findings do not seem to support the hypothesis of Bradley and Rosenzweig (1992) that Chapter 11 is too lenient toward incumbent management, since (i) many top executives lose their jobs during or shortly after emergence, and (ii) potential agency problems between managers and creditors during Chapter 11 can be alleviated by using pay-for-performance compensation schemes and restrictive DIP financing covenants during Chapter 11, as argued by Skeel (2003).<sup>614</sup> While Datta and Iskandar-Datta (1995) found support for the hypothesis of Bradley and Rosenzweig (1992) among firms filing in the 1980s, this seems to have changed for firms filing from 1993-2005.

Firms that are more active in M&A activities, including the acquisition or sale of (parts of) businesses after emerging from bankruptcy, exhibit a higher success probability. While under Chapter 11 protection, successful firms might thus be able to avoid divestments at fire-sale discounts in the sense of Shleifer and Vishny (1992), or

---

<sup>612</sup> Kahl (2002), p.137, explains the investment constraints inherent in his dynamic liquidation theory as follows: "*In particular, leaving leverage high creates a debt overhang problem, which prevents the viable firm from undertaking profitable long-run projects. This investment distortion is a necessary byproduct of making better liquidation decisions.*"

<sup>613</sup> See Hotchkiss (1995), p. 17.

<sup>614</sup> I document a turnover rate of 79% (62%) for successful (unsuccessful) firms until two years after emergence.

at bankruptcy discounts, as documented by Hotchkiss and Mooradian (1998). Acquisitions in the post-bankruptcy phase are in line with strategies in the recovery phase of Robbins and Pearce (1992), intended to increase the market share of distressed firms and to realize long-term profitability.<sup>615</sup>

My results concerning the significantly negative influence of pre-filing economic distress on post-bankruptcy success probability lend support to the proposition formulated by Hotchkiss (1995). She argues that financially distressed firms may exhibit better post-bankruptcy performance than economically distressed firms.<sup>616</sup> Furthermore, I find that a firm's pre-filing size has a significantly positive influence on post-bankruptcy success probability, supporting prior findings by Denis and Rodgers (2007) and Hotchkiss (1995).<sup>617</sup>

Some prior studies argue that Chapter 11 is merely an inefficient filter for distinguishing viable from nonviable firms.<sup>618</sup> Hotchkiss (1995) concludes that Chapter 11 is biased toward the reorganization of nonviable firms.<sup>619</sup> Conversely, my results show that the performance of firms emerging from bankruptcy does not differ significantly from the respective industry group in both the second and third year after emergence. Additionally, I find that fewer firms (13%) refile or liquidate between 1993 and 2005 compared to the studies of Denis and Rodgers (2007) (15%) and Hotchkiss (1995) (20%) for the 1980s and the beginning of the 1990s.<sup>620</sup> This calls into question the view that Chapter 11 is generally biased toward reorganizing inefficient firms. By contrast, it lends support to the view that Chapter 11 provides viable firms the chance of a fresh start, as stated by scholars such as Heron, Lie, and Rodgers (2009), Alderson and Betker (1995a) and Wruck (1990).<sup>621</sup> These findings can also be reconciled with

---

<sup>615</sup> See Robbins and Pearce (1992), p. 291.

<sup>616</sup> See Hotchkiss (1995), p. 20.

<sup>617</sup> It should be noted that my sample firms are significantly larger in size compared to the sample firms in Denis and Rodgers (2007) and Hotchkiss (1995).

<sup>618</sup> See e.g. White (1994).

<sup>619</sup> See Hotchkiss (1995), p. 10 and p. 20.

<sup>620</sup> Hotchkiss (1995) measures the refiling and liquidation rate over five years after confirmation whereas I use a three year horizon after emergence.

<sup>621</sup> See Heron, Lie, and Rodgers (2009), p. 727, Alderson and Betker (1995a), pp. 45-46, and Wruck (1990), p. 420 and pp. 433-435.

the predictions of the dynamic liquidation theory of Kahl (2002) who explains financial distress as a dynamic process. Accordingly, the fact that some firms refile for bankruptcy should not be interpreted as inefficient filtering in Chapter 11, but rather as efficient filtering over time. Given this theory, debt is beneficial, since financial distress may serve as an “*imperfect indicator of economic viability*.”<sup>622</sup> In line with the dynamic liquidation theory, I find that firms emerging from Chapter 11 exhibit a leverage ratio significantly above industry levels in all post-bankruptcy years.<sup>623</sup> This conforms to the earlier findings of Gilson (1997) and LoPucki and Whitford (1993b).<sup>624</sup> In sum, this study adds to our understanding of how firms react to bankruptcy and which restructuring strategies and actions distinguish successful from failed firms during both the bankruptcy and the post-bankruptcy phase.

## 7.2 Limitations and Directions for Future Research

This closing chapter discusses the limitations that should be borne in mind in relation to the current study and highlights possible directions for future research. The study analyzes the restructuring strategies and post-bankruptcy performance of large public firms in the U.S. Accordingly, the findings are *a priori* only applicable to firms that fall into this category. While these firms represent only a small percentage of all U.S. firms that file for bankruptcy, they nevertheless catch the majority of the attention of both the public and academia. It would be interesting to analyze how my findings for large public firms might change if smaller and private firms were to be examined.<sup>625</sup> However, considering the scope of the analyzed restructuring actions taken from databases and hand-collected from company filings, one probably needs to trade off the level of detail in the analysis against the time required for data collection. With regard to private firms, the usual issue of data availability apart from proprietary data arises.

---

<sup>622</sup> Kahl (2002), p. 136.

<sup>623</sup> See Table 14.

<sup>624</sup> See Gilson (1997), p. 161, and LoPucki and Whitford (1993b), p. 611.

<sup>625</sup> See chapter 1.1 and, more generally, Evans and Koch (2007) on the peculiarities of bankruptcy cases for small firms.

Additionally, the current study is a cross-industry study that examines firms from different industries. Industry effects are controlled for using industry dummies and adjusting performance metrics by the respective industry median. Some industry specifics may be lost in such a cross-industry study, as argued by Sudarsanam and Lai (2001).<sup>626</sup> As a result, it seems promising for future research to focus on similar industries or perhaps just one single industry. Such research could extend my cross-industry findings and possibly pinpoint to industry-specific dynamics in the reorganization process.

Another area for future research might relate to the use of quarterly data of public companies instead of limiting the analysis to annual data. This would expand the approach Kalay, Singhal, and Tashjian (2007) have already taken regarding the bankruptcy phase. Such an approach would allow a more granular analysis of the process aspect of restructuring. Also, measuring certain independent variables on a continuous scale as opposed to a discrete scale might contribute to further elaborated results.<sup>627</sup> While the general direction of the findings is unlikely to change by such a scaling, the differences within each of the two performance groups may well become more accentuated. The same approach might also be applied to the dependent variable, making it possible to answer the question by how much performance has improved.

---

<sup>626</sup> See Sudarsanam and Lai (2001), p. 198.

<sup>627</sup> Such scaling is not meaningful for all restructuring actions. For instance, changing the top executive will always require discrete (binary) scaling.



## References

- Adler, Barry E., Vedran Capkun, and Lawrence A. Weiss, 2006, *Destruction of Value in the New Era of Chapter 11*. Working Paper, New York University, HEC Paris, Georgetown University.
- Aghion, Philippe, Oliver Hart, and John Moore, 1994, The Economics of Bankruptcy Reform, in Olivier J. Blanchard, Kenneth Froot, and Jeffrey Sachs, eds.: *The Transition in Eastern Europe. Volume 2: Restructuring* (The University of Chicago Press, Chicago).
- Alderson, Michael J., and Brian L. Betker, 1995a, Liquidation Costs and Capital Structure, *Journal of Financial Economics* 39, 45–69.
- Alderson, Michael J., and Brian L. Betker, 1995b, *Liquidation vs. Continuation: Did Reorganized Firms Do the Right Thing?* Working Paper, Saint Louis University, Ohio State University.
- Alderson, Michael J., and Brian L. Betker, 1999, Assessing Post-Bankruptcy Performance: An Analysis of Reorganized Firms' Cash Flows, *Financial Management* 28, 68–82.
- Altman, Edward I., and Edith S. Hotchkiss, 2006, *Corporate Financial Distress and Bankruptcy. Predict and Avoid Bankruptcy, Analyze and Invest in Distressed Debt* (Wiley, Hoboken).
- Altman, Edward I., Tushar Kant, and Thongchai Rattanuengyot, 2009, *Post-Chapter 11 Bankruptcy Performance: Avoiding Chapter 22*. Working Paper, New York University.
- Andrade, Gregor, and Steven N. Kaplan, 1998, How Costly is Financial (Not Economic) Distress? Evidence from Highly Leveraged Transactions that Became Distressed, *The Journal of Finance* 53, 1443–1493.
- Arogyaswamy, Kamala, Vincent L. Barker, and Masoud Yasai-Ardekani, 1995, Firm Turnarounds: An Integrative Two-Stage Model, *Journal of Management Studies* 32, 493–525.
- Asquith, Paul, Robert Gertner, and David S. Scharfstein, 1994, Anatomy of Financial Distress: An Examination of Junk-Bond Issuers, *The Quarterly Journal of Economics* 109, 625–658.
- Atanassov, Julian, and E. H. Kim, 2009, Labor and Corporate Governance: International Evidence from Restructuring Decisions, *The Journal of Finance* 64, 341–374.
- Ayotte, Kenneth M., and Edward R. Morrison, 2009, Creditor Control and Conflict in Chapter 11, *Journal of Legal Analysis* 1, 511–551.

- Backhaus, Klaus, Bernd Erichson, Wulff Plinke, and Rolf Weiber, 2006, *Multivariate Analysemethoden. Eine anwendungsorientierte Einführung* (Springer, Berlin, Heidelberg).
- Baird, Douglas G., 1986, The Uneasy Case for Corporate Reorganizations, *The Journal of Legal Studies* 15, 127–147.
- Baird, Douglas G., 1993, Revisiting Auctions in Chapter 11, *Journal of Law and Economics* 36, 633–653.
- Baird, Douglas G., 2006, *The Elements of Bankruptcy* (Foundation Press, New York).
- Baird, Douglas G., and Robert K. Rasmussen, 2002, *The End of Bankruptcy*. John M. Olin Law & Economics Working Paper Series 173, University of Chicago.
- Baird, Douglas G., and Robert K. Rasmussen, 2003, Chapter 11 at Twilight, *Stanford Law Review* 56, 673–699.
- Baird, Douglas G., and Robert K. Rasmussen, 2009, *Anti-Bankruptcy*. John M. Olin Law & Economics Working Paper Series 470, University of Chicago.
- Baird, Douglas G., Arturo Bris, and Ning Zhu, 2007, *The Dynamics of Large and Small Chapter 11 Cases: An Empirical Study*. American Law & Economics Association Annual Meetings 2.
- Baker, George P., and Robert E. Kennedy, 2002, Survivorship and the Economic Grim Reaper, *Journal of Law, Economics, and Organization* 18, 324–361.
- Balgobin, Rolf, and Naresh R. Pandit, 2001, Stages in the Turnaround Process: The Case of IBM UK, *European Management Journal* 19, 301–316.
- Bandopadhyaya, Arindam, and Sanjiv Jaggia, 2001, An Analysis of Second Time Around Bankruptcies Using a Split-Population Duration Model, *Journal of Empirical Finance* 8, 201–218.
- Barker, Vincent L., and Pamela S. Barr, 2002, Linking Top Manager Attributions to Strategic Reorientation in Declining Firms Attempting Turnarounds, *Journal of Business Research* 55, 963–979.
- Bebchuk, Lucian A., 1988, A New Approach to Corporate Reorganizations, *Harvard Law Review* 101, 775–804.
- Bebchuk, Lucian A., 1998, Chapter 11, in Peter Newman, ed.: *The New Palgrave Dictionary of Economics and the Law* (Palgrave Macmillan, London).
- Bebchuk, Lucian A., and Jesse M. Fried, 1996, The Uneasy Case for the Priority of Secured Claims in Bankruptcy, *The Yale Law Journal* 105, 857–934.
- Bendel, Robert B., and Abdelmonem A. Afifi, 1977, Comparison of Stopping Rules in Forward "Stepwise" Regression, *Journal of the American Statistical Association* 72, 46–53.
- Bergauer, Anja, 2001, *Erfolgreiches Krisenmanagement in der Unternehmung. Eine empirische Analyse* (Erich Schmidt, Berlin).

- Betker, Brian L., 1995, An Empirical Examination of Prepackaged Bankruptcy, *Financial Management* 24, 3–18.
- Bharath, Sreedhar T., Venkatesh Panchapagesan, and Ingrid M. Werner, 2010, *The Changing Nature of Chapter 11*. Charles A. Dice Center Working Paper 2008-4, Ohio State University.
- Bolton, Patrick, and David S. Scharfstein, 1996, Optimal Debt Structure and the Number of Creditors, *The Journal of Political Economy* 104, 1–25.
- Bowman, Edward H., and Harbir Singh, 1993, Corporate Restructuring: Reconfiguring the Firm, *Strategic Management Journal* 14, 5–14.
- Bradley, Michael, and Michael Rosenzweig, 1992, The Untenable Case for Chapter 11, *The Yale Law Journal* 101, 1043–1090.
- Bris, Arturo, 2008, Bankruptcy, Economics of, in Steven N. Durlauf, and Lawrence E. Blume, eds.: *The New Palgrave Dictionary of Economics* (Palgrave Macmillan, Basingstoke).
- Bris, Arturo, Ivo Welch, and Ning Zhu, 2006, The Costs of Bankruptcy: Chapter 7 Liquidation versus Chapter 11 Reorganization, *The Journal of Finance* 61, 1253–1303.
- Brown, David T., Christopher M. James, and Robert M. Mooradian, 1994, Asset Sales by Financially Distressed Firms, *Journal of Corporate Finance* 1, 233–257.
- Bulow, Jeremy I., and John B. Shoven, 1978, The Bankruptcy Decision, *Bell Journal of Economics* 9, 437–456.
- Buschmann, Holger, 2006, *Erfolgreiches Turnaround-Management. Empirische Untersuchung mit Schwerpunkt auf dem Einfluss der Stakeholder* (DUV, Wiesbaden).
- Carapeto, Maria, 2000, *Is Bargaining in Chapter 11 Costly?* Working Paper, City University London.
- Carapeto, Maria, 2003, *Does Debtor-in-Possession Financing Add Value?* Working Paper, City University London.
- Chatterjee, Sris, Upinder S. Dhillon, and Gabriel G. Ramirez, 1996, Resolution of Financial Distress: Debt Restructurings via Chapter 11, Prepackaged Bankruptcies, and Workouts, *Financial Management* 25, 5–18.
- Clark, Truman A., and Mark I. Weinstein, 1983, The Behavior of the Common Stock of Bankrupt Firms, *The Journal of Finance* 38, 489–504.
- Coelho, Luis, Richard J. Taffler, and Kose John, 2010, *Bankrupt Firms: Who's Buying?* Working Paper, University of the Algarve, Manchester Business School, New York University.
- Dahiya, Sandeep, Kose John, Manju Puri, and Gabriel G. Ramirez, 2003, Debtor-In-Possession Financing and Bankruptcy Resolution: Empirical Evidence, *Journal of Financial Economics* 69, 259–280.

- Datta, Sudip, and Mai E. Iskandar-Datta, 1995, Reorganization and Financial Distress: An Empirical Investigation, *Journal of Financial Research* 18, 15–32.
- Davidson, Russell, and James G. MacKinnon, 1993, *Estimation and Inference in Econometrics* (Oxford University Press, New York).
- Dawley, David D., James J. Hoffman, and Bruce T. Lamont, 2002, Choice Situation, Refocusing, and Post-Bankruptcy Performance, *Journal of Management* 28, 695–717.
- Dawley, David D., James J. Hoffman, and Erich N. Brockman, 2003, Do Size and Diversification Type Matter? An Examination of Post-Bankruptcy Outcomes, *Journal of Managerial Issues* 15, 413–429.
- Dechow, Patricia M., 1994, Accounting Earnings and Cash Flows as Measures of Firm Performance. The Role of Accounting Accruals, *Journal of Accounting and Economics* 18, 3–42.
- Denis, David J., and Timothy A. Kruse, 2000, Managerial Discipline and Corporate Restructuring Following Performance Declines, *Journal of Financial Economics* 55, 391–424.
- Denis, Diane K., and Kimberly J. Rodgers, 2007, Chapter 11: Duration, Outcome, and Post-Reorganization Performance, *Journal of Financial and Quantitative Analysis* 42, 101–118.
- Dickerson, A. M., 2003, Approving Employee Retention and Severance Programs Judicial Discretion Run Amuck?, *American Bankruptcy Institute Law Review* 11, 93–112.
- Dubin, Jeffrey A., and Douglas Rivers, 1989, Selection Bias in Linear Regression, Logit and Probit Models, *Sociological Methods and Research* 18, 360–390.
- Eberhart, Allan C., and Lawrence A. Weiss, 1998, The Importance of Deviations from the Absolute Priority Rule in Chapter 11 Bankruptcy Proceedings, *Financial Management* 27, 106–110.
- Eberhart, Allan C., Edward I. Altman, and Reena Aggarwal, 1999, The Equity Performance of Firms Emerging from Bankruptcy, *The Journal of Finance* 54, 1855–1868.
- Eberhart, Allan C., William T. Moore, and Rodney L. Roenfeldt, 1990, Security Pricing and Deviations from the Absolute Priority Rule in Bankruptcy Proceedings, *The Journal of Finance* 45, 1457–1469.
- Eckbo, Bjørn E., and Karin S. Thorburn, 2008, Corporate Restructuring: Breakups and LBOs, in Bjørn Espen Eckbo, ed.: *Handbook of Corporate Finance: Empirical Corporate Finance, Volume 2* (Elsevier North-Holland, Amsterdam).
- Eckbo, Bjørn E., Ronald W. Masulis, and Øyvind Norli, 2007, Security Offerings, in Bjørn Espen Eckbo, ed.: *Handbook of Corporate Finance: Empirical Corporate Finance, Volume 1* (Elsevier North-Holland, Amsterdam).

- Eichner, Tobias, 2010, *Restructuring and Turnaround of Distressed Manufacturing Firms. An International Empirical Study* (Peter Lang, Frankfurt am Main).
- Epstein, David G., and Steve H. Nickles, 2007, *Principles of Bankruptcy Law* (Thomson West, St. Paul).
- Evans, Jocelyn, and Timothy Koch, 2007, Surviving Chapter 11: Why Small Firms Prefer Supplier Financing, *Journal of Economics and Finance* 31, 186–206.
- Filatotchev, Igor, and Steve Toms, 2006, Corporate Governance and Financial Constraints on Strategic Turnarounds, *Journal of Management Studies* 43, 407–433.
- Franks, Julian R., and Walter N. Torous, 1989, An Empirical Investigation of U.S. Firms in Reorganization, *The Journal of Finance* 44, 747–769.
- Gertner, Robert, and David S. Scharfstein, 1991, A Theory of Workouts and the Effects of Reorganization Law, *The Journal of Finance* 46, 1189–1222.
- Gilson, Stuart C., 1990, Bankruptcy, Boards, Banks, and Blockholders. Evidence on Changes in Corporate Ownership and Control When Firms Default, *Journal of Financial Economics* 27, 355–387.
- Gilson, Stuart C., 1997, Transactions Costs and Capital Structure Choice: Evidence from Financially Distressed Firms, *The Journal of Finance* 52, 161–196.
- Gilson, Stuart C., and Michael R. Vetsuypens, 1993, CEO Compensation in Financially Distressed Firms: An Empirical Analysis, *The Journal of Finance* 48, 425–458.
- Gilson, Stuart C., Kose John, and Larry H. P. Lang, 1990, Troubled Debt Restructurings. An Empirical Study of Private Reorganization of Firms in Default, *Journal of Financial Economics* 27, 315–353.
- Goyal, Amit, Matthias Kahl, and Walter N. Torous, 2003, *The Long-Run Stock Performance of Financially Distressed Firms: An Empirical Investigation*. Working Paper, Emory University, University of California, Los Angeles.
- Greene, William H., 2012, *Econometric Analysis* (Pearson, Boston).
- Griffin, Paul A., 2003, Got Information? Investor Response to Form 10-K and Form 10-Q EDGAR Filings, *Review of Accounting Studies* 8, 433–460.
- Guo, Shourun, Edith S. Hotchkiss, and Weihong Song, 2011, Do Buyouts (Still) Create Value?, *The Journal of Finance* 66, 479–517.
- Hambrick, Donald C., and Steven M. Schecter, 1983, Turnaround Strategies for Mature Industrial-Product Business Units, *Academy of Management Journal* 26, 231–248.
- Hannan, Michael T., and John Freeman, 1984, Structural Inertia and Organizational Change, *American Sociological Review* 49, 149–164.
- Harris, Milton, and Artur Raviv, 1990, Capital Structure and the Informational Role of Debt, *The Journal of Finance* 45, 321–349.
- Hart, Oliver, 2000, *Different Approaches To Bankruptcy*. Harvard Institute of Economic Research Paper 1903, Harvard University.

- Hayashi, Fumio, 2000, *Econometrics* (Princeton University Press, Princeton).
- Healy, Paul M., Krishna G. Palepu, and Richard S. Ruback, 1992, Does Corporate Performance Improve after Mergers?, *Journal of Financial Economics* 31, 135–175.
- Heckman, James J., 1974, Shadow Prices, Market Wages, and Labor Supply, *Econometrica* 42, 679–694.
- Heckman, James J., 1976, The Common Structure of Statistical Models of Truncation, Sample Selection and Limited Dependent Variables and a Simple Estimator for Such Models, *Annals of Economic and Social Measurement* 5, 120–137.
- Heckman, James J., 1979, Sample Selection Bias as a Specification Error, *Econometrica* 47, 153–161.
- Heron, Randall A., Erik Lie, and Kimberly J. Rodgers, 2009, Financial Restructuring in Fresh-Start Chapter 11 Reorganizations, *Financial Management* 38, 727–745.
- Hoetker, Glenn, 2007, The Use of Logit and Probit Models in Strategic Management Research: Critical Issues, *Strategic Management Journal* 28, 331–343.
- Hofer, Charles W., 1980, Turnaround Strategies, *Journal of Business Strategy* 1, 19–31.
- Hosmer, David W., and Stanley Lemeshow, 2000, *Applied Logistic Regression* (Wiley, New York).
- Hotchkiss, Edith S., 1993, *Investment Decisions under Chapter 11 Bankruptcy*, Dissertation, New York University.
- Hotchkiss, Edith S., 1995, Postbankruptcy Performance and Management Turnover, *The Journal of Finance* 50, 3–21.
- Hotchkiss, Edith S., and Robert M. Mooradian, 1997, Vulture Investors and the Market for Control of Distressed Firms, *Journal of Financial Economics* 43, 401–432.
- Hotchkiss, Edith S., and Robert M. Mooradian, 1998, Acquisitions as a Means of Restructuring Firms in Chapter 11, *Journal of Financial Intermediation* 7, 240–262.
- Hotchkiss, Edith S., Kose John, Robert M. Mooradian, and Karin S. Thorburn, 2008, Bankruptcy and the Resolution of Financial Distress, in Bjørn Espen Eckbo, ed.: *Handbook of Corporate Finance: Empirical Corporate Finance, Volume 2* (Elsevier North-Holland, Amsterdam).
- Humphery-Jenner, Mark L., 2012, Internal and external discipline following securities class actions, *Journal of Financial Intermediation* 21, 151–179.
- Jensen, Michael C., 1986, Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers, *The American Economic Review* 76, 323–329.
- Jensen, Michael C., 1989, Active Investors, LBOs, and the Privatization of Bankruptcy, *Journal of Applied Corporate Finance* 2, 35–44.
- Jensen, Michael C., 1991, Corporate Control and the Politics of Finance, *Journal of Applied Corporate Finance* 4, 13–33.

- Jensen, Michael C., and William H. Meckling, 1976, Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure, *Journal of Financial Economics* 3, 305–360.
- John, Kose, Larry H. P. Lang, and Jeffry Netter, 1992, The Voluntary Restructuring of Large Firms in Response to Performance Decline, *The Journal of Finance* 47, 891–917.
- Jory, Surendranath R., and Jeff Madura, 2009, Acquisitions of bankrupt assets, *The Quarterly Review of Economics and Finance* 49, 748–759.
- Jory, Surendranath R., and Jeff Madura, 2010, The Long-Run Performance of Firms Emerging From Chapter 11 Bankruptcy, *Applied Financial Economics* 20, 1145–1161.
- Jostarndt, Philipp, 2007, *Financial Distress, Corporate Restructuring and Firm Survival. An Empirical Analysis of German Panel Data* (DUV, Wiesbaden).
- Jostarndt, Philipp, and Zacharias Sautner, 2008, Financial Distress, Corporate Control, and Management Turnover, *Journal of Banking and Finance* 32, 2188–2204.
- Jostarndt, Philipp, and Zacharias Sautner, 2010, Out-of-Court Restructuring versus Formal Bankruptcy in a Non-Interventionist Bankruptcy Setting, *Review of Finance* 14, 623–668.
- Kahl, Matthias, 2001, *Financial Distress as a Selection Mechanism: Evidence from the United States*. Working Paper, University of California, Los Angeles.
- Kahl, Matthias, 2002, Economic Distress, Financial Distress, and Dynamic Liquidation, *The Journal of Finance* 57, 135–168.
- Kalay, A., R. Singhal, and Elizabeth Tashjian, 2007, Is Chapter 11 Costly?, *Journal of Financial Economics* 84, 772–796.
- Kaplan, Steven N., 1989, The Effects of Management Buyouts on Operating Performance and Value, *Journal of Financial Economics* 24, 217–254.
- Kaplan, Steven N., 1994, Top Executive Rewards and Firm Performance: A Comparison of Japan and the United States, *The Journal of Political Economy* 102, 510–546.
- Kaplan, Steven N., and Bernadette A. Minton, 2008, *How Has CEO Turnover Changed?* Working Paper, University of Chicago, Ohio State University.
- Keck, Sara L., 1997, Top Management Team Structure: Differential Effects by Environmental Context, *Organization Science* 8, 143–156.
- Khanna, Naveen, and Annette B. Poulsen, 1995, Managers of Financially Distressed Firms: Villains or Scapegoats?, *The Journal of Finance* 50, 919–940.
- Lai, Jim, 1997, *Corporate Restructuring and Turnaround: An Exploratory Study of the Determinants and Effectiveness of Corporate Restructuring Strategies by Troubled UK Firms*, Dissertation, City University London.

- Lai, Jim, and Sudi Sudarsanam, 1997, Corporate Restructuring in Response to Performance Decline: Impact of Ownership, Governance and Lenders, *European Finance Review* 1, 197–233.
- Lehavy, Reuven, 2002, Reporting Discretion and the Choice of Fresh Start Values in Companies Emerging from Chapter 11 Bankruptcy, *Review of Accounting Studies* 7, 53–73.
- Lehn, Kenneth, and Annette Poulsen, 1989, Free Cash Flow and Stockholder Gains in Going Private Transactions, *The Journal of Finance* 44, 771–787.
- Lemmon, Michael, Yung-Yu Ma, and Elizabeth Tashjian, 2009, *Survival of the Fittest? Financial and Economic Distress and Restructuring Outcomes in Chapter 11*. Working Paper, University of Utah, Lehigh University.
- Li, Kai, and Nagpurnanand R. Prabhala, 2007, Self-Selection Models in Corporate Finance, in Bjørn Espen Eckbo, ed.: *Handbook of Corporate Finance: Empirical Corporate Finance, Volume 1* (Elsevier North-Holland, Amsterdam).
- Long, J. S., 1997, *Regression Models for Categorical and Limited Dependent Variables* (Sage, Thousand Oaks).
- Long, J. S., and Jeremy Freese, 2001, *Regression Models for Categorical Dependent Variables Using Stata* (Stata Press, College Station).
- LoPucki, Lynn M., and William C. Whitford, 1991, Venue Choice and Forum Shopping in the Bankruptcy Reorganization of Large, Publicly Held Companies, *Wisconsin Law Review* 1, 1–63.
- LoPucki, Lynn M., and William C. Whitford, 1993a, Corporate Governance in the Bankruptcy Reorganization of Large, Publicly Held Companies, *University of Pennsylvania Law Review* 141, 669–800.
- LoPucki, Lynn M., and William C. Whitford, 1993b, Patterns in the Bankruptcy Reorganization of Large, Publicly Held Companies, *Cornell Law Review* 78, 597–618.
- Lubben, Stephen J., 2008, Delaware's Irrelevance, *American Bankruptcy Institute Law Review* 16, 267–281.
- Maddala, G. S., 1992, *Introduction to Econometrics* (Macmillan Publishing, New York).
- Maksimovic, Vojislav, and Gordon Phillips, 1998, Asset Efficiency and Reallocation Decisions of Bankrupt Firms, *The Journal of Finance* 53, 1495–1532.
- Menard, Scott, 2001, *Applied Logistic Regression Analysis* (Sage, Thousand Oaks).
- Mickey, Ruth M., and Sander Greenland, 1989, The Impact of Confounder Selection Criteria on Effect Estimation, *American Journal of Epidemiology* 129, 125–137.
- Mooradian, Robert M., 1994, The Effect of Bankruptcy Protection on Investment: Chapter 11 as a Screening Device, *The Journal of Finance* 49, 1495–1532.
- Morrison, Edward R., 2011, *The Economics of Bankruptcy: An Introduction to the Literature*. Columbia Law and Economics Working Paper 366, Columbia University.



- Muro, Sergio A., 2008, *Bankruptcy Control and the Theory of the Firm*. Latin American and Caribbean Law and Economics Association (ALACDE) Annual Papers, University of California, Berkeley.
- Myers, Stewart C., 1977, Determinants of Corporate Borrowing, *Journal of Financial Economics* 5, 147–175.
- Nothardt, Franz, 2001, *Corporate Turnaround and Corporate Stakeholders: An Empirical Examination of the Determinants of Corporate Turnaround in Germany with a Focus on Financial Stakeholder Theory*, Dissertation, University of St. Gallen.
- Ofek, Eli, 1993, Capital Structure and Firm Response to Poor Performance, *Journal of Financial Economics* 34, 3–30.
- Ohlson, James A., 1980, Financial Ratios and the Probabilistic Prediction of Bankruptcy, *Journal of Accounting Research* 18, 109–131.
- Pettigrew, Andrew M., 1987a, Context and Action in the Transformation of the Firm, *Journal of Management Studies* 24, 649–670.
- Pettigrew, Andrew M., ed., 1987b, *The Management of Strategic Change* (Basil Blackwell, Oxford).
- Pregibon, Daryl, 1981, Logistic Regression Diagnostics, *The Annals of Statistics* 9, 705–724.
- Proppe, Dennis, 2009, Endogenität und Instrumentenschätzer, in Sönke Albers, Daniel Klapper, Udo Konradt, Achim Walter, and Joachim Wolf, eds.: *Methodik der Empirischen Forschung* (Gabler, Wiesbaden).
- Rivers, Douglas, and Quang H. Vuong, 1988, Limited Information Estimators and Exogeneity Tests for Simultaneous Probit Models, *Journal of Econometrics* 39, 347–366.
- Robbins, Keith, and John A. Pearce, 1992, Turnaround: Retrenchment and Recovery, *Strategic Management Journal* 13, 287–309.
- Roe, Mark J., 1983, Bankruptcy and Debt: A New Model for Corporate Reorganization, *Columbia Law Review* 83, 527–602.
- Schendel, Dan, G. R. Patton, and James Riggs, 1976, Corporate Turnaround Strategies: A Study of Profit Decline and Recovery, *Journal of General Management* 3, 3–11.
- Shleifer, Andrei, and Robert W. Vishny, 1989, Management Entrenchment: The Case of Manager-Specific Investments, *Journal of Financial Economics* 25, 123–139.
- Shleifer, Andrei, and Robert W. Vishny, 1992, Liquidation Values and Debt Capacity: A Market Equilibrium Approach, *The Journal of Finance* 47, 1343–1366.
- Skeel, David A., 2003, Creditor's Ball: The "New" New Corporate Governance in Chapter 11, *University of Pennsylvania Law Review* 152, 917–951.
- Slatter, Stuart, 1984, *Corporate Recovery. Successful Turnaround Strategies and their Implementation* (Penguin Books, Harmondsworth).

- Stulz, René M., and Herb Johnson, 1985, An Analysis of Secured Debt, *Journal of Financial Economics* 14, 501–521.
- Sudarsanam, Sudi, and Jim Lai, 2001, Corporate Financial Distress and Turnaround Strategies: An Empirical Analysis, *British Journal of Management* 12, 183–199.
- Tashjian, Elizabeth, Ronald C. Lease, and John J. McConnell, 1996, Prepacks. An Empirical Analysis of Prepackaged Bankruptcies, *Journal of Financial Economics* 40, 135–162.
- Thoma, Georg F., and Rainer Wilke, 2006. Ein internationaler Vergleich, Rechtliche Grundlagen der Unternehmenssanierung, in Ulrich Hommel, Thomas C. Knecht, and Holger Wohlenberg, eds.: *Handbuch Unternehmensrestrukturierung. Grundlagen - Konzepte - Maßnahmen* (Gabler, Wiesbaden).
- Ulbricht, Niels, and Christian Weiner, 2005, *Worldscope meets Compustat: A Comparison of Financial Databases*. SFB 649 Discussion Paper 2005-064, Humboldt University Berlin.
- van de Ven, Wynand P. M. M., and Bernard M. S. van Praag, 1981, The Demand for Deductibles in Private Health Insurance. A Probit Model with Sample Selection, *Journal of Econometrics* 17, 229–252.
- Vella, Francis, 1998, Estimating Models with Sample Selection Bias: A Survey, *The Journal of Human Resources* 33, 127–169.
- Warren, Elizabeth, and Jay L. Westbrook, 2000, *Financial Characteristics of Businesses in Bankruptcy*. Harvard Law School Public Law and Legal Theory Working Paper Series 1, Harvard University, University of Texas.
- Warren, Elizabeth, and Jay L. Westbrook, 2009, The Success of Chapter 11: A Challenge to the Critics, *Michigan Law Review* 107, 603–642.
- Weiss, Lawrence A., 1990, Bankruptcy Resolution. Direct Costs and Violation of Priority of Claims, *Journal of Financial Economics* 27, 285–314.
- Weiss, Lawrence A., and Karen H. Wruck, 1998, Information Problems, Conflicts of Interest, and Asset Stripping: Chapter 11's Failure in the Case of Eastern Airlines, *Journal of Financial Economics* 48, 55–97.
- Welch, Ivo, and Amit Goyal, 2008, A Comprehensive Look at The Empirical Performance of Equity Premium Prediction, *Review of Financial Studies* 21, 1455–1508.
- White, Michelle J., 1983, Bankruptcy Costs and the New Bankruptcy Code, *The Journal of Finance* 38, 477–488.
- White, Michelle J., 1989, The Corporate Bankruptcy Decision, *Journal of Economic Perspectives* 3, 129–151.
- White, Michelle J., 1994, Corporate Bankruptcy as a Filtering Device: Chapter 11 Reorganizations and Out-of-court Debt Restructurings, *Journal of Law, Economics, and Organization* 10, 268–295.
- White, Michelle J., 2004, Asbestos and the Future of Mass Torts, *Journal of Economic Perspectives* 18, 183–204.

- 
- White, Michelle J., 2007, Bankruptcy Law, in A. Mitchell Polinsky, and Steven Shavell, eds.: *Handbook of Law and Economics* (North-Holland, Amsterdam).
- Wooldridge, Jeffrey M., 2010, *Econometric Analysis of Cross Section and Panel Data* (The MIT Press, Cambridge).
- Wruck, Karen H., 1990, Financial Distress, Reorganization, and Organizational Efficiency, *Journal of Financial Economics* 27, 419–444.
- Zhang, Gaiyan, 2010, Emerging from Chapter 11 Bankruptcy: Is It Good News or Bad News for Industry Competitors?, *Financial Management* 39, 1719-1742.
- Zingales, Luigi, 1998, Survival of the Fittest or the Fattest? Exit and Financing in the Trucking Industry, *The Journal of Finance* 53, 905–938.

## Appendix

**Table 28: Emerged Public Sample Firms**

The filing dates use the format DD.MM.YYYY. For reasons of consistency and data availability, two firms (AMF Bowling and United Artists Theatre) were replaced by their respective operating entities, AMF Bowling Worldwide and United Artists Theatre Circuit.

Firm Name	Filing	Firm Name	Filing
Advanced Radio Telecom	20.04.2001	Golden Books Family Entertainment	26.02.1999
AM International	17.05.1993	Goss Graphic Systems	30.07.1999
Amerco	20.06.2003	Grand Union	25.01.1995
American Banknote	08.12.1999	Grand Union	24.06.1998
American Commercial Lines	31.01.2003	Great American Communications	05.11.1993
American Homestar	11.01.2001	Guilford Mills	13.03.2002
Americold	09.05.1995	Harnischfeger Industries	07.06.1999
AMF Bowling Worldwide	02.07.2001	Harvard Industries	08.05.1997
Anacom	05.01.1996	Hawaiian Airlines	21.03.2003
Anchor Glass Container	13.09.1996	Hayes Lemmerz International	05.12.2001
Anchor Glass Container	15.04.2002	Heartland Wireless Communications	04.12.1998
Applied Magnetics	07.01.2000	Hexcel	06.12.1993
Arch Wireless	09.11.2001	Hvide Marine	08.09.1999
Armstrong World Industries	06.12.2000	ICG Communications	14.11.2000
Assisted Living Concepts	01.10.2001	Imperial Sugar	16.01.2001
Atlantic Express Transportation	16.08.2002	IMPSAT Fiber Networks	11.06.2002
Atlas Air Worldwide Holdings	30.01.2004	International Wire Group	24.03.2004
B-E Holdings/ Bucyrus-Erie	18.02.1994	iPCS	23.02.2003
Bradlees	23.06.1995	ITC DeltaCom	25.06.2002
Calpine	20.12.2005	Ithaca Industries	08.10.1996
Calton	09.03.1993	JPS Textile Group	01.08.1997
Carmike Cinemas	08.08.2000	JWP	21.12.1993
Chart Industries	08.07.2003	Kaiser Aluminum	12.02.2002
Cherokee	23.04.1993	Kash N Karry Food Stores	09.11.1994
Chiquita Brands International	28.11.2001	KCS Energy	05.01.2000
Coho Energy	25.08.1999	Kitty Hawk	01.05.2000
Consolidated Hydro	15.09.1997	Komag	24.08.2001
Covad Communications	15.08.2001	Lason	05.12.2001
DDI	20.08.2003	Leap Wireless International	13.04.2003
Delta Air Lines	14.09.2005	Leiner Health Products	28.02.2002
Eagle Food Centers	29.02.2000	Live Entertainment	02.02.1993
Emerson Radio	29.09.1993	Lodgian	20.12.2001
Envirodyne Industries	06.01.1993	Loewen Group	01.06.1999
Exide Technologies	15.04.2002	Loral Space & Communications	15.07.2003
Federal-Mogul	01.10.2001	Magellan Health Services	11.03.2003
Flagstar Companies	11.07.1997	Mariner Post-Acute Network	18.01.2000
Fleming Companies	01.04.2003	McLeodUSA	31.01.2002
Footstar	02.03.2004	Memorex Telex	11.02.1994
Forstmann & Company	22.09.1995	Metals USA	14.11.2001
Fountain View	02.10.2001	Metromedia Fiber Network	20.05.2002
Genesis Health Ventures	22.06.2000	Mirant	14.07.2003
GenTek	11.10.2002	Mpower Holding	08.04.2002
Global Crossing	28.01.2002	NationsRent	17.12.2001
Globix	01.03.2002	Neenah Foundry	05.08.2003
Northwest Airlines	14.09.2005	Sterling Chemicals Holdings	16.07.2001
Northwestern	14.09.2003	Sun HealthCare Group	15.10.1999
NRG Energy	14.05.2003	Superior Telecom	03.03.2003
NTELOS	04.03.2003	Thermadyne Holdings	19.11.2001
O'Brien Environmental Energy	28.09.1994	Thermadyne Industries	02.12.1993
Oglebay Norton	23.02.2004	Tokheim	28.08.2000
Owens Corning	05.10.2000	Trans World Airlines	30.06.1995
Pacific Gas & Electric	06.04.2001	Trend-Lines	11.08.2000
Pathmark Stores	12.07.2000	Trico Marine Services	21.12.2004
Payless Cashways	21.07.1997	Trump Hotels & Casino Resorts	21.11.2004
Penn Traffic	01.03.1999	UAL (United Airlines)	09.12.2002
Penn Traffic	30.05.2003	UDC Homes	17.05.1995

Firm Name	Filing	Firm Name	Filing
Peregrine Systems	22.09.2002	United Artists Theatre Circuit	05.09.2000
Philip Services	25.06.1999	USG	17.03.1993
Pioneer Companies	31.07.2001	USG	25.06.2001
Polymer Group	11.05.2002	Vencor	13.09.1999
Purina Mills	28.10.1999	ViaSystems	01.10.2002
RCN	27.05.2004	Vista Eyecare	05.04.2000
Redback Networks	03.11.2003	Warnaco Group	11.06.2001
Resorts International	21.03.1994	Washington Group International	14.05.2001
Restaurant Enterprises Group	23.11.1993	Westmoreland Coal	08.11.1994
Salant	29.12.1998	Wheeling Pittsburgh	16.11.2000
Seitel	21.07.2003	WHX	07.03.2005
SLM International	24.10.1995	Wherehouse Entertainment	02.08.1995
Solutia	17.12.2003	Winn-Dixie Stores	21.02.2005
SpectraSite Holdings	15.11.2002	XO Communications	17.06.2002
Spiegel	17.03.2003	Zenith Electronics	23.08.1999
Stage Stores	01.06.2000	-	-

Source: UCLA-LoPucki Bankruptcy Research Database.

### Table 29: Multivariate Probit Regression of Post-Bankruptcy Performance - Final Model

In model (I), post-bankruptcy success (failure) is defined as free cash flow scaled by sales above or equal to (below) zero in E+3. In model (II), the performance metric is adjusted by the respective industry median. Restructuring actions are defined as in Table 9 and control variables are defined as in Table 10. \*\*\*, \*\*, \* denote two-tailed significance levels of 1%, 5% and 10%, respectively.

	(I)		(II)	
	Free Cash Flow/Sales		Ind.-adj. Free Cash Flow/Sales	
	Coefficient	p-value	Coefficient	p-value
Sales Increase (in)	0.510	0.200	0.233	0.511
Personnel Reduction (in)	-1.003 ***	0.004	-0.471	0.106
Personnel Reduction (out)	-0.495	0.116	-0.170	0.559
Capex Reduction (in)	-0.441	0.141	-0.328	0.244
Leverage Reduction (out)	0.984 ***	0.008	0.397	0.225
Equity Issue (out)	-0.426	0.151	0.338	0.221
DIP Financing	0.847 **	0.011	-0.057	0.852
Top Executive Change (in)	0.540	0.189	0.420	0.261
Top Executive Change (out)	0.686 **	0.043	0.551 *	0.081
Acquisition (out)	0.550 *	0.085	0.402	0.148
Divestment (out)	0.777 **	0.013	0.418	0.135
Economic Distress	-0.770 **	0.012	-0.803 ***	0.003
Size (sales)	0.337 **	0.017	0.241 **	0.047
Constant	-2.196 **	0.042	-1.794 *	0.062
LR-Chi <sup>2</sup>	61.988 ***	0.000	35.653 ***	0.001
Nagelkerke pseudo-R <sup>2</sup>	0.512		0.331	
McFadden pseudo-R <sup>2</sup>	0.350		0.211	
Number of Firms	128		128	

Source: Author's own illustration.

**Table 30: Multivariate Logistic Regression of Post-Bankruptcy Performance – Cumulative Models by Restructuring Strategies**

Post-bankruptcy success (failure) is defined as free cash flow scaled by sales above or equal to (below) zero in E+3. Restructuring actions are defined as in Table 9 and control variables are defined as in Table 10. \*\*\*, \*\*, \* denote two-tailed significance levels of 1%, 5% and 10%, respectively.

	(I)		(II)		(III)		(IV)	
	Coef.	p-val.	Coef.	p-val.	Coef.	p-val.	Coef.	p-val.
Sales Increase (in)	0.705	0.246	0.997	0.124	1.012	0.134	0.871	0.216
Personnel Reduction (in)	-0.839 *	0.071	-1.454 ***	0.008	-1.752 ***	0.003	-1.761 ***	0.005
Personnel Reduction (out)	-0.264	0.537	-0.387	0.413	-0.393	0.417	-0.775	0.154
Capex Reduction (in)	-0.783 *	0.078	-0.633	0.182	-0.652	0.177	-0.801	0.127
Leverage Reduction (out)			1.424 **	0.013	1.541 **	0.012	1.696 ***	0.008
Equity Issue (out)			-0.885 *	0.063	-0.720	0.141	-0.715	0.160
DIP Financing			1.357 **	0.011	1.443 **	0.010	1.547 ***	0.009
Top Executive Change (in)					1.230 *	0.064	0.919	0.197
Top Executive Change (out)					1.163 **	0.039	1.221 **	0.043
Acquisition (out)							0.978 *	0.081
Divestment (out)							1.319 **	0.015
Economic Distress	-1.369 ***	0.001	-1.555 ***	0.001	-1.631 ***	0.001	-1.340 **	0.013
Size (sales)	0.579 ***	0.003	0.590 ***	0.008	0.621 ***	0.008	0.587 **	0.016
Constant	-1.830	0.186	-2.439	0.130	-3.396 *	0.053	-3.897 **	0.038
LR- $\chi^2$	33.486 ***	0.000	47.536 ***	0.000	52.845 ***	0.000	62.115 ***	0.000
Nagelkerke pseudo- $R^2$	0.307		0.414		0.451		0.513	
McFadden pseudo- $R^2$	0.189		0.268		0.298		0.351	
Number of Firms	128		128		128		128	

Source: Author's own illustration, influenced by Eichner (2010), p. 229.

**Table 31: Correlation Matrix of Independent and Control Variables**

Variables are taken from the final model. The final sample consists of 128 firms. The coefficients represent correlation coefficients with respective p-values below.

	a	b	c	d	e	f	g	h	i	j	k	l	m
a Sales Increase (in)	1.00												
b Personnel Reduction (in)	-0.26	1.00											
	0.00												
c Personnel Reduction (out)	0.08	0.19	1.00										
	0.39	0.04											
d Capex Reduction (in)	-0.07	0.10	0.05	1.00									
	0.42	0.25	0.61										
e Leverage Reduction (out)	-0.12	0.14	0.10	-0.12	1.00								
	0.17	0.11	0.27	0.18									
f Equity Issue (out)	0.02	-0.05	-0.20	-0.02	0.05	1.00							
	0.86	0.57	0.02	0.81	0.56								
g DIP Financing	-0.09	0.13	-0.15	-0.11	-0.17	-0.02	1.00						
	0.31	0.13	0.09	0.22	0.06	0.85							
h Top Executive Change (in)	-0.07	0.09	-0.04	-0.09	0.07	-0.05	0.13	1.00					
	0.45	0.31	0.69	0.29	0.40	0.59	0.15						
i Top Executive Change (out)	0.08	0.03	0.02	0.05	0.01	-0.13	-0.10	-0.53	1.00				
	0.35	0.72	0.80	0.56	0.93	0.16	0.26	0.00					
j Acquisition (out)	0.15	-0.05	-0.03	0.09	-0.12	-0.13	0.05	0.05	0.03	1.00			
	0.09	0.54	0.78	0.33	0.17	0.15	0.57	0.61	0.71				
k Divestment (out)	0.07	-0.04	0.26	-0.04	-0.01	0.03	0.03	0.12	-0.06	0.03	1.00		
	0.41	0.65	0.00	0.62	0.95	0.78	0.76	0.16	0.48	0.73			
l Economic Distress	0.08	-0.01	0.06	-0.03	0.00	-0.11	-0.14	-0.01	-0.04	-0.26	-0.14	1.00	
	0.35	0.94	0.48	0.70	0.96	0.23	0.11	0.91	0.67	0.00	0.13		
m Size (sales)	0.03	0.01	-0.12	-0.04	-0.16	-0.08	0.32	0.16	-0.14	0.15	0.15	-0.10	1.00
	0.78	0.93	0.18	0.67	0.08	0.36	0.00	0.07	0.12	0.10	0.10	0.25	

Source: Author's own illustration.