Determinants of M&A Activity and Control Concept

—Firm Characteristics as Economic Indicators for Control in Business Combinations—

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St. Gallen, October 29, 2012

The President:

Prof. Dr. Thomas Bieger

Dedicated to my Family

Adriana, Lorena, Arlen, and my parents, Márta and Günter

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New York, December 10, 2012 Robert Gutsche

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Table of Contents

Table of Contents 1
List of Figures 5
List of Tables 7
List of Notations and Abbreviations 9
1 Introduction 1
1.1 Motivation and Purpose 1
1.2 Research Question and Contribution 3
1.3 Structure 5
2 Definitions 6
3 Regulatory Framework 8
3.1 Business Combination Project Development 8
3.1.1 Phase II—The Joint Project, 2004 to the Present 8
3.1.2 Phase I—International Consolidation Standards, Development prior to 2005 9
3.2 Standards on Firm Characteristics and Control Assessment 10
3.2.1 Firm-Level vs. Owner-Level Control 12
3.2.2 Ownership Uncertain 17
3.3 Interim Summary of Chapter 3 21
4 Theoretical Framework 23
4.1 Overview: Incentives and Barriers Approach 24
4.2 Incentives of Acquisition Activity 25
4.2.1 Synergies 25
4.2.1.1 Operating Synergy 27
4.2.1.2 Financial Synergy 30
4.2.1.2.1 Leverage, Co-Insurance, and Capital Structure 32
4.2.1.2.2 Liquidity 33
4.2.1.2.3 Taxes 35
4.2.2 Growth – Make or Buy 38
4.2.2.1 External Growth through Merger 39
4.2.2.2 Internal Growth and Merger Activity 40
4.2.2.2.1 Internal Growth 40
4.2.2.2.2 Growth-Resource Mismatch 42
4.2.2.2.3 Internal Future Growth Strategies 43
4.2.3 Managerial Inefficiencies and Performance 44
4.2.4 Valuation Discrepancies and Merger Activity 46
4.2.4.1 Target Undervaluation Hypothesis 46
4.2.4.2 Acquirer Overvaluation Hypothesis 47

4.2.4.3 Price-Earnings Magic, Bootstrap Game, Merger Profit ... 48
4.2.5 Agency Conflicts ... 51
4.3 Barriers Constraining Acquisition Activities ... 53
4.3.1 Firm Size ... 53
4.3.2 Asset structure and Debt-Capacity ... 54
4.3.3 Payment ... 54
4.3.4 Other Determinants of Merger Activity ... 55
4.4 Interim Summary of Chapter 4 ... 55
5 Meta-Analysis ... 57
5.1 Overview: Previous Empirical Studies on Acquisition Likelihood ... 57
5.2 Performance Measures ... 62
5.2.1 Earnings in Absolute Numbers ... 62
5.2.2 Earnings per Share Ratio ... 64
5.2.3 Return on Assets, Return on Investment ... 65
5.2.4 Profit Margin Ratios ... 69
5.2.5 Asset Turnover ... 72
5.2.6 Return on Equity ... 76
5.2.7 Return on Capital Employed ... 80
5.2.8 Other Earnings Measures ... 82
5.2.9 Market-related Performance Measures ... 83
5.2.10 Interim Summary—Performance Measures ... 84
5.3 Size Metrics ... 84
5.4 Valuation Ratios ... 88
5.4.1 Price-Earnings Ratio ... 88
5.4.2 Price-Earnings to Growth Ratio ... 92
5.4.3 Price-to-Book Ratio ... 93
5.4.4 Market Value-to-Replacement Cost / Q-Measures ... 96
5.4.5 Price-to-Sales Ratio ... 97
5.4.6 Earnings Yield ... 98
5.4.7 Interim Summary—Valuation Measures ... 99
5.5 Liquidity Metrics ... 100
5.5.1 Working Capital ... 100
5.5.2 Current Ratio ... 103
5.5.3 Quick Ratio ... 106
5.5.4 Cash Ratio ... 108
5.5.5 Cash Conversion Cycle ... 110
5.5.6 Working Capital Turnover Ratios ... 112
5.5.7 Other Measures for Short-term Liquidity used in Prediction Studies ... 115
5.5.8 Interim Summary—Liquidity Measures ... 116
5.6 Leverage, Long-term Solvency and Debt Capacity Metrics ... 120
5.6.1 Debt Ratio ... 121
5.6.2 Debt-Equity Ratio ... 125
5.6.3 Further Solvency Stock Measures ... 131
5.6.4 Interest Coverage Ratio ... 132

5.6.5 Further Solvency Flow Measures ... 135
5.6.6 Other Measures related to Leverage ... 136
5.6.7 Interim Summary—Leverage Measures ... 138
5.7 Growth Measures ... 139
5.7.1 Common Growth Measures ... 140
5.7.2 Investment and Spending for Growth ... 146
5.7.3 Interim Summary—Growth Measures ... 148
5.8 Growth-Resource Mismatch Measures ... 149
5.9 Asset Structure ... 150
5.10 Industry Disturbance Metrics ... 152
5.11 Agency Conflict Measures ... 154
5.11.1 Free Cash Flow Measures ... 155
5.11.1.1 Free Cash Flow Definitions in Research ... 155
5.11.1.2 Free Cash Flow Definitions in Textbooks ... 157
5.11.1.3 Free Cash Flow based on the Statement of Cash Flows ... 157
5.11.1.4 Free Cash Flow based on the Income Statement ... 158
5.11.1.5 Free Cash Flow not distributed to Owners ... 161
5.11.1.6 Free Cash Flow Related Variables in Takeover Studies ... 162
5.11.2 Further Free Cash Flow Measures ... 164
5.11.2.1 Free Cash Flow per Share ... 164
5.11.2.2 Free Cash Flow Yield ... 164
5.11.3 Ratios indicating the Dividend Policy of a Firm ... 165
5.11.3.1 Dividend Yield ... 166
5.11.3.2 Dividend Payout Ratio ... 168
5.11.3.3 Percentage of Earnings Retained ... 170
5.11.4 Agency Dummies ... 172
5.11.5 Interim Summary—Agency Conflict Measures ... 172
5.12 Further Variables used in Takeover Studies ... 174
5.12.1 Taxes ... 174
5.12.2 Miscellaneous ... 175
5.13 Interim Summary of Chapter 5 ... 181
6 Empirical Study ... 184
6.1 Statement of Hypothesis ... 184
6.1.1 Performance ... 185
6.1.2 Liquidity, Leverage, Growth and the Growth-Resource Mismatch ... 186
6.1.3 Size ... 187
6.1.4 Agency ... 188
6.1.5 Valuation ... 190
6.1.6 Asset Structure ... 191
6.2 Methodology ... 192
6.2.1 Univariate Analysis ... 192
6.2.2 Multivariate Analysis ... 193

6.3 Sample ... 194
6.3.1 Databases ... 194
6.3.2 Subsamples ... 195
6.3.3 Sample Characteristics ... 195
6.4 Results ... 206
6.4.1 Overview and Diagnostic ... 206
6.4.2 Relative Firm Characteristics ... 207
6.4.2.1 Performance ... 207
6.4.2.2 Liquidity, Leverage and Growth ... 207
6.4.2.3 Size ... 208
6.4.2.4 Agency Conflicts ... 208
6.4.2.5 Valuation Discrepancies ... 208
6.4.2.6 Asset Structure ... 209
6.4.3 Sample Comparison ... 209
6.5 Interim Summary of Chapter 6 ... 219
7 Discussion and Conclusion ... 220
7.1 Theoretical Implications ... 220
7.2 Implications for Standard Setters and Practitioners ... 221
7.3 Limitations and Further Research ... 222
8 Executive Summary ... 224
Appendix A: Variable Definition and Data Source ... 228
Appendix B: Logit Regression Diagnostics ... 231
B1: Low Complexity Sample ... 232
B2: Moderate Complexity Sample ... 234
B3: High Complexity Sample ... 236
References ... XVII
Curriculum Vitae ... XXXVI

List of Figures

Figure 1: Control on Firm-level vs. Control on Owner-level 14
Figure 2: Theoretical Framework 24
Figure 3: Net Present Value of Business Combinations 26
Figure 4: Impact of Merger on Earnings Growth 50
Figure 5: Earnings Calculation Scheme, Nature of Expense Method 63
Figure 6: Earnings per Share Ratio 64
Figure 7: Return on Assets Ratio 66
Figure 8: Disaggregation of the Return on Assets Ratio 70
Figure 9: Profit Margin 70
Figure 10: Asset Turnover 73
Figure 11: Return on Equity 76
Figure 12: Return on Capital Employed 81
Figure 13: Price-to-Earnings Ratio 90
Figure 14: Price-to-Earnings to Growth Ratio 92
Figure 15: Price-to-Book Ratio 93
Figure 16: Price-to-Sales Ratio 98
Figure 17: Earnings Yield 99
Figure 18: Working Capital 100
Figure 19: Current Ratio 103
Figure 20: Quick Ratio 107
Figure 21: Cash Ratio 108
Figure 22: Components of the Cash Conversion Cycle 110
Figure 23: Days of Additional Working Capital Financing 111
Figure 24: Accounts Receivables Turnover 113
Figure 25: Inventories Turnover 113
Figure 26: Accounts Payables Turnover 113
Figure 27: Debt Ratio 121
Figure 28: Debt-Equity Ratio 125
Figure 29: Capitalization Ratio 131
Figure 30: Fixed Assets to Equity Ratio 131
Figure 31: Current Liabilities to Equity Ratio 132
Figure 32: Interest Coverage Ratio 133
Figure 33: Cash Flow-based Interest Coverage Ratio 134
Figure 34: Cash Flow to Debt Ratio 135
Figure 35: Solvency Ratio 136

Figure 36: Sales Growth 140
Figure 37: Asset Structure 151
Figure 38: Free Cash Flow Measure in Empirical Studies 155
Figure 39: Measurement of Free Cash Flows from Cash Flow Statement 159
Figure 40: Measurement of Free Cash Flows from Income Statement 160
Figure 41: Free Cash Flow not Distributed to Owners (1) 161
Figure 42: Free Cash Flow not Distributed to Owners (2) 161
Figure 43: Free Cash Flow per Share 164
Figure 44: Free Cash Flow Yield 165
Figure 45: Dividend Yield 166
Figure 46: Dividend Payout Ratio 168
Figure 47: Percentage of Earnings Retained 171
Figure 48: Performance Hypothesis 185
Figure 49: GRMM Hypothesis 187
Figure 50: Size Hypothesis 188
Figure 51: Agency Conflict Hypothesis 189
Figure 52: Valuation Discrepancy Hypothesis 190
Figure 53: Asset Structure Hypothesis 191
Figure 54: Logit Regression 194

List of Tables

Table 1: Market Value and Earnings per Share 49
Table 2: Studies on Firm Characteristics and Acquisition Likelihood 61
Table 3: Absolute Earnings Measures 64
Table 4: Earnings per Share 65
Table 5: Return on Assets 69
Table 6: Profit Margin 72
Table 7: Asset Turnover 76
Table 8: Return on Equity 80
Table 9: Return on Capital Employed 82
Table 10: Other Performance Measures 82
Table 11: Market-related Performance Measures 84
Table 12: Firm Size 88
Table 13: Price-Earnings Ratio 92
Table 14: Price-to-Book Ratio 96
Table 15: Q-Measures 97
Table 16: Earnings Yield 99
Table 17: Working Capital Measures 103
Table 18: Current Ratio 106
Table 19: Quick Ratio 108
Table 20: Cash Ratio 109
Table 21: Cash Conversion Cycle-Metrics 112
Table 22: Working Capital Turnover Ratios 115
Table 23: Other Short-term Liquidity Measures 119
Table 24: Debt Ratio 124
Table 25: Debt-Equity Ratio 130
Table 26: Interest Coverage Ratios 135
Table 27: Solvency Ratio 136
Table 28: Other Long-term Solvency Ratios 138
Table 29: Sales Growth Measures 143
Table 30: Earnings Growth Measures 144
Table 31: Assets Growth Measures 145
Table 32: Net Assets Growth Measures 145
Table 33: Market Capitalization Growth 146
Table 34: Other Growth Measures 146
Table 35: Future Growth-related Measures 148

Table 36: Growth-Resource Mismatch Measures 150
Table 37: Asset Structure 152
Table 38: Industry Disturbance Metrics 154
Table 39: Free Cash Flow Metrics 163
Table 40: Dividend Yield 168
Table 41: Dividend Payout Ratio 170
Table 42: Percentage of Earnings Retained 172
Table 43: Agency Conflict Dummy Variables 173
Table 44: Tax-related Measures 175
Table 45: Ownership 176
Table 46: Equity Structure 177
Table 47: Takeover Defense 177
Table 48: Further Miscellaneous Variables 180
Table 49: Industry Distribution 197
Table 50: Distribution of Business Combinations per Year 198
Table 51: Distribution of Accounting Standards 199
Table 52: Country Distribution 205
Table 53: Proportion of Mergers in Favor of Hypotheses 211
Table 54: Comparison of Means and Median, Low Complexity Sample 213
Table 55: Comparison of Means and Median, Moderate Complexity Sample 215
Table 56: Comparison of Means and Median, High Complexity Sample 217
Table 57: Logit Regression Analysis 218

List of Notations and Abbreviations

Acc.Rec.	Accounts Receivables
adj.	Adjusted
ADV	Advertising Costs
AER	Average Excess Earnings
APB	Accounting Principles Board
ASC	Accounting Standards Codification
ATCA	Anti-Takeover Charta Amendment
avg.	Average
BCG	Boston Consulting Group
BCP	Blank-Check Preferred-Stock
C	Conglomerate
CAP	Capital Expenditure
CAR	Cumulative Abnormal Returns
CB	Classified Boards
CE	Common Equity
CEO	Chief Executive Officer
Chem	Chemicals
Chg.i.Contr	Change in Institutional Control
Coef.	Coefficient
Corp.	Corporation
CPI	Consumer Price Index
CR	Current Ratio
Curr.-Cost	Current Cost
DA	Discriminant Analysis
Dbt	Debt
DC	Dual-Class Recapitalizations
DER	Debt-to-Equity Ratio
DPO	Dividend Payout
ed., eds.	Editor, Editors
e.g.	For Example
EBIAT	Earnings Before Interests After Taxes
EBIT	Earnings Before Interests, Taxes; Operating Profit
EBITDA	Earnings Before Interests, Taxes, Depreciation and Amortization
EBT	Earnings Before Taxes
Econ.	Economy
ElectrMach	Electrical Machinery
EPS	Earnings per share
f.	& Next Page
ff.	& Next Pages
FAS	Financial Accounting Standards
FASB	Financial Accounting Standards Board
FIFO	First In First Out
FIN	FASB's Interpretation of US-GAAP Standards

fn.	Footnote
FP	Fair-Price Requirements
G20	The Group of Twenty Finance Ministers and Central Bank Governors (also known as the G-20, and Group of Twenty)
GR	Growth
GRMM	Growth-Resource Mismatch
HC	Historical cost measure
Hist.-Cost	Historical Cost
I&B-Contr	Institutional & Bank Control
IAS	International Accounting Standards
IASB	International Accounting Standards Board
IASC	International Accounting Standards Committee
IFRS	International Financial Reporting Standards
Ind.	Industry
IPO	Initial Public Offering
L, (L),	Logit
LDA	Linear Discriminant Analysis
LEV	Leverage
LIFO	Last in First Out
LIQ	Liquidity
LOGA	Natural Logarithm of Total Assets
LOGS	Natural Logarithm of Sales
LT	Long-term Debt
LtDbt.	Long-term Debt
M	Comparison of Means or Medians
m.	Million
MDA	Multivariate Discriminant Analysis
Mgrs-Shareh	Managers' Shareholdings
MLE.	Maximum Likelihood Estimation
MM	Modigliani/Miller
MU	Money Unit
MV	Market Value of Equity
MVEQ	Market Value of Equity
n/a	Not Available
N-C	Non-Conglomerate
NI	Net Income
No.	Number
NOPAT	Net operating Profit after Taxes
NPV	Net Present Value
NWC	Net Working Capital
O&D-Shareh	Officer- & Director-Shareholdings
Obs.	Observed
P, (P)	Probit
P/B, or P/B ratio	Price-to-Book Ratio, or Market-to-Book Ratio
P/E, or P/E ratio	Price-Earnings Ratio
PER	Percentage of Earnings Retained
PP	Poison Pill

PR	Profitability
Q	Tobin's Q
QR	Quick Ratio
RC	Replacement Cost Measure
RD	Research and Development Cost
ROA	Return on Assets
ROCE	Return on Capital Employed
ROE	Return on Equity
ROI	Return on Investment
RONW	Return on Net Worth
S	Significant at the 1 to 10 percent level
SA	Sales
SG&A	Selling, General and Administrative Expenses
SIC	Standing Interpretations Committee
signif.	Significant
SM	Supermajority Requirements
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TA	Total Assets
TAC	Transaction Cost
TOBDA	Thomson One Banker Deals Analysis
TotalDbt	Total Debt
Trans	Transportation
US-GAAP	United States Generally Accepted Accounting Principles
VAL	Valuation
VR	Restricted Voting Rights,
vs.	Versus
WS	Worldscope Database
X	Not Significant at the 1 to 10 percent level

Abstract

The identification of a business combination and the designation of which firm is the acquirer and which is the target, the acquiree, are important from an accounting perspective. In order to reflect the economic substance of the transaction, the identified acquirer must report the fair value of the acquiree's assets and liabilities and any applicable gain or loss.

IFRS and US-GAAP determine the acquirer in business combinations by comparing the control power that a firm has over another firm. In doing so, the standards implicitly assume that the ability to control an acquiree is the best approximation of economic rationales for a business combination.

This study presumes that economic rationales for business combinations are largely captured by relative firm characteristics, and that firm characteristics can be used to validate the determination of the acquirer by the control concept. Therefore, this study analyzes the role of firm characteristics in identifying the acquirer in business combinations. The analysis proceeds as follows. First, the regulatory background is reviewed. Second, a theoretical framework for further investigation is provided by reviewing merger theories and the related acquisition likelihood hypotheses. Third, a meta-analysis of findings in prior empirical takeover activity studies is performed. Fourth, an empirical study on the control concept is conducted by using firm characteristics of the acquirer and the acquiree to analyze the extent to which relative firm characteristics reflect the control assessment in business combinations.

The general findings suggest that control is largely consistent with the economic motivation for mergers and acquisitions, and that firm characteristics of the acquirer and the acquiree reflect these motivations. Hence, firm characteristics are possible indicators for control in business combinations. However, economic indicators do not reflect accounting control for reverse acquisitions.

Acquiring firms are larger, more profitable, higher valued, and less levered than their acquirees. Compared with their acquirers, acquirees have an imbalance of financial resources and growth, larger free cash flows, and lower asset growth. Relative liquidity varies depending on the type of consideration transferred in exchange for control (cash or stock).

If standard setters provided these firm characteristics in their guidance on accounting control, it would beneficial for professionals, stakeholders, and auditors as well as other users of consolidated financial statements.

Zusammenfassung

Aus Sicht der Rechnungslegung sind die Feststellung eines Unternehmenszusammenschlusses und die damit verbundene Bestimmung des Erwerbers zu Konsolidierungszwecken von zentraler Bedeutung. Das als ökonomischer Erwerber identifizierte Unternehmen muss die Fair Values der Vermögenswerte und Schulden des erworbenen Unternehmens bilanzieren sowie einen aus dem Unternehmenszusammenschluss möglicherweise entstehenden Gewinn oder Verlust erfassen, um damit die aus dem Unternehmenszusammenschluss entstehenden wirtschaftlichen Verhältnisse abzubilden.

IFRS und US-GAAP bestimmen den Erwerber nach dem Kriterium der Beherrschungsmöglichkeit. Sie unterstellen dabei implizit, dass Beherrschung die dem Zusammenschluss zugrunde liegende ökonomische Realität approximiert und sich auf dieser Basis die wirtschaftliche Substanz des Zusammenschlusses erfassen lässt.

Die vorliegende Arbeit geht davon aus, dass die ökonomischen Gründe eines Zusammenschlusses weitestgehend durch die relativen Firmeneigenschaften der beteiligten Unternehmen dargestellt werden können und dass Firmeneigenschaften somit einen praktischen, heuristischen Nutzen für die Validierung des nach dem Beherrschungskonzept zu bestimmenden Erwerbers bieten. Aus diesem Grund untersucht die vorliegende Arbeit die Rolle von Firmeneigenschaften bei der Identifizierung des Erwerbers in Unternehmenszusammenschlüssen. Im Rahmen der Analyse wird zunächst der regulatorische Rahmen dargestellt und gewürdigt. Im Anschluss wird ein theoretischer Bezugsrahmen entwickelt, der bestehende theoretische Ansätze systematisiert und verbindet. Auf dieser Grundlage werden die Befunde vorhergehender empirischer Forschungsarbeiten erfasst und eine eigene empirische Analyse durchgeführt. Die so gewonnenen Erkenntnisse werden dann hinsichtlich normativer Empfehlungen diskutiert.

Die vorliegende Arbeit zeigt, dass das Beherrschungskriterium größtenteils mit der ökonomischen Motivation für Unternehmenszusammenschlüsse übereinstimmt. Allerdings erklären die von relativen Firmeneigenschaften erfassten ökonomischen Motive nicht die Beherrschung im Fall eines umgekehrten Unternehmenszusammenschlusses.

Generell sind erwerbende Unternehmen grösser, profitabler, höher bewertet und weniger verschuldet als erworbene Unternehmen. Erworbene Unternehmen weisen ein Ungleichgewicht von finanziellen Ressourcen und Wachstum auf; Sie haben einen höheren Anteil freier Cashflows und geringeres Wachstum der Bilanzsumme. Die

Liquidität variiert mit der Art der Vergütung des Kontrollerwerbs (liquide Zahlungsmittel oder Aktien des Erwerbers).

Firmeneigenschaften dürften somit bei der Identifizierung des Erwerbers eine wertvolle Orientierungshilfe darstellen, da sie potenziell die Beurteilung der Beherrschungsmöglichkeit validieren und mit der Feststellung und Prüfung der Beherrschungsmöglichkeit beauftragte Personen in ihrer Entscheidungsfindung unterstützen können.

"There are few areas of accounting that need improvement more than the accounting for business combinations."

Edmund L. Jenkins, Chairman of the Financial Accounting Standards Board Testimony before the U.S. House of Representatives, May 4, 2000[1]

1 Introduction

1.1 Motivation and Purpose

There have been many changes and improvements in the accounting for business combinations over the past decade. One of the most important achievements was the standardization of the accounting method for all business combinations. Specifically, reflecting the fact that mergers and acquisitions are economically similar, and, hence, that all business combinations are acquisitions, the pooling of interest method was eliminated, and the acquisition method was adopted for all business combinations.[2] The joint decision by IASB and FASB to account for all business combinations using the acquisition method means that one acquirer must be identified in every business combination,[3] notwithstanding the difficulties the decision itself might cause,[4] and even neglecting the accounting issues that may arise by identifying only one acquirer.[5] Under the current standards, the designation of the acquiring firm is directly linked to the question of which firm discloses fair values, goodwill and intangibles resulting from the acquisition.[6]

A fundamental requirement of international accounting standards (IFRS and US-GAAP) is that financial reporting information be relevant and reliable.[7] As such, accounting for business combinations is meant to disclose the economic substance of

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1 As quoted in Fisher/Taylor/Chen (2005), p. 1.

2 Prior to IFRS 3 (revised 2008) / FAS 141 (revised 2007), the term purchase method instead of acquisition method was used in IFRS and US-GAAP. However, a business combination could occur in absence of a purchase transaction. For this reason, the IASB and the FASB decided to change their terminology. IFRS 3.BC14, .BC29-.BC35 (revised 2008); FAS 141.BC14, .BC29-.BC35 (revised 2007); see also Berndt/Gutsche (2009), p. 17-18; for a critical perspective on the development of consolidation standards, see Berndt/Hommel (2005), pp. 407-423.

3 IFRS 3.BC82 (revised 2008); FAS 141.BC82 (revised 2007).

4 IFRS 3.BC79 (revised 2008); FAS 141.BC79 (revised 2007).

5 IFRS 3.BC79 (revised 2008); FAS 141.BC79 (revised 2007).

6 IFRS 3.BC70, .BC79 (revised 2008); FAS 141.BC70, .BC79 (revised 2007).

7 The Framework (1989) used the term "reliability" instead of "faithful representation," IASB Framework (2010).BC3.20.

the transaction in order to provide the most relevant and reliable, and hence, useful information for decision making. Therefore, the IASB Framework,[8] IAS 8.10(b)(ii), and several individual US-GAAP[9] require that transactions and other events are accounted for in accordance with their substance and economic reality, and not merely their legal form,[10] stating that: "Faithful representation means that financial information represents the substance of an economic phenomenon rather than merely representing its legal form. Representing a legal form that differs from the economic substance of the underlying economic phenomenon could not result in a faithful representation."[11]

Thus, for accounting purposes it is important to identify the business combination and to designate which firm economically is the acquirer and which is the target, the acquiree. On a firm level, the acquirer is often considered the party with the greater control power, usually measured by voting rights. However, since the legal structure of business combinations are frequently influenced by a host of factors—for example, cost avoidance strategies (e.g., taxes or transaction costs), off-balance sheet reporting incentives, and indirect voting rights—the identification of the acquirer and with it the identification of the acquisition can be difficult and discretionary. Such ambiguity can be problematic because the control assessment directly affects the recognition and measurement of acquired fair values and any applicable gain or loss resulting from the business combination.

Considering this, international accounting standard setters recognize that "in rare circumstances it might be difficult to identify the acquirer",[12] in which case other facts and circumstances need to be considered. For example, IFRS 3 (revised 2008) and FAS 141 (revised 2007 and now ASC 805)[13] assume that when a smaller firm acquires a larger firm's stock, relative firm size might indicate another control relationship than that suggested by the equity interest held by the smaller firm. In this case, the standards require an additional step, in which not the majority interest of the combining firms themselves is determining the controlling acquirer (firm-level approach), but rather the controlling acquirer is determined by the (former) owners of

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8 Until September 2010, the IASC Framework (1989).35, as adopted by the IASB in 2001; after September 2010 Conceptual Framework for Financial Reporting 2010, IASB Framework (2010).Chapter 3.

9 ASC 805-40-330; ASC 360-20-15-2.

10 For example, IASC Framework (1989); IAS 8; SIC-12.12.

11 IASB Framework (2010).BC3.26.

12 IFRS 3.BC79 (revised 2008); FAS 141.BC79 (revised 2007).

13 The FASB reorganized its accounting statements in 2009. The set of guidelines prescribed by FAS 141 (revised 2007) is now codified by Accounting Standards Codification, ASC 805. This study uses the terminology "ASC" when referring to the current set of FASB standards.

the target firm because they may have acquired the majority control of the combined firm (owner-level approach).[14] However, firm size is the one (and only) relative firm characteristic used to validate the control assessment and to identify the acquirer in international accounting standards.

Besides size, the finance literature has found further pre-merger firm characteristics to be relevant for acquisition activity, suggesting that discriminating firm characteristics, such as profitability, leverage or growth, reflect the economic motivations of acquirers with regard to their potential merger gains.

Therefore, this study presumes that obtaining a controlling interest in a business combination is largely induced by obtaining control of expected merger gains. Accordingly, this study builds upon the assumption that the relation of acquirer and target characteristics bears significant economic information regarding the economic motivation and the substance of the business combination. This can be used to determine which firm is the acquiring firm and which firm is the target, the acquiree.

The relevance of this topic is shown by several revisions and recent changes in international accounting standards, which expanded the current control concept by implementing a fact based, more holistic approach with IFRS 10. However, under US-GAAP, this de facto approach is currently not permitted, ASC 810-10-15-8; and IFRS 10 is still not applying relative firm characteristics except size in its guidance to distinguish the acquirer.

1.2 Research Question and Contribution

The primary objective of this study is to evaluate if firm characteristics play a role in identifying the acquirer in business combinations. The study is guided by the following research question:

> *Are relative firm characteristics of merging firms indicators for the acquirer (the controlling firm) in business combinations?*

By doing so, this study provides additional evidence on the extent to which the control concept of international standards is consistent with underlying economic motivations for business combinations.

This study suggests a theoretical framework that links merger theories to acquisition likelihood hypotheses. In doing so, this framework proposes relationships that can be

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[14] See section 3.2.1—Firm-Level vs. Owner-Level Control.

used to analyze firm characteristics. In addition to the implications for the development of merger theory, identifying determinants of acquirers has importance for practitioners, such as auditors and preparers of financial statements, when voting power is not reflective of the economic content of a transaction. So far, the guidance in international standards includes very few economic criteria that reflect motivations for business combinations. As such, the current guidance needs to be scrutinized and alidated by economic arguments for business combinations because it reflects a legal, rather than economic, construct.

Based on the theoretical framework, this study performs a meta-analysis of thirty-six empirical studies. These studies cover forty years of research, and are analyzed with regard to their findings on relative firm characteristics. The outcome of this meta-analysis is used to evaluate the importance of selected firm characteristics for the identification of the acquiring firm.

In addition, an empirical study on the control concept is conducted by using firm characteristics of the acquirer and the acquiree to analyze the extent to which relative firm characteristics reflect the control assessment in business combinations.

The general findings suggest that control is largely consistent with the economic motivation for mergers and acquisitions, and that firm characteristics of the acquirer and the acquiree reflect these motivations and, hence, are possible indicators for control in business combinations. However, economic indicators do not reflect accounting control in reverse acquisitions.

Overall, acquirers are found to be larger, more profitable, higher valued, and less levered than their acquirees. Compared with their acquirers, acquirees have an imbalance of financial resources and growth, larger free cash flows, and lower asset growth. Relative liquidity varies depending on the type of consideration transferred in exchange for control (cash or stock).

Applying merger motives as economic indicators for control can contribute to ensuring the identification of the acquirer in business combinations. This implies that practitioners may benefit by considering firm characteristics when the acquirer is difficult to identify. So far, the guidance of international accounting standards makes only limited use of relative firm characteristics as economic indicators of control.

1.3 Structure

The remainder of this study proceeds as follows.

The next section provides definitions for terms used throughout the study. Section 3 describes the regulatory framework, starting with the historical development of international standard setting for business combinations, which resulted in the general adoption of the acquisition method by the IASB and the FASB. Section 4 presents the theoretical framework for this study, summarizing the status quo of important empirical studies with regard to the merger and acquisition activity research. Section 5 builds on section 4 by performing a meta-analysis of the characteristics of takeover targets. In the meta-analysis, first, an understanding of each firm characteristic is developed with a short discussion of what is measured, and second, results of each measure are analyzed. Section 6 conducts an empirical study of acquirer and acquiree characteristics based on the findings of the two previous sections. The hypotheses are re-discussed, the research methodology is outlined, and the sample used for empirical analysis is described. The final section discusses the main findings, provides implications for theory and practice, and, finally, draws a conclusion from this study.

2 Definitions

Terms in the merger and acquisition literature, such as merger, acquisition, takeover, and consolidation, vary greatly in their definitions. One explanation is the ample area of different disciplines that mergers and acquisitions touch, including managerial, legal, financial and accounting aspects, and involving scholars as well as professionals. Therefore, several very purpose-specific and sometimes inconsistent definitions have been constructed. For that reason, this section defines the most important terms as used in this study.

The term **merger** as employed in this study applies to all types of transactions where at least two firms combine, whether through asset purchases (asset deal) or share acquisitions (share deal) and notwithstanding that one of the combining firms no longer exists after the business combination. This broad use of the term merger is due to the very vague and inconsistent adaption of this term in standards and research literature.[15] In literature, the term merger and the term acquisition are often used interchangeably.[16] For example, APB Opinion 16.9. states that "[m]ost business combinations [are] classified as 'mergers,' the acquisition of one company by another, or as a 'consolidation,' the formation of a new corporation."[17] The IASB suggests in its 2008 project summary: "A business combination is the acquisition of one business by another, and is part of what is commonly referred to as M&A (mergers and acquisitions) activity."[18] As such, the term merger as used in this study does not reflect only mergers in a proper, more specific sense, which is the combination of two corporations in which only one survives and the merged corporation goes out of existence; it includes all possible types of business combinations. As in many empirical studies, the term **takeover** equals the above definition of merger. This study uses merger and takeover as synonyms regardless of whether the takeover is hostile.[19]

Throughout this study the term **acquirer** is widely used for all firms that attempt to combine with another firm within a certain time period.[20] This also includes firms that launched unsuccessful bids. Analogously, the term **target** is used for all firms that experienced at least one bid during a certain time period.

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15 For example, Melicher/Rush (1974), pp. 141-149; Dietrich/Sorensen (1984), pp. 393-402; Wansley (1984), pp. 76-85; Pastena/Ruland (1986), pp. 288-301; Meador/Church/Rayburn (1996), pp. 11-23; Thompson (1997), pp. 37-53; Sorensen (2000), pp. 423-433; Gorton/Kahl/Rosen (2009), pp. 1291-1344; Gaughan (2011), p. 12.

16 DePamphilis (2011), pp. 13-14; Sherman (2011), p. 1-3; Gaughan (2011), pp. 12-13; Bruner (2004), p. 12.

17 APB Opinion 16. 9.

18 IASB (2008), p. 4.

19 See Gaughan (2011), p. 13; Belkaoui (1978), p. 93.

20 See DePamphilis (2011), p. 2.

The term **acquisition** applies to one company taking a controlling ownership interest in another firm, a legal subsidiary of another firm, or selected assets (also referred to as businesses,[21] e.g. a manufacturing facility) of another firm.[22] The typical feature of an acquisition is that the acquired firm continues to exist but is controlled by another firm. Thus, the definition here used corresponds to the term acquisition as implied in international accounting standards (IFRS 3, ASC 805); it includes all business combinations, unless it is a combination involving entities or businesses under common control.

The term **accounting acquirer** refers to the definitions used in current accounting standards (IFRS 3, ASC 805). The standards claim that for accounting purposes only the firm that controls another firm after considering all economic circumstances—the substance of the transaction—should be considered an acquirer. This is sometimes also referred to as the **economic acquirer**.

The **legal acquirer** is the firm that is considered the acquirer due to voting rights or other contractual agreement. The legal acquirer is not necessarily the same as the accounting acquirer. The legal acquirer usually differs from the accounting acquirer when more than one legal acquirer exists and/or if economic circumstances indicate that the legal acquirer is not the economic acquirer.[23]

The term **accounting acquiree** is also taken from the definition of current accounting standards (IFRS, ASC 805) and refers to the firm that is considered to be acquired by the accounting acquirer. The **legal acquiree** then is the counterpart of the legal acquirer and refers to a firm that has been acquired from a legal perspective, i.e., based on voting rights and contracts.

The term **ownership** (also majority ownership, controlling ownership) refers to the relationship of two or more firms in a business combination. Majority ownership in IFRS 3 and ASC 805 is rebuttable presumed when a firm holds a majority interest in another firms (in the following **firm-level** approach). However, majority ownership can also exist when the firm's owners by majority control the combined firm (**owner-level** approach). This phenomenon can lead to "reverse acquisition", in which the owner-level approach overrides the firm-level approach.[24]

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21 For example, IFRS 3.3, .B5-B12 (revised 2008).
22 See DePamphilis (2011), p. 15; Sherman (2011), p. 3; see also section 3—Regulatory Framework.
23 See section 3—Regulatory Framework.
24 See section 3.2.1—Firm-Level vs. Owner-Level Control.

3 Regulatory Framework

This section provides an overview of the development of the most relevant international accounting standards for business combinations and describes the regulatory framework to assess control and identify a business combination. Whereas the first part of this section deals with the development of standards for business combinations and consolidation in general, the second part systemizes the control requirements of IFRS and US-GAAP accounting standards in detail.

3.1 Business Combination Project Development

In 2004, the IASB and the FASB decided to jointly develop a common, high-quality standard on consolidation policy (Phase II). Prior to this date, both boards had focused separately on the elimination of most significant inconsistencies within IFRS and US-GAAP (Phase I). The most important IFRS and US-GAAP on business combinations and consolidation as well as the significant historical milestones are described and analyzed below.

3.1.1 Phase II—The Joint Project, 2004 to the Present

In December 2007 and January 2008, the FASB and the IASB, respectively, completed the second phase of their joint project on business combinations. The result of the project was the issuance of a revised version of IFRS 3—Business Combinations and an amended version of IAS 27—Consolidated and Separate Financial Statements by the IASB. At the same time, the FASB issued FAS 141 (revised 2007)—Business Combinations and FAS 160—Noncontrolling Interests in Consolidated Financial Statements; now ASC 805 and ASC 810, respectively. [25]

Then in June 2009, the FASB published Accounting Standards Update No. 2009-17, FASB Statement No. 167, Amendments to FASB Interpretation No. 46 (revised 2003), which requires a reporting entity to perform a qualitative evaluation of its power and economics to determine whether it should consolidate a variable interest entity (formerly: special purpose entity).[26] However, due to some differences to the IASB standards and some concerns from preparers of financial statements—particularly with

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[25] FAS 141 (revised 2007) is now codified by Accounting Standards Codification, ASC 805, see p. 2, fn. 13; FAS 160 is now codified by ASC 810.

[26] FASB (2011), p. 1.

regard to investment funds that are variable interest entities—the FASB "indefinitely deferred the effective date of the consolidation requirements in Statement 167".[27]

In May 2011, the IASB replaced IAS 27—Consolidated and Separate Financial Statements and the related SIC-12—Consolidation—Special Purpose Entities by publishing IFRS 10.[28] IFRS 10 establishes principles for the presentation and preparation of consolidated financial statements when an entity controls one or more other entities, and it builds on existing principles by identifying the concept of control as the determining factor in whether an entity should be included within the consolidated financial statements of the parent company. The IASB expects the standard to provide additional guidance to assist in the determination of control where this is difficult to assess, tightening up the reporting requirements for the consolidation of subsidiaries and special purpose vehicles, and requiring the substance of joint arrangements to be revealed.[29]

In November 2011, the FASB followed the IASB and issued proposed Accounting Standards Update, Consolidation (Topic 810): Principal versus Agent Analysis. Similar to the IASB's IFRS 10, the FASB wanted to "provide comprehensive guidance for the consolidation of all entities, including certain entities controlled by voting or similar interests and entities".[30] Particularly with regard to kick-out rights and variable interest entities, the FASB's proposal required the decision maker to qualitatively assess whether it is using its power as a principal or an agent.[31,32]

3.1.2 Phase I—International Consolidation Standards, Development prior to 2005

Prior to the second face, the first phase of the business combination project addressed the elimination of most significant inconsistencies within IFRS and within US-GAAP as well as across jurisdictions.

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27 FASB (2011), p. 1.

28 Together with IFRS 11—Joint Arrangements and IFRS 12—Disclosure of Interests in Other Entities, the IASB completed in May 2011 its broadly alignment of the accounting treatment for off balance sheet activities in IFRS and US-GAAP, see IASB (2011), p. 1.

29 IASB (2011), p. 1.

30 FASB (2012), p. 1.

31 When developing FAS 167 in 2009, the FASB acknowledged that the "requirements for evaluating kick-out and participating rights were not consistent with other U.S. generally accepted accounting principles (GAAP) (for example, while the consolidation guidance for a partnership that is not a variable interest entity considers the existence of substantive kick-out or participating rights, the consolidation analysis resulting from Statement 167 does not consider kick-out or participating rights, unless one party has the unilateral ability to exercise those rights). At the time, the Board decided to address that inconsistency in a subsequent project that reconsidered consolidation accounting more broadly", FASB (2011), pp. 2-3.

32 FASB (2012), p. 1.

The first phase started in 1996, when the FASB put the issue of accounting for business combinations on its agenda, which eventually led to the issuance of two new FASB standards in June 2001: the first versions of FAS 141—Business Combinations, and FAS 142—Goodwill and Other Intangible Assets which superseded APB Opinion 16 and 17.[33] FAS 141 discontinued the pooling-of-interest method by prescribing that all mergers and acquisitions be accounted for using the purchase method only.[34] It also replaced the amortization of goodwill with a goodwill impairment test.

FAS 141 superseded APB Opinion 16, which had previously prescribed the accounting treatment for business combinations in the U.S. Prior 2001, APB Opinion 16, which was issued in 1970, had codified two methods of accounting for business combinations: the purchase method[35] and the pooling-of-interest method. Purchase and pooling were not meant to be alternative methods available for any acquisition. The pooling-of-interest method was restricted to meet cumulatively the criteria set out in APB Opinion 16 for describing "mergers of equals." And, if fulfilled, the pooling-of-interest method was obligatory.

As far as the IASB, or its predecessor, IASC, are concerned, the first phase of the overhaul of standards for business combinations was completed in March 2004 when IAS 22—Business Combinations was replaced with IFRS 3 (approved 1983 and revised in 1993, 1996, 1998 and 1999) and related interpretations[36]. [37] Similar to the changes to US-GAAP discussed above, IFRS 3, as issued in 2004, then addressed the pooling of interests, goodwill impairment and amortization. Although IAS 22 allowed a restricted use of the pooling-of-interest method, the IASB rejected its further application in IFRS 3 in favor of comparability between financial statements, and because of the elimination of the pooling of interests method in the accounting standards of Australia, Canada and the United States.[38]

3.2 Standards on Firm Characteristics and Control Assessment

Since the first issuance of APB Opinion 16—Business Combinations in 1970, merger activity has increased and the definitions used in international standards of US-GAAP

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33 APB Opinion 16 dealt with Business Combinations, and APB Opinion 17 described the treatment of Intangible Assets; FASB (2001), p1.

34 APB Opinion No. 16 (1970).

35 The purchase method is substantially equal to the acquisition method, see p. 1, fn. 2.

36 SIC-9—Business Combinations—Classification either as Acquisitions or Unitings of Interests, SIC-22—Business Combinations—Subsequent Adjustment of Fair Values and Goodwill Initially Reported, SIC-28—Business Combinations—"Date of Exchange" and Fair Value of Equity Instruments.

37 IASB (2008), p. 7.

38 IFRS 3 (2004).BC38.

and IFRS have been controversial. Specifically, there has been dispute over how control, the acquirer (the controlling firm), and the acquiree (the controlled firm) are identified. Standard setters tried to resolve this by providing control definitions—, which indeed have been subject to various modifications, amendments—, and characteristics of the acquiring and the controlled firm.

IFRS 10, which was introduced in 2011, now prescribes a revised, rather holistic approach to determine which investments should be consolidated. Superseding IAS 27 and SIC-12—Consolidation—Special Purpose Entities, it proposes a single model to be applied in the control analysis for all investees, regardless of the nature of its involvement with the investee.

This "de facto" approach by the IASB, and the recent efforts by the FASB, have attempted to address the issues that are typically unclear when assessing control and identifying the acquirer. The following three cases outline major issues that occur when the current control concept is used. The first case refers to problems in identifying the acquirer, when a controlling ownership between two businesses is present. Cases 2 and 3 are concerned with the issues that arise when no majority "firm level" ownership is evident, e.g. by voting rights, but additional facts and circumstances are affecting control, e.g. voting-patterns at shareholder meetings, kick-out rights, etc.[39]

Case 1—Firm-Level vs. Owner-Level Control

(1) Ownership of majority voting interest or over 50 percent of outstanding voting shares given (firm level), but, for example, due to the fact that the acquiring firm offered more than 50 percent of its equity as consideration to the target firm, the target firm owners are becoming the majority owner of the new company (owner level).[40]

Cases 2 & 3—Ownership Uncertain

(2) Ownership of less than a majority voting interest or equal or less than 50 percent of outstanding voting shares given, but additional facts and circumstances indicate controlling ownership;

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[39] See also section 3.2.2—Ownership Uncertain, p. 17.
[40] See further explanations on the following pages.

(3) No ownership of voting interest or outstanding voting shares given, but additional facts and circumstances, the economic substance, indicate control such as it is usually the case when referring to

- special purpose entities which are created for a limited purpose, with a limited life and limited activities, and designed to benefit a single company; or
- investment funds where the fund manager has a significant decision-maker role coupled with market based remuneration which aligns the interests of investors with those of the fund manager, and investors do not hold substantive rights that could affect the fund manager's decision-making authority, so that the fund manager can be considered as a principal and not an agent anymore.

The following section describes the control assessment with regard to the categories above, outlining the process of identifying the acquirer.

3.2.1 Firm-Level vs. Owner-Level Control

APB Opinion 16—Business Combinations as issued in 1970, and which was the relevant standard concerning accounting for business combinations in the U.S. for more than 30 years, early recognized that it can be unclear which of the firms involved in an acquisition is the acquirer. APB Opinion 16.70 suggested that:

> "A corporation which distributes cash or other assets or incurs liabilities to obtain the assets or stock of another company is clearly the acquirer. The identities of the acquirer and the acquired company are usually evident in a business combination effected by the issue of stock. The acquiring corporation normally issues the stock and commonly is the larger company. The acquired company may, however, survive as the corporate entity, and the nature of the negotiations sometimes clearly indicates that a smaller corporation acquires a larger company. The Board concludes that presumptive evidence of the acquiring corporation in combinations effected by an exchange of stock is obtained by identifying the former common stockholder interests of a combining company which either retain or receive the larger portion of the voting rights in the combined corporation. That corporation should be treated as the acquirer unless other evidence clearly indicates that another corporation is the acquirer. For example, a substantial investment of one company in common stock of another before the combination may be evidence that the investor is the acquiring corporation." (APB Opinion 16.70, 1970)

Thus, standard setters since the 1970s have been concerned with the difficulties of identifying the acquirer when the merger is carried out by an exchange of stock (stock-for-stock acquisition) instead of a cash transfer. APB Opinion 16.70 recognized that the legal acquirer is not necessarily the economic acquirer, e.g. if a smaller firm acquires a larger firm with stock, it is possible that the acquirer's ownership of the combined firm is diluted so that the management of the smaller firm is actually controlled by the owners of the larger firm and a so called reverse acquisition took place.

Figure 1 outlines this phenomenon of a reverse acquisition compared to the standard acquisition. In Scenario 1, the standard acquisition, firm A acquires firm B by cash after an increase of firm A's capital stock. In Scenario 2, the reverse acquisition case, a similar acquisition as in scenario 1 is displayed in which Firm A holds a majority interest in firm B (on the **firm-level**). However, firm A's capital was increased by an exchange of equity interests with firm B. Since firm B's former owners are the new owners of the combined firm, it is concluded that firm B economically controls firm A as a result of the owner structure (**owner-level** approach). In other words, a controlling ownership on owner-level overrides control on the firm-level.[41]

[41] In contrast to this approach in which owner-level control overrides firm-level control, the IASB and the FASB concluded the following when discussing the pooling method with regard to the assertion that the pooling method properly portrays true mergers as a transaction between the owners of the combining entities rather than between the combining firms or entities: "The boards rejected that assertion, noting that business combinations are initiated by, and take place because of, a transaction between the combining entities themselves. The entities—not their owners—engage in the negotiations necessary to carry out the combination, although the owners must eventually participate in and approve the transaction." IFRS 3.BC31 (revised 2008); FAS 141.BC31 (revised 2007).

Figure 1
Control on Firm-level vs. Control on Owner-level

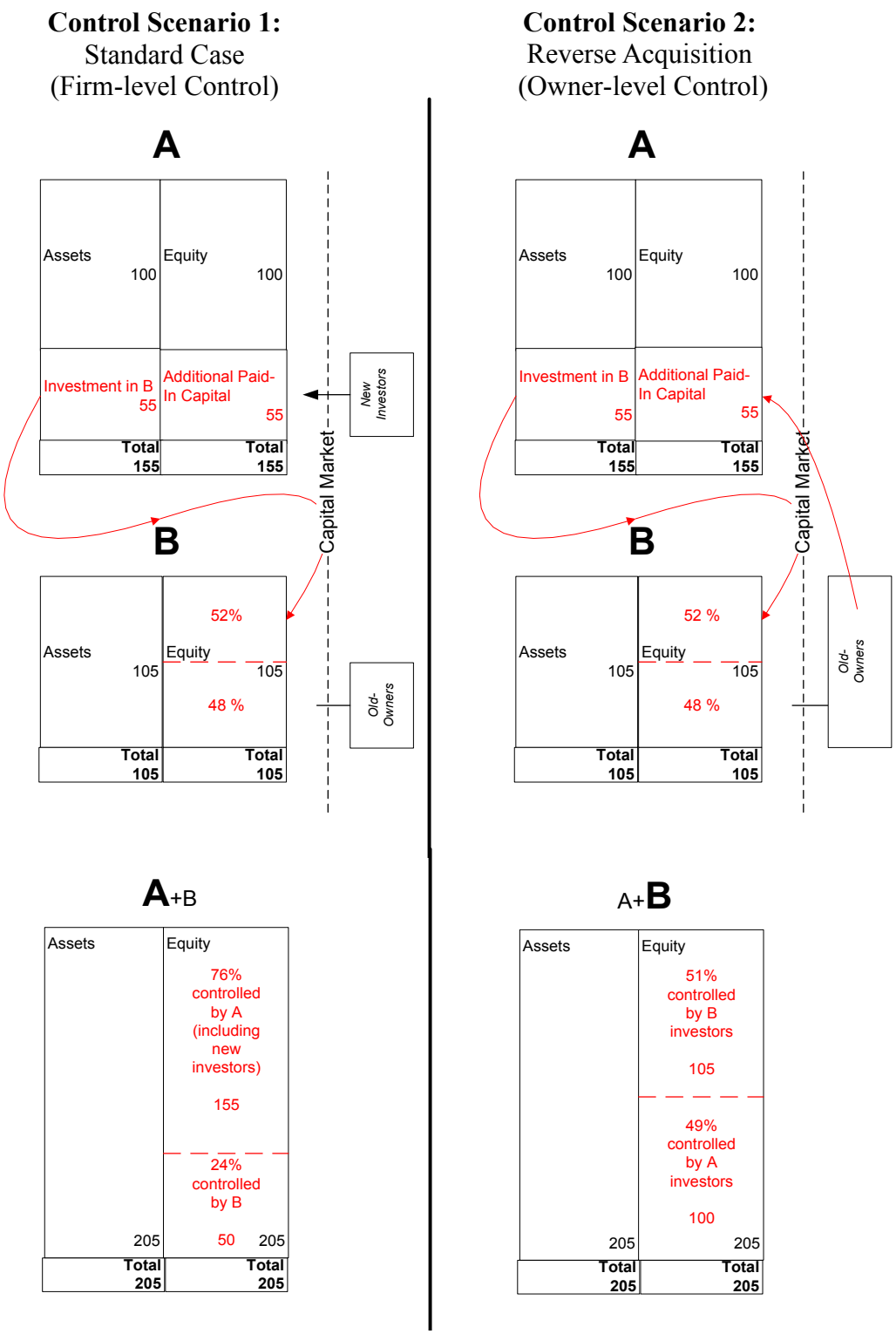

Figure 1: Control on Firm-level vs. Control on Owner-level[42]

42 Source: Author's analysis.

The IASC's first standard on business combinations, IAS 22—Accounting for Business Combinations, was published in 1983. This standard did not explicitly consider acquisitions in which the legal acquirer is treated as the accounting acquiree. The standard was defining control from a simple legal perspective, proposing that control is direct or indirect ownership of more than one half of the voting power of an enterprise, IAS 22.3 (1983).

Reverse acquisitions were first codified in IAS 22.13 (revised 1993) by the IASC, and remained unchanged until the IASB replaced IAS 22 with IFRS 3 in 2004. IAS 22.13 (revised 1993) stated in paragraph 13:

> "Occasionally an enterprise obtains ownership of the shares of another enterprise but as part of the exchange transaction issues enough voting shares, as consideration, such that control of the combined enterprise passes to the owners of the enterprise whose shares have been acquired. This situation is described as a reverse acquisition. Although legally the enterprise issuing the shares may be regarded as the parent or continuing enterprise, the enterprise whose shareholders now control the combined enterprise is the acquirer enjoying the voting or other powers identified in paragraph 11. The enterprise issuing the shares is deemed to have been acquired by the other enterprise; the latter enterprise is deemed to be the acquirer and applies the purchase method to the assets and liabilities of the enterprise issuing the shares." IAS 22.13 (1993)

The FASB published the first final version of FAS 141 in 2001. The standard mainly followed the concept of APB Opinion 16.70 (1970), suggesting in FAS 141.17 (2001) that in a "business combination effected through an exchange of equity interests, the entity that issues the equity interests is generally the acquiring entity." The FASB in its 2001 standard additionally emphasized the need to consider "all pertinent facts and circumstances" in identifying the acquiring entity. In particular, the standard demanded consideration of the following:

- the relative size of the combining entities;
- the name of the combined entity being equal the name of the acquired entity;
- the relative voting rights in the combined entity after the business combination;
- the existence of a large minority voting interest in the combined entity if no other owner or organized group of owners has a significant voting interest;
- the composition of the governing body of the combined entity;
- the composition of the senior management of the combined entity;

- the terms of the exchange of equity interests; and
- the initiator of the business combination.

The IASC approach in IAS 22.13 in 2001 was still far from the FASB's approach, as it focused on the legal structure of the combining firms. The FASB's approach was forward-looking and already incorporated a rather holistic view in which business combinations were not restricted to the relative legal structure of the combining firms but were assessed by incorporating all facts and circumstances.

Acknowledging the holistic approach used by the FASB as well as inconsistencies in its own guidance, the IASB in 2002 decided not to carry forward the guidance of IAS 22.12 for reverse acquisition in its Exposure Draft for IFRS 3.[43] The (former) IAS 22.12 approach assumed that "the entity whose owners control the combined entity is always the entity with the power to govern the financial and operating police".[44] This, however, could override the control concept for identifying the acquirer, which defined control as "the power to govern the financial and operating policies of an enterprise so as to obtain benefits from its activities".[45]

As a consequence, when IFRS 3 was issued in 2004, it stated that "irrespective of the form of the purchase consideration",[46] "all pertinent facts and circumstances shall be considered to determine which of the combining entities has the power to govern the financial and operating policies of the other entity (or entities) so as to obtain benefits from its (or their) activities", IFRS 3.21 (2004). Despite that IFRS appeared to move towards a holistic approach, IFRS 3.21 (2004) maintained a rebuttable presumption that "the entity that issues the equity interests is normally the acquirer "in a business combination effected through an exchange of equity interests.[47]

Similar to FAS 141 (2001), IFRS 3 (2004) addressed firm characteristics of the acquirer with regard to the relative size of the combining entities. Specifically, IFRS 3 (2004) noted that"[c]ommonly the acquirer is the larger entity", IFRS 3.B1-.B15 (2004). APB Opinion 16 noted this already in the 1970's, stressing "however, the facts and circumstances surrounding a combination sometimes indicate that a smaller entity acquires a larger entity", APB Opinion 16.70.

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43 IFRS 3.BC58-.BC60 (2004).
44 IFRS 3.BC57 (2004).
45 IFRS 3.BC57 (2004).
46 IFRS 3.BC58 (2004).
47 The IASB additionally provided brief guidance in IFRS 3.B1B15 (2004) with regard to accounting for reverse acquisitions, as well as an example for firms that combine in a reverse acquisition in order to avoid business combinations that were motivated by the desire to go public without undergoing a formal IPO.

The 2008 revision of IFRS 3 did not substantially alter the guidance on the identification of the acquirer provided by IFRS 3 (2004). However, IFRS 3.B15 (revised 2008) did use FASB's wording, and it listed pertinent facts that should be considered which were similar to the ones already issued with the FAS 141.17 (2001) standard. The list issued by IFRS suggested that in a business combination effected primarily by exchanging equity interests, the following should be considered:

- the relative voting rights in the combined entity after the business combination;
- the existence of a large minority voting interest in the combined entity if no other owner or organized group of owners has a significant voting interest;
- the composition of the governing body of the combined entity;
- the composition of the senior management of the combined entity;
- the terms of the exchange of equity interests;
- the relative size of the combining entities; and
- the initiator of the business combination.

The FASB's 2007 revision of FAS 141 also did not change much. The terminology was changed to comply with the acquisition method (formerly purchase method),[48] and detailed instructions were given on how to measure the consideration transferred, goodwill, and non-controlling interest, FAS 141.A108-129 (revised 2007). However, no further instruction to indicate how to identify the acquiring entity was provided than that already available in the 2001 version of FAS 141.

To sum up, accounting standards so far rarely make use relative firm characteristics to identify the acquirer in business combinations. However, both boards, the IASB and the FASB, indicate that relative firm size is a relevant determinant of the acquirer.

3.2.2 Ownership Uncertain

As outlined previously, the acquired voting rights are usually the basis for identifying a business combination and distinguishing the acquirer. But what if additional variable interests exist, for example, those arising from convertible instruments, options, or forward contracts? What about minority shareholder veto rights despite majority ownership? Or, what if the managers of the acquired firm replace the management of the combined firm? In more than forty years of international standard setting on firm's control assessment, there has been much controversy on the guidance and definition of control in the standards.

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[48] See p. 1, fn. 2.

In May 2011, the IASB issued IFRS 10—Consolidated Financial Statements, which superseded IAS 27—Consolidated and Separate Financial Statements and SIC-12—Consolidation—Special Purpose Entities. The standard was largely issued because the IASB had observed major divergences in the application of the control concept of IAS 27 and the concept of economic substance with regard to special purpose entities in SIC-12. In its conclusions on IFRS 10, the IASB stressed that entities varied in their application of the control concept,[49] noting that entities diverged in the following:[50]

> "(a) in circumstances in which an investor controls an investee but the investor has less than a majority of the voting rights of the investee (and voting rights are clearly the basis for control).
>
> (b) in circumstances involving special purpose entities (to which the notion of 'economic substance' in SIC-12 applied).
>
> (c) in circumstances involving agency relationships.
>
> (d) in circumstances involving protective rights." (IFRS 10.BC2)

The IAS 27 defines control in IAS 27.4 (revised in 2008), and in IAS 27.6 (2003) as "the power to govern the financial and operating policies of an entity so as to obtain benefits from its activities"; control is presumed to be rebuttable when "the parent owns, directly or indirectly through subsidiaries, more than half of the voting power of an entity."[51] SIC-12 which interpreted the requirements of IAS 27 in the context of special purpose entities required a "risks and rewards" approach, placing greater emphasis on the "economic substance" of transactions.

However, the "risk and reward" approach of SIC-12 was perceived to lead potentially to inconsistent accounting with regard to the control definition of IAS 12. Especially, it was unclear when to place more emphasis on "risk and rewards" (SIC-12) and when on the "power to govern the financial and operating policies of an entity so as to obtain benefits from its activities" (IAS 27).[52] The IASB recognized this lack of a clear guidance towards the relationship between IAS 27 and SIC-12, observing the fact that "assessing control sometimes resulted in a quantitative assessment sharp 'bright line' distinctions created structuring opportunities to achieve particular accounting outcomes."[53] Particularly, the dealing with the risk of off-balance investments,

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49 IFRS 10.IN3, .IN4.
50 IFRS 10.BC2, similarly IFRS 10.IN9.
51 IAS 27.4 (revised in 2008), IAS 27.6 (2003).
52 IFRS 10.BC3.
53 IFRS 10.BC3; IFRS 10.BC37.

eventually resulted in G20 leaders, the Financial Stability Board and others[54] asking the IASB to review the accounting and disclosure requirements for "off balance sheet vehicles".[55]

With IFRS 10, the IASB attempted to solve the inconsistencies by implementing a hierarchy that contrasted the extent of control with the investor's possible risk and rewards. This approach underlined IASB's view that the basis for consolidation is control—understood as the investor's current ability to direct those activities of the investee that significantly affect the investee's returns and can benefit by using that ability[56]—and it is applied irrespective of the nature of the investee.[57] Risk and reward should only additionally be considered as an indicator for control. However, as it is not perfectly correlated with the investor's power over the investee, risk and reward alone cannot be used to determine that the investor has control over the investee.[58]

The IASB's objective in developing the guidance in IFRS 10 then was to provide a principle's based approach to determining control that could be used as the single standard in all types of business combinations.[59]

Control as defined in IFRS 10.6 applies three requirements simultaneously:[60]

- an investor's power over the investee;
- an investor's exposure, or rights, to variable returns from its involvement with the investee; and
- an investor's ability to use its power over the investee to affect the amount of the investor's returns.

Assigning control under IFRS 10.11 is sometimes straightforward: When power over an investee is obtained directly and solely from the voting rights granted by equity instruments such as shares it may be assessed by considering these voting rights from those shareholdings. However, IFRS 10 also notes that there are other cases, in which the assessment will be more complex and will require additional factors to be considered. IFRS 10 explicitly states that an investor can de facto control the investee by owning less than 50 percent of voting rights, for example, if the other interests are widely dispersed and the other shareholders are not organized such that they actively

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54 See, for example, recommendation made in the Financial Stability Forum's April 2008 and 2009 Reports, the G20 Washington Action Plan and the London Summit Statement, FSB (2009), p. 2.
55 IFRS 10.BC4.
56 IFRS 10.BC31.
57 IFRS 10.BC29.
58 IFRS 10.BC32.
59 IASB (2012), p. 8.
60 IFRS 10.BC.41.

vote. This also includes voting patterns at previous shareholder meetings, special relationships, and other evidence that the investor has been directing relevant activities of the investee and carries the related exposure towards variable returns, IFRS 10.10-.18, .B80-.B85. Under US-GAAP, this is currently not permitted, ASC 810-10-15-8, and IAS 27 did not contain such a statement. As such, IFRS 10, in contrast to IAS 27, acknowledges that control can be achieved in several ways, not just through governing financial and operating policies. Also, although risk and rewards are not the sole focus, they are incorporated in IFRS 10's control approach, provided that they can be linked to the investor's right to direct the relevant activities.[61]

Furthermore, whereas IAS 27 considered only "currently exercisable" potential voting rights when assessing control, IFRS 10 requires consideration of all potential voting rights, even if they are not currently exercisable; however, they must be substantive.[62] The term "substantive" refers to the right holder's practical ability to exercise its rights, especially in situations where decisions about the direction of the relevant activities need to be made.[63]

Additionally relevant when assessing control may be the delegation of the decision-making authority (e.g. in case of investment funds). Acknowledging this, IFRS 10 requires an investor with decision-making rights to determine whether it is a principal or an agent relationship, IFRS 10.B58, .B59. An agent is defined as "a party primarily engaged to act on behalf and for the benefit of another party or parties (the principal(s)) and therefore does not control the investee when it exercises its decision-making authority". IFRS 10.B58. IAS 27 and SIC-12 had no such specific guidance regarding situations when power is delegated by a principal to an agent.

In assessing agency relationships, the general guidance in IFRS 10 and, in particular, all the following factors as codified in IFRS 10.B60 should be applied to evaluate control:

- the scope of its decision-making authority over the investee;[64]
- the rights held by other parties;[65]
- the remuneration to which it is entitled in accordance with the remuneration agreement(s);[66]

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61 IASB (2012), p. 8.
62 IASB (2012), p. 8.
63 IASB (2012), p. 8.
64 IFRS 10.B62, .B63
65 IFRS 10.B64-.B67.
66 IFRS 10.B68-.B70.

- the decision maker's exposure to variability of returns from other interests that it holds in the investee.[67]

If no investor with control over the investee is identified, then other IFRS are relevant, such as IFRS 11—Joint Arrangements, IAS 28—Investments in Associates and Joint Ventures or IFRS 9—Financial Instruments.

Due to consolidation issues and unintended off-balance sheet reporting with regard to variable interest entities that were similar to the issues that the current IASB's control approach faced and aimed to solve with IFRS 10,[68] the FASB in January 2011 decided to substantially align its consolidation requirements for investments with IFRS 10.[69] So far, the FASB, since 2009, uses a qualitative analysis approach in FIN 46 (Revised), focusing on the power over and returns from an investee to determine control (FAS 167—Amendments to FIN 46 (Revised)).[70]

In November 2011 the FASB published a proposal for an Accounting Standards Update, Consolidation (Topic 810): Principal versus Agent Analysis. This proposal provided guidance for assessing the principal-agent relationship that is similar to IFRS 10. However, respondents to comment letters indicated their concerns toward the qualitative guidance in this Exposure Draft.[71] In particular, respondants complained that objectives that the agent or the principal could possibly pursue and their impact on control assessment are not indicated.[72]

3.3 Interim Summary of Chapter 3

For more than forty years, international standards setters have provided guidance on the identification of the acquirer (and the acquiree, respectively) in business combinations.

Thus far, the approach of international standard setters, IASB and FASB, is that control determines the acquirer. Control is primarily indicated by voting rights and similar contractual agreements, so is determined mainly on a legal basis. Although recent IASB and FASB guidance has begun to consider additional features when control is unclear, such as the investor's risks and rewards or factual ownership, it is

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67 IFRS 10.B71, .B72.
68 See also p. 18, fn. 53.
69 IASB (2012), p. 4.
70 The requirements of FAS 167 were afterwards included in Accounting Standards Update No. 2009-17; IFRS 10.BC35.
71 FASB (2012), p. 3.
72 FASB (2012), p. 3.

still questionable whether this will lead to representing the economic substance of business combinations rather than merely their legal form in cases.

The latest approach of IFRS 10 and the current exposure draft by the FASB are attempts to address the issues that are typically unclear when assessing control and identifying the acquirer. The holistic approach of IFRS 10 incorporates a consideration of “de facto” control when assessing whether the investor controls the investee. US-GAAP do currently not contain such a statement.

However, economic motivations for business combinations—in terms of relative firm characteristics—are still not addressed in IFRS or US-GAAP when control is determined. So far, there is only one criterion, the relative size, which refers to the relative characteristics of merging firms. All other criteria determining which party is the acquirer or the acquiree rather refer to ownership characteristics, such as voting rights, owner structure, management composition, voting patterns.

4 Theoretical Framework

There is no rigorous, comprehensive theoretical model of the acquisition process yet. Instead, there is a bundle of more or less theoretically connected hypotheses—sometimes referred to as theories or theoretical approaches. Most of these theories have been subject to empirical analysis in prior literature. An important part of this literature concerns takeover likelihood and the prediction of takeover targets.[73]

This study's purpose is to analyze the role of firm characteristics in identifying the acquirer in business combinations. Therefore, this section aims to provide a theoretical framework, connecting theories of acquisition likelihood and firm characteristics in order to describe the relationship of acquirer and target firms. This framework does not preset to be exhaustive or fully valid. It is designed in the first place to reduce complexity in the theoretical context of mergers and acquisitions, hopefully providing a frame and plausible dimensions for this and for future analysis. It is needed in this study to prepare the empirical analysis of important economic indicators of the acquiring and the target firm and their implications for the current control conception. Based on this framework, a meta-analysis will be conducted in section 5 of this study, providing a detailed analysis of the findings of empirical takeover studies. In section 6, this framework is used to guide an empirical study on relative firm characteristics of acquirers and the acquirees in business combinations.

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[73] For example, Monroe/Simkowitz (1971), pp. 1-16; Singh (1971); Stevens (1973), pp. 149-158; Melicher/Rush (1974), pp. 141-149; Kuehn (1975); Singh (1975), pp. 497-515; Castagna/Matolcy (1976); Belkaoui (1978), pp. 93-108; Harris/Stewart/Guilkey/Carleton (1982), pp. 164-184; Palepu (1982); Wansley/Lane (1983), pp. 87-98; Dietrich/Sorensen (1984), pp. 393-402; Wansley (1984), pp. 76-85; Hasbrouck (1985), pp. 351-362; Bartley/Boardman (1986), pp. 41-55; Palepu (1986), pp. 3-35; Hannan/Rhoades (1987), pp. 67-74; Bartley/Boardman (1990), pp. 53-72; Ambrose/Megginson (1992), pp. 575-589; Bacon/Shin/Murphy (1992), pp. 8-; Davis/Stout (1992), pp. 605-633; Trahan/Shawky (1992), pp. 81-94; McGuinness (1993), pp. 215-231; Trahan (1993), pp. 21-35; Walter (1994), pp. 349-377; Meador/Church/Rayburn (1996), pp. 11-23; Chen/Su (1997), pp. 71-82; Powell (1997), pp. 1009-1030; Thompson (1997), pp. 37-53; Zanakis/Zopounidis (1997), pp. 678-687; Barnes (1998), pp. 573-591; Barnes (1999), pp. 283-301; Barnes (2000), pp. 147-162; Cudd/Duggal (2000), pp. 105-120; Sorensen (2000), pp. 423-433; Powell (2001), pp. 993-1011; Akhigbe/Madura/Whyte (2004), pp. 55-71; Doumpos/Kosmidou/Pasiouras (2004), pp. 191-211; Panigrahi (2004), pp. 16-25; Powell (2004), pp. 35-72; Ooghe/De Langhe/Camerlynck (2006), pp. 725-733; Tsagkanos/Georgopoulos/Siriopoulos (2006), pp. 183-194; Daniels/Phillips (2007), pp. 57-74; Kumar/Rajib (2007), pp. 27-44; Azofra/Olalla/Olmo (2008), pp. 53-63; Bhabra (2008), pp. 158-175; Tsagkanos/Georgopoulos/Siriopoulos/Koumanakos (2008), pp. 180-192; Baixauli/Fernández (2009), pp. 69-86; Brar/Giamouridis/Liodakis (2009), pp. 430-450; Check/Walker/Randall (2009), pp. 41-55; Desyllas/Hughes (2009), pp. 393-402; Gorton/Kahl/Rosen (2009), pp. 1291-1344; Pasiouras/Gaganis/Zopounidis (2010), pp. 328-335; Burns/Liebenberg (2011), pp. 1028-1046; Cai/Song/Walkling (2011), pp. 2242-2285; Komlenovic/Mamun/Mishra (2011), pp. 239-235; Shim/Okamuro (2011), pp. 193-203.

4.1 Overview: Incentives and Barriers Approach

The here presented framework considers merger activity as predominantly arising from potential prospective merger gains. As described below, merger gains commonly accrue from several strategic decisions that incorporate the consideration of incentives and barriers. Figure 2 illustrates the relationship and dimensions of the theoretical framework, which will guide the further analysis in this study.

Figure 2
Theoretical Framework

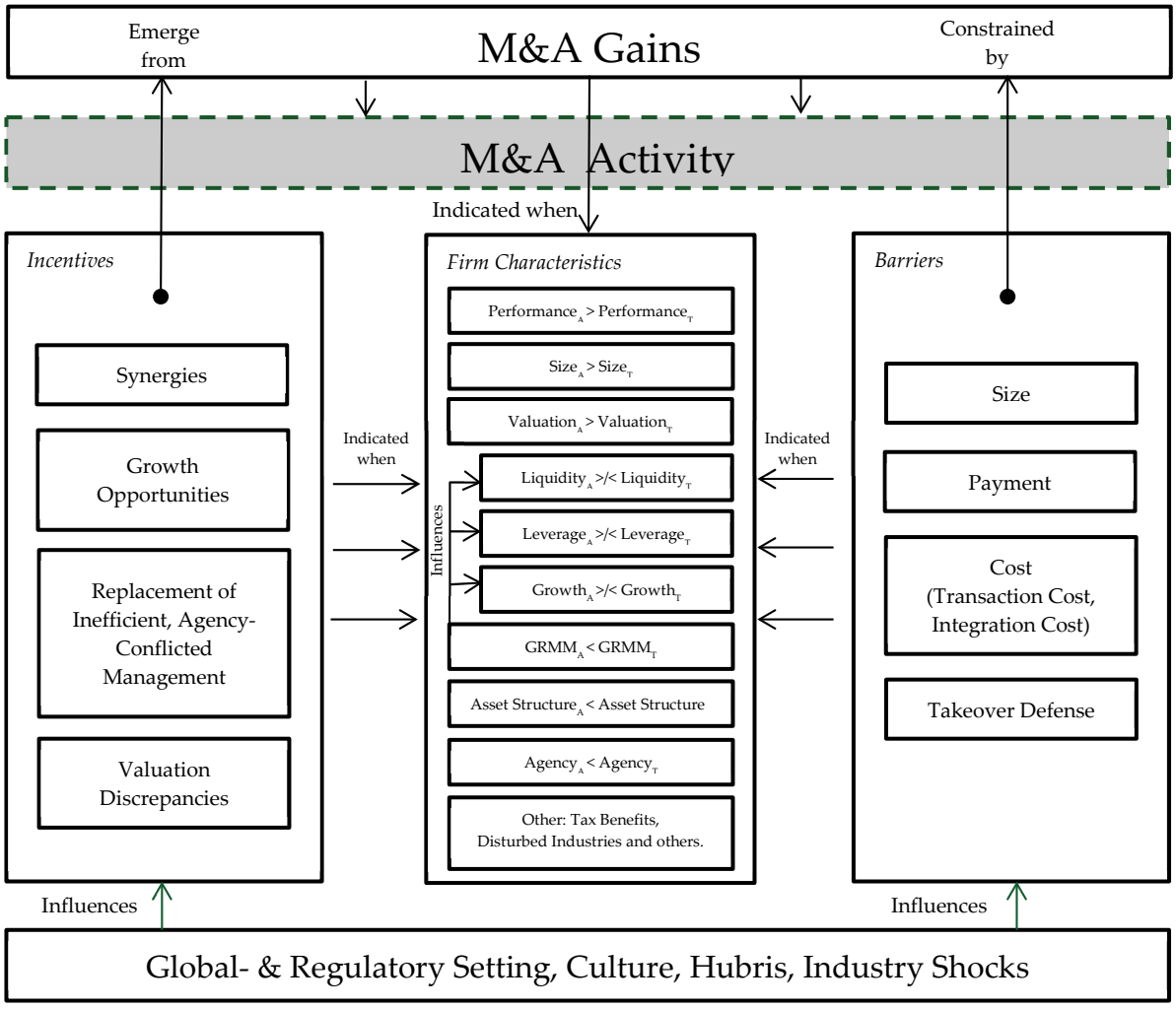

Figure 2: Theoretical Framework[74]

74 Source: Author's analysis.

Incentives emerge primarily from synergies and growth opportunities that are interconnected, for example, with control mechanisms to replace poor or agency-conflicted management. Literature provides several acquisition likelihood hypotheses that are based on the rationale of potential merger gains. They refer to the dimension of performance (understood predominantly as accounting profitability), valuation discrepancies, free cash flow and the firms' dividend policy (to capture potential agency conflicts), and the firms' leverage, liquidity and growth. In addition to incentives which enforce merger activity, barriers to merger activity are identified. These barriers manifest in firm characteristics such as firm size (particularly for smaller firms in acquiring larger firms) or asset structure of firms (which is supposed to coinsure a merger). Incentives and barriers are exposed and influenced, among other things, by the global setting, by antitrust and other business regulation, by cultural aspects, particularly with regard to the integration of one business into another, as well as by the sometimes irrational belief (pride or hubris) of managers to earn returns from potentially unfavourable acquisitions,[75] or by the impact of changing environment due to industry-related "economic shocks".

4.2 Incentives of Acquisition Activity

4.2.1 Synergies

A major driver for mergers and acquisitions is the likelihood of a deal to create economic value by synergistic gains.[76] The synergistic value stems from reduced cost and/or enhanced earnings,[77] and is enacted based on the "economics of an opportunity".[78] Synergies are commonly expected to emerge if the combination of two or more businesses generates a greater shareholder value than the individual businesses, or simply the popular expression "1 + 1 = 3". If the synergistic effects outweigh both the transaction costs (TAC), such as the legal, consulting, and organizational costs that occur through and as a consequence of the acquisition, and the premium paid to target shareholders, firms achieve a positive net present value (NPV) when entering the business combination (Figure 3).[79]

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75 Roll (1986), pp. 197-216.
76 Jensen/Ruback (1983), pp. 5-50; Bradley/Desai/Kim (1983), pp. 183-206; Grossman/Hart (1986), pp. 691-719; Jacoby (1970), pp. 35-48; Roll (1988), pp. 241-252, Jensen (1987), p. 111; Jensen (1988), p. 28.
77 Houston/James/Ryngaert (2001), pp. 285-331.
78 Chatterjee (1986), pp. 119-139; Bruner (2004), p. 5.
79 Gaughan (2011), p. 132.

Figure 3
Net Present Value of Business Combinations

$$NPV = NPV_{AB} - (NPV_A + NPV_B) - NPV_{TAC}$$

Where:

NPV	=	NPV of a business combination;
NPV_{AB}	=	Combined value of two firms;
NPV_A, NPV_B	=	Individual value of firm A and firm B; and
NPV_{TAC}	=	Transaction cost

Figure 3: Net Present Value of Business Combinations

Approaches in investigating synergies resulting from mergers apply predominantly an event study methodology based on capital market data, examining abnormal returns (CAR) to target firm shareholders, acquirers and the combination of both during the merger announcement period.[80] Several studies suggest that mergers yield in a premium return mainly to target firm shareholders and that almost all of the studies report positive returns of the combined firm.[81] However, according to Bruner (2004) the distribution of market returns to acquiring firm's shareholders is mixed with a slight positive bias (26 percent of empirical studies in his sample show significantly negative returns; 31 percent show insignificantly different from zero and 43 percent indicate value creation, showing positively significant returns).[82]

Other research approaches are based on financial statement data comparing the pre- and post-merger performance (in terms of accounting profitability, cash flow enhancement and asset productivity) or the surveys of executives. These studies show similar results compared with the ones of the event study approach.[83] Recent findings on synergistic gains and underlying hypotheses are discussed in the following section along with the types of synergies that can generally be classified as operating and financial synergies.[84]

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80 Chatterjee (1986), pp. 120; for a review of market-based event studies, Bruner (2004), pp. 36-65.
81 Bruner (2004), pp. 36, 44-49.
82 Bruner (2004), pp. 36-49.
83 Bruner (2004), pp. 47-65.
84 Lewellen (1971), p. 521.

4.2.1.1 *Operating Synergy*

Operating synergies emerge from economies of scale, economies of scope, and revenue enhancement.[85] Economies of scale arise because fixed costs are spread over increased production volume. With this rising output level, the cost per unit declines. Moreover, increased specialization of labor and management may improve the combined firm's efficiency.[86] Indeed, several empirical studies in this area document post-merger efficiency and productivity improvements. For example, Westen/Mansinghka (1971) document increased profitability for 63 conglomerate mergers between 1958 and 1968.[87] Halpern (1973) suggested that gains and premiums increased for 77 merging firms between 1950 and 1965.[88] Jensen/Ruback (1983) indicate in their meta-analysis on the market for corporate control that corporate takeovers generate positive gains, that target firm shareholders benefit, and that shareholders of the bidding firm do not lose.[89] Also, a recent study of shareholder wealth and horizontal takeovers by Shahrur (2005), which uses a sample of 463 horizontal mergers and tender offers from 1987 to 1999, proposes that on average takeovers are driven by efficiency considerations.[90] However, Lang/Stulz (1994) use a sample of 512 firms between 1978 and 1990 and analyze Tobin's Q and its relation to firm diversification. They find that highly diversified firms are consistently lower valued than specialized firms.[91] With regard to productivity, Lichtenberg/Siegel (1978) use a sample of 20,493 manufacturing plants owned by more than 5,700 firms from 1972 to 1981, and suggest that efficiency increases after ownership changes.[92] Healy/Palepu/Ruback (1992), who analyze the 50 largest U.S. mergers between 1979 and mid-1984, as well as Powell/Stark (2005), who use 191 mergers between 1985 and 1993, show that merging firms have significant improvements in asset productivity relative to their industries.[93] McGuckin/Nguyen (1995), who analyze an unbalanced panel of 28,294 plants between 1977 and 1987, and Maksimovic/Phillips (2001), who investigate 35,291 transactions from 1974 to 1992, state that transferred plants after acquisition experience improved allocation of resources and better productivity

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85 Jacoby (1970), pp. 35-48; Gaughan (2011), pp. 135-143, DePamphiliy (2012), pp. 5-7.

86 DePamphilis (2012), p. 5; coordinating larger scale operations can also yield in higher costs of operations, Gaughan (2011), p. 137; however, efficient mergers can be scale-increasing or scale-decreasing, Eckbo (1992), pp. 1005-1029; Andrade/Stafford (2004), pp. 1-36; Shahrur (2005), pp. 61-98.

87 Westen/Mansinghka (1971), pp. 919-936.

88 Halpern (1973), pp. 554-575.

89 Jensen/Ruback (1983), pp. 5-50.

90 Shahrur (2005), pp. 61-98.

91 Lang/Stulz (1994), pp. 1248-1280.

92 Lichtenberg/Siegel (1978), pp. 643-683.

93 Healy/Palepu/Ruback (1992), pp. 135-176; Powell/Stark (2005), pp. 293-317.

performance.[94] Fee/Thomas (2004) use a sample of 554 transactions between 1980 to 1997, and suggest that gains in horizontal mergers result from improved productive efficiency and buying power.[95]

Economies of scope are achieved by using one set of inputs to produce a broader range of products or services.[96] Several studies investigate economies of scales using mergers of professional service firms, especially financial institutions such as banks. While bank mergers potentially lead to shared service cost (for personnel and operating expenses) and broader service offerings (such as teller transactions, ATMs serviced, trust departments, investment products or market analysis groups), and thus have ample opportunities to reduce redundancies and exploit synergies.[97] Studies using merger data from the 1980s have found little to no evidence that mergers create significant gains for banks, and studies using merger data from the 1990s and later have found only slight evidence of merger gains. For example, Houston/Ryngaert (1994), (1997), who investigate the stock market's perception of 153 and 184 bank mergers announcements, respectively, in the period from 1985 to 1991, fail to find any significant cost savings resulting from bank mergers for the combined firm.[98] Houston/Ryngaert (1994) finds an abnormal significant return for the target firm of 14.77 percent, and Houston/Ryngaert (1997) finds an abnormal significant return for the target firm of 20.4 percent, but these gains exists only if acquirers and target banks are considered separately. The corresponding abnormal return of the acquirer banks in both studies is slightly negative (-2.25 percent and -0.24 percent, respectively). Rhoades (1998) applies a case study approach analyzing nine promising bank mergers during the early 1990s, and documents that only four of the nine bank mergers resulted in successful improvements despite that he initially believed all were likely to yield efficient gains from significant cost cutting.

However, recent studies claim to correct for some methodological flaws and document increased performance of the merged banks in the 1990s compared to the 1980s. For example, one of the first, Vennet (1996) analyzes a sample of 492 European takeovers (422 domestic and 70 cross-border acquisitions) from 1988 to 1993, which is after deregulation and harmonization efforts in the European banking sector, and finds that domestic mergers significantly increase the performance of the merged bank,

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94 McGuckin/Nguyen (1995), pp. 257-276; Maksimovic/Phillips (2001), pp. 2019-2065.
95 Fee/Thomas (2004), pp. 423-460.
96 Gaughan (2011), p. 138; DePamphilis (2012), p. 6; Sherman/Rupert (2006), p. 257.
97 A case study and overview of related research can be found in Gaughan (2011), 138-142.
98 Houston/Ryngaert (1994), pp. 1155-1176; Houston/Ryngaert (1997), pp. 197-219.

especially among equal-sized partners.[99] In a study of 558 bank mergers from 1980 to 1997, Becher (2000) reports abnormal returns of 3 percent for the combined firm, abnormal returns of over 22 percent for targets, and abnormal returns of -0.1 percent for bidders. He additionally shows that bank mergers in the 1990s have been more successful than bank mergers in the 1980s.[100] Further studies using datasets from the 1990s similarly report performance improvements through mergers.[101]

In addition to cost reducing synergies, such as economies of scale and economies of scope, revenue enhancement is an element of operating synergies. Potential sources of revenue enhancement are diverse and vary throughout mergers.[102] A common example is cross-marketing of products; merging firms may use brand names or distribution networks symbiotically to increase profits and shareholder returns. While the impact of revenue enhancement may be economically significant, it is usually measured jointly with cost reducing effects captured by the previously presented pre- and post-merger profitability studies. With regard to the premerger relationship between acquirer and target firms, which is of particular interest to this study, there are few recent empirical studies suggesting that synergistic gains are related to premerger where performance measured in terms of size, market valuation, and dividend policy.[103]

Some researchers attribute merger gains to management changes through merger rather than to synergies, and analyze them under the performance hypothesis. They argue that mergers allow for the replacement of poorly performing management.[104] For example, Jensen/Ruback (1983), who consider merger gains resulting from replaced management as non-synergistic gains.[105] Indeed, the effects of gains from cost-reduction and revenue enhancement usually occur concurrently with the benefits of a new, more capable management. Therefore, this is reconsidered in section 4.2.3—Managerial Inefficiencies and Performance.

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99 Vennet (1996), pp. 1531-1558.

100 Becher (2000), pp. 189-241.

101 For example, Houston/James/Ryngaert (2001), pp. 285-331; Lang/Wetzel (1999), pp. 273-286; Rhoades (1998), pp. 273-291; Cuesta/Orea (2002), pp. 2231-2247; Cybo-Ottone/Murgia (2000), pp. 831-859; Valverde/Hamphrey (2004), pp. 137-157; DeLong (2001), pp. 221-252; Fiordelisi/Molyneux (2010), pp. 241-253; Sherman/Rupert (2006), pp. 253-268; Behr/Heid (2011), pp. 117-135.

102 Gaughan (2011), pp. 134.

103 Bernile/Bauguess (2011), pp. 1-48.

104 See Gaughan (2011), p. 133; Section 4.2.3—Managerial Inefficiencies and Performance.

105 Jensen/Ruback (1983), pp. 5-50; other studies take a broader approach and include management-induced gains, for example, Asquith (1983), pp. 51-83; Bradley/Desai/Kim (1983), pp. 183-206; Gaughan (2011), p. 133.

4.2.1.2 *Financial Synergy*

Financial synergy usually refers the reduction in cost of capital of the combined firm, meaning that the merged firms has access to new capital markets, resulting in higher liquidity and financing opportunities to realize value creation.[106] The reduction of the cost of capital through merger implies a reduction in the default risk of one or both merging firm. In theory, the combination of two firms with uncorrelated (or not perfectly correlated) cash flows decreases the capital risk of the combined firm and, hence, the cost of capital.[107] In other words, the combined firm is able to take more risk, and can thus finance profitable investment projects by taking more debt. This may occur because the merging partner can help to prevent the financial failure and bankruptcy of the other firm by its cash flows. This concept is referred to as mutual "debt co-insurance" of merging firms, and was first advanced by Lewellen (1971). It is considered to maximise shareholder wealth by preventing creditors from suffering losses, hence, increasing the debt-capacity of the combined firm.[108] In contrast to this reasoning, Higgins/Schall (1975), Rubinstein (1973) and Galai/Masulis (1976) argue that financial resources due to mergers are not real and only shift risk from debtholders to equity holders, so that the price of the corporate co-insurance is effectively paid by the equity-holders.[109] Consequently, the benefits to shareholder wealth of increased debt capacity may be offset by a higher cost to equity holders due to a higher risk of bankruptcy after merger. Also, Levy/Sarnat (1970) theorizes that "such a premium will not be forth-coming in a perfect capital market because the superior risk-return combination […] could have been achieved by investors, even in the absence of the merger, by combining the individual shares in a portfolio", however, at the same time acknowledging that "[b]y increasing the size of the firm, mergers may create financial advantages. For example, large firms have better access to the capital markets and also enjoy significant cost savings when securing their financing needs."[110] This advantage results in greater access to new borrowings and increased ability to raise capital after the merger. Higgins/Schall (1975) and Galai/Masulis (1976) argue that a wealth reducing shift from bondholders to shareholders is offset to some extent by tax savings on the interest payments (tax shield) when new debt is issued after the merger.

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106 Gaughan (2011), pp. 144-145; DePamphilis (2012), pp. 7-8; Dietrich/Sorensen (1984), p. 395; Leland (2007), pp. 765-807.

107 Markowitz (1952), pp. 77-91; Tobin (1958), pp. 65-86; Levy/Sarnat (1970), pp. 795-802.

108 Lewellen (1971), p. 530.

109 Higgins/Schall (1975), pp. 93-113; Rubinstein (1973), pp. 167-181; Galai/Masulis (1976), pp. 53-81; Lee (1977), pp. 1527-1537; Kim/McConnell (1977), pp. 349-365; Gaughan (2011), p. 144.

110 Levy/Sarnat (1970), pp. 796, 801.

One of the first efforts to empirically determine the impact of corporate mergers on the market value of the merging firms' debt was undertaken by Kim/McConnell (1977).[111] They analyzed 39 merging firms with 44 bonds outstanding for the period 1960 to 1973. They find no statistically significant transfer of wealth from stockholders to bondholders, but document that merged firms do make greater use of financial leverage after the merger than the independent firms do before the merger.[112] Later studies document conflicting results with regard to excess returns on bonds at the announcement of a merger. For example, Dennis/McConnell (1986) report significant negative acquirer bond returns and insignificant target bond returns using a sample of 67 bonds of 39 acquirers and 27 bonds of 21 targets.[113] However, Maquieira/Megginson/Nail (1998) find significant positive acquirer bond returns and insignificant target bond returns in a sample of 504 acquirer bonds and 124 target bonds in 260 mergers.[114] The failure to find significant wealth effects for target bonds may be due to sample size and available bond price data. For example, Billett/King/Mauer (2004) find evidence of a co-insurance effect of 1.09 percent up to 4.30 percent for target bonds during the announcement period of the merger using a large sample of 818 bonds of 265 target firms and 3,083 bonds of 831 acquiring firms.[115] Penas/Unal (2004) reports similar findings. They study 66 bank mergers and 282 bonds, and find 4.33 percent positive cumulated adjusted bond return for targets bonds and 1.24 percent for acquirer bonds.[116] Another indication of possible wealth transfer from bondholders to shareholders resulting from the so-called bankruptcy avoidance rationale was found by Shrieves/Stevens (1979). They document that 15.2 percent of acquired firms are near bankruptcy at the time of acquisition, which is highly significant when compared to non-acquired firms.[117]

111 Kim/McConnell (1977), pp. 349-365.
112 Kim/McConnell (1977), pp. 362.
113 Dennis/McConnell (1986), pp. 143-187.
114 Maquieira/Megginson/Nail (1998), pp. 3-33.
115 Billett/King/Mauer (2004), pp. 107-135.
116 Penas/Unal (2004), pp. 149-179.
117 Shrieves/Stevens (1979), pp. 501-515.

4.2.1.2.1 Leverage, Co-Insurance, and Capital Structure

Despite the controversy concerning the co-insurance effect of corporate debt, there is much agreement in empirical studies that underutilized debt capacity represents a financial rationale for merger.[118]

Several empirical takeover likelihood studies, such as Stevens (1973), Melicher/Rush (1974), Wansley/Lane (1983), Wansley (1984), Bartley/Boardman (1986), Walter (1994), and Barnes (1998), (1999), (2000),[119] refer to the suggestion in Lewellen (1971) that underutilized debt capacity of a firm is an important acquisition rationale.[120] Lewellen (1971) argues that a merger is a form of taking advantage of latent debt capacity.[121] The takeover studies reason accordingly that by acquiring a less levered firm, the acquiring firm's debt ratio is lowered, which benefits the combined firm by reducing the overall cost of capital and allowing for increased borrowing.[122] As such, low leverage may signal unused debt capacity, which a potential acquirer would find attractive. Thus, theory predicts that the acquiring firm has higher leverage than the target firm before the merger.[123]

A similar conclusion may result when agency conflicts between management and shareholders are considered. Jensen (1986) stresses the incentive effects of debt in limiting managerial discretion over the use of free cash flow,[124] which suggests the possibility of raised agency problems at low levels of debt.[125] Takeover literature builds upon this theory and argues that firms with agency problems have low levels of debt, high distributable free cash flows, and are likely to be taken over by "cash-starved" acquirers.[126] Therefore, consistent with Lewellen's co-insurance rationale described before, firms with higher debt are less likely to be acquired. Section 4.2.5—Agency Conflicts analyzes how agency conflict impacts mergers activity.[127]

However, the impact of relative leverage between acquirer and target firms on the likelihood of acquisition is ambiguous. Myers/Majluf (1984) present an alternate

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118 For example, Stevens (1973), pp. 149-158; Dietrich/Sorensen (1984), pp. 393-402; Palepu (1986), pp. 3-35; Hannan/Rhoades (1987), pp. 67-74; Powell (1997), pp. 1009-1030; Cudd/Duggal (2000), pp. 105-120; Powell (2004), pp. 35-72; Bhabra (2008), pp. 158-175.

119 Stevens (1973), pp. 149-158; Melicher/Rush (1974), pp. 141-149; Wansley/Lane (1983), pp. 87-98; Wansley (1984), pp. 76-85; Bartley/Boardman (1986), pp. 41-55; Walter (1994), pp. 349-377; Barnes (1998), pp. 573-591; Barnes (1999), pp. 283-301; Barnes (2000), pp. 147-162.

120 See section 5.6—Leverage, Long-term Solvency and Debt Capacity Metrics.

121 Lewellen (1971), pp. 521-537; Lintner (1971), pp. 101-111.

122 Melicher/Rush (1974), p. 142.

123 Ravenscraft (1987), p. 24; Walter (1994), p. 358.

124 Jensen (1986), pp. 323-329.

125 Bhabra (2008), p. 162; Trahan (1993), p. 25; Trahan/Shawky (1992), p. 83.

126 Tsagkanos/Georgopoulos/Siriopoulos/Koumanakos (2008), p. 183.

127 See section 4.2.5—Agency Conflicts.

theoretical approach suggesting that highly levered firms are attractive merger targets.[128] They argue that firms "whose investment opportunities outstrip operating cash flows, and which have used up their ability to issue low-risk debt, may forego good investments rather than issue risky securities to finance them. This is done in the existing stockholders' interest." In other words, growing firms with capital constraints forego profitable projects because financing them with new stock is suboptimal for the existing shareholders of the firm. Hence, the acquisition of a capital-constrained firm by a capital-rich firm increases the combined value of the firm.[129] Thus, firms with high financial leverage can be attractive targets for firms with low financial leverage.

Similarly, studies by Barnes (1998), (1999), (2000) and Espahbodi and Espahbodi (2003) propose that low leverage may signal unused debt capacity while high leverage may indicate financial difficulties and, therefore, highly leveraged firms are vulnerable to takeover bids.[130]

Consequently, the effect of leverage as a determinant of the acquirer or target in business combination is ambiguous. Its direction seems to depend on the interaction between growth opportunities and liquidity.[131] Therefore, as suggested by Palepu (1986), Ambrose/Megginson (1992), Cudd/Duggal (2000), and Bhabra (2008), when comparing acquirer and target firm characteristics, models need to consider growth, liquidity, and leverage before evaluating the individual impact of leverage.[132]

4.2.1.2.2 Liquidity

Several empirical studies report that financial liquidity has an impact on takeover likelihood,[133] but only few studies deliver explanations for why liquidity potentially

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128 Myers/Majluf (1984), pp. 187-221.

129 Palepu (1982), p. 31.

130 Barnes (1998), p. 580; Barnes (2000), p. 120; Espahbodi/Espahbodi (2003), pp. 558; Tsagkanos/Georgopoulos/Siriopoulos/Koumanakos (2008), p. 183.

131 See section 5.7—Growth , and section 4.2.5—Agency Conflicts.

132 Palepu (1986), pp. 3-35; Ambrose/Megginson (1992), pp. 575-589; Cudd/Duggal (2000), pp. 105-120; Bhabra (2008), pp. 158-175.

133 Stevens (1973), pp. 149-158; Singh (1975), pp. 497-515: Belkaoui (1978), pp. 93-108; Harris/Stewart/Guilkey/Carleton (1982), pp. 164-184; Palepu (1982); Wansley/Lane (1983), pp. 87-98; Dietrich/Sorensen (1984), pp. 393-402; Wansley (1984), pp. 76-85; Hasbrouck (1985), pp. 351-362; Bartley/Boardman (1986), pp. 41-55; Palepu (1986), pp. 3-35; Bartley/Boardman (1990), pp. 53-72; Ambrose/Megginson (1992), pp. 575-589; Bacon/Shin/Murphy (1992), p. 8; Walter (1994), pp. 349-377; Meador/Church/Rayburn (1996), pp. 11-23; Chen/Su (1997), pp. 71-82; Powell (1997), pp. 1009-1030; Zanakis/Zopounidis (1997), pp. 678-687; Barnes (1998), pp. 573-591; Barnes (1999), pp. 283-301; Barnes (2000), pp. 147-162; Cudd/Duggal (2000), pp. 105-120; Sorensen (2000), pp. 423-433; Doumpos/Kosmidou/Pasiouras (2004), pp. 191-211; Powell (2004), pp. 35-72; Tsagkanos/Georgopoulos/Siriopoulos (2006), pp. 183-194; Kumar/Rajib (2007), pp. 27-44; Bhabra (2008), pp. 158-175; Tsagkanos/Georgopoulos/Siriopoulos/Koumanakos (2008), pp. 180-192.

influences takeover activity.[134] These studies argue that when excess liquidity results from inefficient asset allocation, and/or excess debt capacity, liquid firms may be attractive takeover targets.[135]

In addition to the before mentioned rationale, the acquisition of cash-rich targets is plausible for leveraged buyouts, but also for acquisitions paid by the acquirer's stock. Leveraged buyouts are debt-financed acquisition, in which the target firm's future liquidity, the cash flows, and assets of the target secure the acquisition to repay the debt.[136] Similar, in acquisitions that are paid by using the acquirer's stock (stock-for-stock acquisitions) instead of cash, a motive may be that the acquiring firm's liquidity is low. Therefore, theory generally predicts a positive relationship between the level of liquidity and acquisition likelihood. Relatively high industry-specific liquidity ratios of the target firm reflect this condition, especially for debt-financed takeovers, where the liquidity of the target is an important factor in the target's ability to pay for its own financing after the merger.[137]

However, it is also reasonable that a firm with high liquidity may acquire one with low liquidity, depending on the interaction of corporate liquidity with leverage and growth.[138] A so-called growth-resource mismatch occurs, for example, if a high-growth firm is restricted in its future growth by low liquidity and high leverage; a low-growth firm with a surplus financial resources may be interested in acquiring this firm.[139] A combination of both firms would result in value-creating financial synergies.[140]

In sum, the positive relationship between liquidity and takeover likelihood is plausible when it involves a stock- or debt-financed business combination. In the case of a growth-resource mismatch, the relation between liquidity and acquisition likelihood can take opposite directions depending on the leverage and growth of the acquiring and/or target firm.

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134 Stevens (1973), pp. 149-158; Harris/Stewart/Guilkey/Carleton (1982), pp. 164-184; Palepu (1982); Dietrich/Sorensen (1984), pp. 393-402; Hasbrouck (1985), pp. 351-362; Bartley/Boardman (1986), pp. 41-55; Walter (1994), pp. 349-377; Chen/Su (1997), pp. 71-82; Doumpos/Kosmidou/Pasiouras (2004), pp. 191-211.

135 Walter (1994), p. 358; Chen/Su (1997), p. 70.

136 Gaughan (2011), p. 594.

137 Gaughan (2011), p. 594; Dietrich/Sorensen (1984), pp. 393-402.

138 Harris/Stewart/Guilkey/Carleton (1982), pp. 169; Stevens (1973), pp. 154; Monroe/Simkowitz (1971), pp. 1-16.

139 Palepu (1982), p. 32.

140 Harris/Stewart/Guilkey/Carleton (1982), pp. 164-184.

4.2.1.2.3 Taxes

As already stressed in section 4.2.1.2.1—Leverage, Co-Insurance, and Capital Structure, tax savings are another potential benefit arising from mergers.[141]

Gilson/Scholes/Wolfson (1988) provide a theoretical framework for tax-motivated mergers. Their assessment creates three categories of merger related tax treatment: the first and the weakest is that mergers can result in "pure tax gains," because tax benefits emerge from the merger "without any change in pretax cash flows".[142] Second, and of greater importance in his analysis, is the dimension that classifies all tax benefits that can be achieved better by an acquisition than by other means and are described as the "next best alternative" Third, and of the greatest importance, is that taxes are the greatest determinant of mergers when the tax gains impact the acquisition "premiums" and explain "pricing" observed in mergers.[143] Comparing the previously mentioned tax advantages with transaction and information costs and alternative means to achieve tax savings, Gilson/Scholes/Wolfson (1988) find "that, in certain situations, the alternatives are less costly and provide greater tax gains than acquisitions. In other situations, however, acquisitions display a comparative advantage at reducing transaction and information costs. […] Finally, in some situations these costs exceed the tax gains from either acquisitions or any other tax-planning alternative, thereby transforming the potential tax gain into a mirage. Empirically we observe that far less than all potential tax gains are achieved. Thus providing support for our conclusion that transaction and information costs are pervasive and have first-order effects on the choice among alternative ways to achieve tax gains […]".[144] Hence, and in addition to this, Gilson/Scholes/Wolfson (1988) conclude that tax motives could have played a significant role but only for a certain small fraction of mergers.[145] Auerbach/Reishus (1988a) have a similar finding. They analyze 318 mergers from 1968 to 1983 in the United States, and suggest that "only for a significant minority of transactions the benefits appeared significant enough to play a role in the decision to merge."[146]

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141 See section 4.2.1.2.1—Leverage, Co-Insurance, and Capital Structure.

142 Gilson/Scholes/Wolfson (1988), pp. 272.

143 Within its framework, the study of Gilson/Scholes/Wolfson (1988) classifies possible sources of tax gains prior to the passage of the US Tax Reform Act of 1986 (which eliminated many of the previous tax benefits that could arise through mergers in the US) according to the three dimensions by the following three categories: the change in net asset basis through taxable acquisitions; the faster utilization of non-operating losses available through non-taxable acquisitions; and the tax deduction for interest available for interest paid on funds borrowed to finance the acquisitions, Gilson/Scholes/Wolfson (1988), pp. 272-273.

144 Gilson/Scholes/Wolfson (1988), pp. 273-274.

145 Gaughan (2011), p. 177.

146 See also Auerbach/Reishus (1988b), who in a later study cannot document significant tax effects to merger activity, Auerbach/Reishus (1988b), p. 157; Auerbach/Reishus (1988a), pp. 300-313.

The operating-loss-carry forward,[147] a frequently used proxy for merger tax incentives in takeover prediction studies, stresses that corporate income tax generally allows the acquiring firm to carry forward the tax loss of the target firm to offset its taxable income.[148] Hayn (1989), for example, finds tax attributes of target firms, especially operating-loss-carry-forwards in US tax-free acquisitions, are significant in explaining the abnormal returns to shareholders of both target and acquiring firms following acquisition announcements.[149] Therefore, several studies assume that tax benefits determine the merger target by existence and/or extent of an operating-loss-carry forward, indicating potential future tax benefits resulting from the merger. Thus, they expect firms to have high operating-loss-carry forward to be attractive targets.

The avoidance of inflationary tax losses may also be a merger incentive.[150] An inflationary tax loss is defined as the additional tax that corporations pay due to economy-wide price increases. Rising prices result in overstated corporate taxable income because historical costs, rather than current costs, are used in computing corresponding depreciation expense and cost of sales.[151] Hence, an overstatement of taxable income results in overstated taxes, thereby reducing the cash flows available for dividends and/or investment.[152] Expressed in other words, if a firm is highly capitalized, uses old fixed assets, applies conservative inventory costing (i.e., FIFO), hence, generating hidden reserves, then taxes are paid based on nominal rather than real (economic) income.[153] Depending on the tax law, the acquiring firm may be able to record purchased assets at their fair market values and realize hidden reserves for tax purposes. Higher (fair value adjusted) depreciation charges and cost of sales after the merger would then result in future tax benefits for the acquiring firm, which may motivate the merger.[154] However, there are two possible inconsistencies in this reasoning: First, disclosing taxable hidden reserves commonly leads to tax liabilities on the date of the merger, which would reduce the overall net value of the future tax benefits; and second, even if there is a tax benefit (e.g., due to changes in future tax rates or because of an interest effect due to tax deferments), comparing the present value of future tax payments and the tax payments due at the date of the merger, then

147 An theoretical and empirical analysis as well as an outline of US-Tax rules, especially with regard to operating-loss-carry forward and its impact as merger incentive is provided by Auerbach/Poterba (1987), pp. 305-342.

148 Chen/Su (1997), pp. 71-82; Harris/Stewart/Guilkey/Carleton (1982), pp. 164-184; Bartley/Boardman (1990), pp. 53-72; Walter (1994), pp. 349-377.

149 Hayn (1989), pp. 121-153.

150 Steiner (1975) cited after Walter (1994), p. 354.

151 Walter (1994), p. 354.

152 Walter (1994), p. 354; Hong (1977), pp. 51-59.

153 Hong (1977), p. 51.

154 Walter (1994), p. 354; DePamphilis (2012), p. 12.

this tax benefit is commonly included in the premium of the consideration transferred to the previous owners of the firm's shares.[155] For example, a study by Kaplan (1989) estimates the value of the tax benefits received in 76 management buyouts of public companies completed from 1980 to 1986. The study documents that the pre-buyout shareholders' premium is largely determined by tax benefits, whereas the post-buyout shareholder gains are not related to the tax benefits created by the buyout.[156]

Additionally, mergers, especially when they are cross-border, may even suffer from taxation multiple levels of taxation.[157] Normally, shareholders are subject to double-taxation; first, income is taxed on the corporate level, then dividends are taxed individually. However, even U.S. based firms may have more than two levels of taxation if, for example, the money goes through a holding company that does not meet the applicable tax exceptions. Since holding companies receive dividend income from a company that has already been taxed at the corporate level, any income distributed from the corporation to the holding company and then to the shareholders will be taxed at three levels. There are certainly several exceptions to avoid double and triple taxation.[158] Those exceptions usually depend on the parent company's ownership of the subsidiary's voting equity and resulting consolidation of taxable income,[159] but also on taxation treaties between states and countries.

The preceding discussion on the tax benefits of mergers can be best summarized by Auerbach (2002)[160] who stresses that "[i]dentifying the potential tax benefits of mergers and acquisitions confronts two significant obstacles at the outset. First, the tax law governing these transactions is complex. There are many different types of transactions within the general category, and the tax treatment of corporations and their shareholders varies […] A second problem encountered in identifying the potential tax benefits of mergers and acquisitions is that benefits associated with mergers and acquisitions generally may be obtained through alternative transactions, though not necessarily as easily or at the same cost. Thus, the incremental tax benefits to merger and acquisition activity may be smaller than they might first appear to be. […] Still, if firms are found to respond to the apparent tax incentives to merge, this suggests that they do not view the alternative means of obtaining tax benefits as perfect substitutes. Thus, the response of firms and markets to the tax incentives to

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155 DeAngelo/DeAngelo/Rice (1984), pp. 367-402; Marais/Schipper/Smith (1989), pp. 155-191.
156 Kaplan (1989), pp. 611-632.
157 Gaughan (2011), pp. 34.
158 Storck/Spori (2010), pp. 977-999.
159 Gaughan (2011), p. 34.
160 Auerbach (2002), p. 48.

merge remains an open question for empirical investigation." Similarly Ravenscraft (1987) states: "In general, most tax breaks gained through mergers can be obtained through other means. Tax motivations may affect the structure and timing of the mergers, and the total premium paid for the target, but in only a minority of cases are mergers the only or even the best means of achieving certain tax breaks."[161] Thus: "Tax savings are not a primary motivation in most mergers."[162]

Accordingly, the full effect of the tax benefits on business combinations remains an open question. It is unclear if there are any tax gains from mergers, and if there are tax-related merger gains, who—pre- or post-merger shareholders—potentially benefits from these gains. Nevertheless, in the pre-merger phase, potential estimated tax benefits may play a motivating role, even if the expected benefits will not be realized until after the merger.

4.2.2 Growth – Make or Buy

Academic literature generally differentiates between growth by merger, so called external growth, and growth by other means that can be grouped under the heading of internal or organic growth.[163] The choice between external and internal growth is considered to be driven by strategic decisions, applying popular tools like SWOT—to assess the analysis of business' strengths, weaknesses, opportunities, and threats—, the Boston Consulting Groups' (BCG) Growth-Share Matrix—that assesses the firm's relative business position in the market—, or Porter (1979)'s Five Forces framework —that highlights the structure of the competition and the attractiveness of an industry—.[164]

The key advantage of external growth is that it is supposed to be much more rapid than internal growth, allowing the acquirer to increase capacity and output almost immediately with an acquisition.[165] If internal, organic expansion is low, external growth is considered as alternative to speed up profits. However, it requires available financial capacities and brings some uncertainty.

Several studies have examined the firm decisions and other factors that affect growth, and have found that firm growth may also occur because of economic or seasonal

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161 Ravenscraft (1987), p. 25.
162 Ravenscraft (1987), p. 25.
163 Nelson (1969), p. 52.
164 Bruner (2004), pp. 123-165; Porter (2008), pp. 75-93; Porter (1979), pp.137-145; Morrison/Wensley (1991), pp. 105-129.
165 Becketti (1986), pp. 13-26; Komlenovic/Mamun/Mishra (2011), pp. 243.

factors. Growth largely depends on present and future products, market share and competition, as well as resources, regional and market barriers and opportunities to expand and the business cycle.[166] Research on business cycle and mergers often considers merger activity to be pro-cyclical, growing more rapidly during periods of economic expansion and more slowly during recessions.[167]

4.2.2.1 *External Growth through Merger*

The realization of growth strategies by merger is a crucial motive for business combinations. Both diversification, which refers to the expansion of a firm's current primary lines of business to new products and/or new markets, as well as within business or industry growth, e.g. vertical integration, are possible motivations to accomplish external expansion through mergers.[168]

The measurement of target and acquirer characteristics and their relation to external merger activity is implicitly considered in empirical research. The economic disturbance theory proposed by Gort (1969) gained much attention.[169] In accordance with the research on mergers and business cycles, Gort (1969) suggested that mergers are induced by unexpected "economic shocks" within industries (rapid changes in technology, demand, movements in capital markets, and changes in entry barriers within industries). In times of economic shocks, the uncertainty of firm values rises; this stimulates markets and triggers merger activity.[170] Further literature has developed Gort's theory: Ravenscraft (1987)'s review of merger activity studies and Mitchell/Mulherin (1996) 1980s merger wave study, suggest that this theoretical approach of unexpected economic shocks broadly applies for industries as well as regions, depending on the focus of these shocks, and, thereby, embraces additionally an even much broader range of possible drivers, including globalization, (de-) regulations and related changes of antitrust, accounting and tax law, as well as demographic shifts and input price shocks.[171] These findings are supported by several more recent empirical studies such as Maksimovic /Phillips (2001) who find that "shock in an industry increases the opportunity cost of operating as an inefficient producer in that industry. […] Thus, industry shocks […] create incentives for

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166 Gaughan (2011), pp. 125-132; for business cycle and mergers, Nelson (1969), p. 54; Komlenovic/Mamun/Mishra (2011), pp. 239-235; Stock/Watson (1999), pp. 3-64.
167 Becketti (1986), pp. 13-26.
168 DePamphilis (2012), p. 8; Gaughan (2011), p. 125.
169 Gort (1969), pp. 624-642.
170 For short summary of related research, Bruner (2004), pp. 80-81.
171 Bruner (2004), pp. 80-81; Ravenscraft (1987), pp. 17-51; Mitchell/Mulherin (1996), pp. 193-229.

transfers [assets] to more productive use".[172] Jovanovic/Rousseau (2008) reach a similar conclusion. Based on the merger waves of 1890-1930 and 1971-2001 and related technological changes of industries in these periods, they suggest that mergers reallocate assets toward an economy's more efficient firms.[173] Recent research on takeover activity by Lambrecht (2004), Morellec/Zhdanov (2005) and Lambrecht/Myers (2007) acknowledges the idea of economic shocks by Gort (1969). Using a real option approach to explain the pro-cyclical timing of mergers, these studies suggest that a firm always has an option to acquire instead of growing organically.[174]

This appealing theoretical approach of economic shocks has found the interest of takeover likelihood studies that assume that the occurrence of a merger in an industry increases the likelihood of more mergers occurring in the same industry and, hence, hypothesize that "[f]irms that are in an industry subjected to 'economic disturbances' are likely acquisition targets."[175,176]

4.2.2.2 ***Internal Growth and Merger Activity***

Internal growth considers strategies that refer to the firm's growth that is achieved without the acquisition of other businesses. Internal growth emerges from "developing new products and processes; building—from the ground up— additional facilities to produce one's traditional product or a new one; internal vertical integration; and expanding geographically into new markets."[177]

4.2.2.2.1 Internal Growth

High-growth firms may be attractive merger targets. For example, firms in mature or declining industries and markets may be interested in aquiring growing firms to stay competitive.[178] Agarwal (1997) analyzes product life cycle and firm survival, and suggests that the survival of a firm depends on its competitive intensity.[179] Lambkin/Day (1989) suggest that in situations of oversupply market on the product

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172 Maksimovic /Phillips (2001), p. 2020; Maksimovic /Phillips (2002), pp. 721-767.
173 Jovanovoc/Rousseau (2008), pp. 765-776.
174 Lambrecht (2004), pp. 41-62; Lambrecht/Myers (2007), pp. 809-845; Morellec/Zhdanov (2005), pp. 649-672; Bruner (2004), p. 81.
175 Palepu (1982), p. 34; Lambert/Larcker (1985), p. 198; Palepu (1986), p. 17; but also Chen/Su (1997), p. 74; Cudd/Duggal (2000), p. 108; Brar/Giamouridis/Liodakis (2009), pp. 438-439.
176 See also section 5.10—Industry Disturbance Metrics.
177 Nelson (1969), p. 52.
178 Stubbart/Knight (2006), p. 93.
179 Agarwal (1997), pp. 571-584.

market, competition is increasing, as a consequence, overcapacity disappears through business failures or mergers.[180] Moreover, Rumelt (1974), (1982) and empirical studies by Christenson/Montgomery (1981) and Stimpert/Duhaime (1997) advance the "escape" paradigm of firms.[181] This suggests that firms with "declining prospects in their original business areas" attempt an escape to more attractive, growing areas by diversification.[182] Based on the idea that "early" acquisitions relative to peers in merger waves capture significant advantages;[183] Carow/Heron/Saxton (2004) develop a framework to analyze the applicability of first-mover theory to the practice of acquisitions in industry acquisition waves.[184] They document that "early-mover" transactions experience significantly larger combined returns and that "strategic pioneers" outperform other acquirers in acquisition waves in terms of long-term stock price performance. Therefore, acquiring high-growth firms at the right time is a strategic requisite in the long run for future growth and survival.

This and the finding that, historically, target firms were located in rapidly growing industries[185] underscores the popular assumption in merger research that high-growth firms are more likely to become merger targets.

A contrasting perspective is developed by Ambrose/Megginson (1992) who propose that "firms with significant future growth opportunities are poor takeover candidates since outside bidders do not have a comparative advantage in managing the growth options."[186] Ambrose/Megginson (1992) measure growth opportunities understood as "opportunities for outside bidders with expectations and information different from management's to shift current asset utilization" in their study with the proportion of fixed assets of a firm's total assets and find support for their hypothesis association.[187] However, other studies use this and similar ratios to proxy for a co-insurance of debt.[188] Thus, an interpretation of this result is ambiguous.

In addition, it seems sometimes reasonable that low-growth firms may become acquisition targets. For example, if a high-growth firm foresees that it will be

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180 Lambkin/Day (1989), pp. 10-11.

181 Rumelt (1974), p. 104; Rumelt (1982), pp. 359-369; Christenson/Montgomery (1981), pp. 327-343; Stimpert/Duhaime (1997), pp. 560-593.

182 Rumelt (1974), pp. 81, 104; Christenson/Montgomery (1981), pp. 327-343; Rumelt (1982), pp. 359-369; Stimpert/Duhaime (1997), pp. 560-593.

183 Liebermann/Montgomery (1988), pp. 41-58; for a controversial discussion with a review of more recent empirical literature, see Liebermann/Montgomery (1998), pp. 1111-1125.

184 Carow/Heron/Saxton (2004), pp. 563-585.

185 Ravenscraft (1987), p. 24.

186 Ambrose/Megginson (1992), p. 583; Similarly Trahan (1993), p. 29.

187 Ambrose/Megginson (1992), p. 583.

188 See section 4.3.2—Asset structure and Debt-Capacity.

constrained by its financial resources, this firm will seek a firm with excess financial capacity regardless of the growth opportunities available to that firm. Such a merger would provide the high-growth firm with access to financial resources and would reduce the risk of financial exposure in the event of failure. In other words, the question of who acquires and who is acquired may be dependent on the concurrence of high growth with low financial resources and/or low growth with high financial resources.

4.2.2.2.2 Growth-Resource Mismatch

The growth-resource mismatch hypothesis (GRMM)[189] considers the joint effect of growth opportunities and the firm's financial resources on the firm's acquisition likelihood. The growth-resource mismatch hypothesis was first advanced by Palepu (1982), (1986), and Harris/Stewart/Guilkey/Carleton (1982), and was then revisited by several subsequent studies, among them Ambrose/Megginson (1992), Cudd/Duggal (2000), Powell (2004), Bhabra (2008), Brar/Giamouridis/Liodakis (2009) and Shim/Okamuro (2011).[190]

Palepu (1982) refers to the work of Myers and Majluf (1981) and explains the following association of a growth-resource mismatch and the takeover likelihood: [191]

> "One type of imbalance occurs when a rapidly growing firm faces a financial incapacity to sustain the growth. In a fully efficient capital market, a firm does not suffer from constraints of capital to invest in profitable projects. Deviations from this are possible under certain conditions. For example, Myers and Majluf (1981) consider a situation where managers of a firm have superior and proprietary information in an otherwise efficient capital market. They demonstrate that the asymmetric information results in the market value being different from the true value of a project. Under this scenario, financing the project with a new stock issue is suboptimal to the existing shareholders of the firm. If there is no surplus cash, and if the firm used up its ability to issue low risk debt, it may be optimal to forego good investment opportunities in the interest of

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189 According to Barnes (1998), (2000) referring to Levine/Aaronovitch (1981), the growth-resource mismatch is sometimes considered to be another aspect of the inefficient management hypothesis, Barnes (1998), p. 580; Barnes (2000), p. 120; Levine/Aaronovitch (1981), pp. 149-172.

190 Palepu (1982); Palepu (1986), pp. 3-35; Ambrose/Megginson (1992), pp. 575-589; Cudd/Duggal (2000), pp. 105-120; Powell (2004), pp. 35-72; Bhabra (2008), pp. 158-175; Brar/Giamouridis/Liodakis (2009), pp. 430-450; Shim/Okamuro (2011), pp. 193-203.

191 Palepu (1982), pp. 31-33, referring to Myers/Majluf (1984), pp. 187-221; similar in Palepu (1986), p. 16.

> the current shareholders of the firm. Myers and Majluf show that in such situations, acquisition of the 'cash-poor' firm by a 'cash-rich' firm increases the combined value of the two firms.
>
> An opposite type of imbalance occurs in the case of a firm that lacks profitable investment opportunities for the funds generated from its current operations. The management of such a firm has several options: (1) retire any outstanding debt, (2) pay out large cash dividends, and (3) repurchase stock. The firm also has the option of acquiring another firm with good investment opportunities. If for some reason, the management fails to pursue one or more of these options, the firm is likely to attract acquisition bids that seek to redeploy the firm's idle pool of cash." [192]

In sum, the growth-resource mismatch hypothesis assumes that firms with a one of the following growth-resource imbalances may be an acquisition target:

- High growth, low resources (low liquidity, high leverage), or
- Low growth, high resources (high liquidity, low leverage).

4.2.2.2.3 Internal Future Growth Strategies

Although research generally uses conventional growth measures like sales growth, growth in market value, and asset growth, other measures may more accurately capture future growth characteristics. Since growth opportunities heavily rely on recent investment in assets (e.g., human capital and property, plant and equipment), the investment trend could be a good indicator of growth. The investment trend could be measured using capital expenditure, the amount of intangible assets or real property.

Several studies use variables that proxy for the investment policy of a firm. Examples of possible measures can be found in Dietrich/Sorensen (1984), Trahan/Shawky (1992), and Trahan (1993), these studies derive the likelihood of becoming an acquirer, or target, respectively, depending on the firm's internal investment strategy. The internal investment strategy is defined as capital expenditures on new plant and equipment as a percentage of total assets. They hypothesize that if a firm is investing heavily in internal growth, it is unlikely that it will also carry out large external acquisitions.[193]

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[192] Palepu (1982), pp. 31-32.
[193] Trahan/Shawky (1992), p. 84; Trahan (1993), pp. 26-27; Dietrich/Sorensen (1984), pp. 395-396.

Harris/Stewart/Guilkey/Carleton (1982), Bartley/Boardman (1990), Chen/Su (1997) and Kumar/Rajib (2007) analyze the impact of R&D expenditure and merger activity. Their research assumes that acquirers are to some extent motivated by the technological advantages or knowledge capital of the targets.[194] They find that firms with higher R&D expenditure experience a greater likelihood of acquisition.

Similarly, the impact of firms' advertisement intensity on their takeover likelihood is used by Harris/Stewart/Guilkey/Carleton (1982) and Kumar/Rajib (2007). These studies hypothesize that the extension of market power is a motive to acquire firms in concentrated industries with high barriers to entry. However, advertisement intensity provides little explanatory power.[195]

4.2.3 Managerial Inefficiencies and Performance

Another hypothesis for merger activity is that it may allow for replacement of inefficient managers. A much cited early study by Manne (1965) stresses the importance of managerial efficiency in the market of corporate control: "A fundamental premise underlying the market for corporate control is the existence of a high positive correlation between corporate managerial efficiency and the market price of shares of that company."[196]

The inefficient management hypothesis (or performance hypothesis) argues that acquisitions of poorly managed firms are a means to discipline underperforming firms, and are mainly motivated by potential gains that should accrue when the inefficient managers of the firm are replaced.[197]

Several early bankruptcy and merger prediction studies, for example those by Beaver (1966), Stevens (1973), and Singh (1975), identified efficiency gains achieved through mergers.[198] Others, such as Halpern (1973) and Mandelker (1974), suggest that the

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194 Chen/Su (1997), p. 73. Harris/Stewart/Guilkey/Carleton (1982), pp. 164-184; Bartley/Boardman (1990), pp. 53-72; Kumar/Rajib (2007), pp. 27-44.

195 Harris/Stewart/Guilkey/Carleton (1982), pp. 173, 165; Kumar/Rajib (2007), pp. 27-44.

196 Manne (1965), p. 112.

197 Stevens (1973), p. 149; Singh (1975), p. 512; Belkaoui (1978) p. 95-96; Harris/Stewart/Guilkey/Carleton (1982) p. 172; Palepu (1982) p. 28; Dietrich/Sorensen (1984) p. 39; Bartley/Boardman (1986) p. 45; Palepu (1986) p. 16; Davis/Stout (1992) p. 613; Trahan/Shawky (1992) p. 83;Trahan (1993) p. 22; Walter (1994), p. 358; Meador/Church/Rayburn (1996) pp. 12, 20; Chen/Su (1997), p. 74; Powell (1997) pp. 1003, 1012-1013; Barnes (1998), p. 580; Barnes (2000) p. 152; Cudd/Duggal (2000) p. 107; Espahbodi/Espahbodi (2003), p. 560; Powell (2004) p. 40; Bhabra (2008) pp. 162-163; Brar/Giamouridis/Liodakis (2009), p. 435; Gorton/Kahl/Rosen (2009), p. 1292.

198 Beaver (1966), pp. 71-111; Stevens (1973), p. 149; Singh (1975), p. 512.

replacement of inefficient managers is rewarded by the stock market, reporting 14 percent abnormal returns to the stockholders of the acquired firm.[199]

These early studies created the basis for later studies, particularly the studies of Palepu (1982), and (1986) who, citing Fama/Miller (1972), stresses that merger is an important market control that "remove a management failing to act in the best interest of the owners."[200] Similarly, Bartley/Boardman (1986) propose that a "major motive for takeovers is the potential for operating efficiencies that can be obtained by replacing inefficient management and instituting new policies and procedures".[201]

To measure efficiency improvement potential, Palepu (1986) stressed that "[a]ccounting profitability measures only current performance. The excess return measure reflects, in addition to the current performance, the market's expectation of future performance. Hence, the excess return measure is probably a better proxy."[202] In accordance with this approach, Davis/Stout (1992) find that the firm's share price provides the only objective indicator of management performance.[203] Similarly, Bartley/Boardman (1986) study refers to Marris (1964) and Tobin (1969) and proposes valuation ratios as the primary determinant of the likelihood that a firm will be a takeover target.[204] However, Harris/Stewart/Guilkey/Carleton (1982) comments that "the valuation ratio has been used in previous research but it is not a particularly good measure of the concept of efficiency."[205] Recent studies by Brar/Giamouridis/Liodakis (2009) use accounting profitability measures rather than stock performance to analyze firm performance and merger activity.[206] The most common profitability ratios used in takeover studies are return on equity, return on assets and assets turnover.

Inefficient Management Hypothesis is partly congruent and interferes with other acquisition hypotheses:

Asquith (1983), Bradley/Desai/Kim (1983), for example, consider to the inefficient management hypothesis as s subset of hypotheses related to synergies which was described in section 4.2.1—Synergies.[207]

Inefficient management and poor performance also touches assertions of the agency-conflict hypothesis on mergers activity, as analyzed in section 4.2.5—Agency

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199 Mandelker (1974), pp. 303-335.
200 Fama/Miller (1972), p. 75; Palepu (1982), p. 28-31; Palepu (1986), p. 16.
201 Bartley/Boardman (1986), p. 41.
202 Palepu (1986), p. 16.
203 Davis/Stout (1992), p. 613.
204 Bartley/Boardman (1986), p. 41; Marris (1964), p. 263; Tobin (1969), pp. 15-29.
205 Harris/Stewart/Guilkey/Carleton (1982), p. 172.
206 Brar/Giamouridis/Liodakis (2009), p. 435.
207 Asquith (1983), pp. 51-83; Bradley/Desai/Kim (1983), pp. 183-206; section 4.2.1—Synergies.

Conflicts.[208] Managers forego profitable projects and are inefficient when they make decisions that are based on their own objectives rather than the objective of the shareholders. The misaligned incentives of the managers increase the costs on the shareholders, and, consequently, the takeover likelihood increases. The resulting replacement of management is expected to alleviate agency problems.

4.2.4 Valuation Discrepancies and Merger Activity

There are several theories that relate valuation discrepancies of the acquirer and target firm to merger activity. These theories can be grouped in theories that refer to the target's undervaluation or the acquirer's overvaluation.

4.2.4.1 *Target Undervaluation Hypothesis*

The first and earlier approach was advanced by Marris (1964), Tobin (1969), Palepu (1982), (1986), Hasbrouck (1985), Bartley/Boardman (1986) and Golbe/White (1988) and suggests that firms are undervalued when they underutilize their assets, and that they are possibly available at a bargain price.[209]

For instance, Palepu (1982) contends "[t]he economic rationale behind this hypothesis is as follows. Consider a firm that wishes to invest in a new enterprise. There are two ways of accomplishing this. The firm can purchase the required plant and machinery from the asset markets or it can acquire an existing firm that already has the required assets in place. If the latter alternative is cheaper than the former, the investing firm is expected to choose the acquisition alternative."[210]

In this context, Walter (1994) stresses "[u]pon acquisition of a poorly managed firm, the well-managed firm is perceived to utilize the target's resources more efficiently. Alternatively, the Q-ratio is sometimes used to indicate that a firm may be under- or overvalued. A low Q-ratio may reflect the mispricing by the stock market of the firm's physical assets in their current use. The [...] information concerning a company is uncovered as a result of a tender offer, prompting the market to revalue previously undervalued shares."[211]

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208 Davis/Stout (1992), p. 613; Jensen (1988), pp. 21-48; Manne (1965), pp. 110-120; Jensen/Ruback (1983), pp. 5-50; section 4.2.5—Agency Conflicts; and section 5.11—Agency Conflict Measures.

209 Marris (1964), p. 263; Tobin (1969), pp. 15-29; Palepu (1982), p. 35; Palepu (1986), pp. 3-35; Hasbrouck (1985), pp. 351-362; Bartley/Boardman (1986), pp. 41-55; Golbe/White (1988), pp. 265-310.

210 Palepu (1982), p. 35.

211 Walter (1994), p. 352; similarly, Bradley/Desai/Kim (1983), pp. 183-206.

Similarly, Davis/Stout (1992) state: "The worse a firm is managed, the lower its share price and, therefore, the greater the potential capital gains to outsiders who buy the firm's stock and run the firm more efficiently."[212]

For their analysis, the before mentioned studies commonly use market valuation measures like the market-to-book ratio and market-to-replacement cost.

Bartley/Boardman (1986) is the first study to analyze the predictive power of replacement values versus market values. However, this study uses a discriminant analysis model. It was not until Hasbrouck (1985), which found that target firms are characterized by low Q-ratios (market values / replacement values),[213] that logit regressions were used to analyze replacement value.

In sum, the target undervaluation hypothesis argues that firms with low market-to-book ratios and low price-earnings ratios or, more precisely, low market-to-replacement cost (Q-)measures, are viewed as undervalued and are potential takeover targets.

4.2.4.2 *Acquirer Overvaluation Hypothesis*

More recent theories by Shleifer/Vishny (2003), Rhodes-Kropf/Viswanathan (2004) and Ang/Cheng (2006) contrast the Q-hypothesis and instead support a behavioral approach of stock market-driven acquisitions.[214] They argue that stock markets in certain situations are not efficient and overvalue stock. Using asymmetric information advantages when markets are "hot" and the firm's stock price is high, managers enhance the value for their shareholders by using overvalued stock for payment in share-by-share acquisitions.[215] For instance, Shleifer/Vishny (2003) state that "firms with overvalued equity might be able to make acquisitions, survive, and grow, while firms with undervalued, or relatively less overvalued, equity become takeover targets themselves."[216]

They further suggest with regard to inefficient markets and rational managers that "[t]his theory is in a way the opposite of Roll's (1986) hubris hypothesis of corporate

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212 Davis/Stout (1992), p. 607.

213 Palepu (1982); Palepu (1986), pp. 3-35; Hasbrouck (1985), pp. 351-362; Bartley/Boardman (1986), pp. 41-55.

214 Ang/Cheng (2006), pp. 199-216; Shleifer/Vishny (2003), pp. 295-311; Rhodes-Kropf/Viswanathan (2004), pp. 2685-2718.

215 Bruner (2004), pp. 77-78; Shleifer/Vishny (2003), pp. 295-311; Rhodes-Kropf/Viswanathan (2004), pp. 2685-2718; Ang/Cheng (2006), pp. 199-216.

216 Shleifer/Vishny (2003), p. 309.

takeovers, in which financial markets are rational, but corporate managers are not. In our theory, managers rationally respond to less-than-rational markets."[217]

However, Shleifer/Vishny (2003)'s considerations are incomplete as they fail to explain why targets accept stock that is likely to be overvalued. Rhodes-Kropf/Viswanathan (2004) investigates this question and assumes that target management acts rationally and in the interests of the shareholders. They refer to the rationale advanced by Myers/Majluf (1984) who argue that in certain situations managers forego good investment projects as financing the project with new stock issuance is suboptimal to the existing shareholders of the firm.[218] An acquisition of these firms by firms with financial capacities to finance the promising projects of the target may create synergies and increase the value of the combined firm. Building on this idea, Rhodes-Kropf/Viswanathan (2004) stress that: "Thus, our theory is a Myers and Majluf (1984) setup such that overvalued bidders make high stock bids. The stock merger market does not collapse because some bidders have positive synergies. In addition, the target (buyer of the stock) has some noisy information about the bidder's (who is selling stock) valuation. This leads to mistakes that are correlated with valuation."[219] Ang/Cheng (2006) documents evidence on the analytical findings of Shleifer/Vishny (2003) and Rhodes-Kropf/Viswanathan (2004). Using a sample of more than 3,000 mergers between 1981 and 2001, they report that "the probability of a firm becoming a stock acquirer increases significantly with its degree of overvaluation."[220,221]

4.2.4.3 *Price-Earnings Magic, Bootstrap Game, Merger Profit*

Another hypothesis that relates a market valuation multiple to takeover likelihood is the price-earnings magic hypothesis. This hypothesis goes back to a phenomenon, first described by Mead (1969) as "The merger profit hypothesis," which was predominantly observed during the 1960s: some conglomerate firms made acquisitions that offered no evident economic gains like operating efficiency or market power, but produced rising earnings per share.[222] The price-earnings ratio of firm A is higher than

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217 Shleifer/Vishny (2003), p. 296, 297; Roll (1986), pp. 197-216.
218 Myers/Majluf (1984), pp. 187-221.
219 Rhodes-Kropf/Viswanathan (2004), p. 2688.
220 Ang/Cheng (2006), p. 200.
221 However, since the overvaluation approach refers only to stock-for-stock acquisitions, an empirical analysis of acquirer and target valuation characteristics should consider the means of payment in business combinations. The sample in the empirical part of this study separates business combinations in subsamples based on their means of payment, see section 6—Empirical Study.
222 Mead (1969), pp. 295-306.

that of firm B, see Table 1.[223] Since the merger produces no economic gains, the earnings and the market value after the acquisition of B is equal to the sum of the two separate firms. As firm A's stock is selling for double the price of firm B's stock (line 2), firm A can acquire the 100,000 firm B shares for 50,000 of its own shares. After the merger firm A+B will have 150,000 shares outstanding. This procedure reduces the denominator of earnings per share and the earnings per share ratio rises about 33 percent, without creating any real gain by the merger. If the market does not understand the deal, for example, if firm A proposes to implement new technologies and improve firm B's efficiency, then the market could easily mistake the deal that has a post-merger increase of 33 percent earnings per share, assuming real growth behind that. If so, stakeholders of both firms receive something for nothing. Brealey/Myers (1981) refer to this as the "bootstrap" or "chain letter" game , "because there is no real gain created by the merger and no increase in the two firms' combined value."[224]

Table 1

Market Value and Earnings per Share

	A Corp.	B Corp.	A + B Corp.
1. Earnings per share	$2.00	$2.00	$2.67
2. Price per share	$40	$20	$40
3. Price–earnings ratio	20	10	15
4. Number of shares	100,000	100,000	150,000
5. Total earnings	$200,000	$200,000	$400,000
6. Total market value	$4,000,000	$2,000,000	$6,000,000
7. Current earnings per dollar invested in stock (line 1 ÷ line 2)	$.05	$.10	$.067

Table 1: Market Value and Earnings per Share [225]

[223] The following example is adopted with slight changes from Brealey/Myers/Franklin (2008), pp. 889-890.
[224] Brealey/Myers (1981), p. 665; also Brealey/Myers/Franklin (2008), pp. 889-890.
[225] Source: Adopted with slight changes from Brealey/Myers/Franklin (2008), pp. 889-890, Table 32.2.

Figure 4
Impact of Merger on Earnings Growth

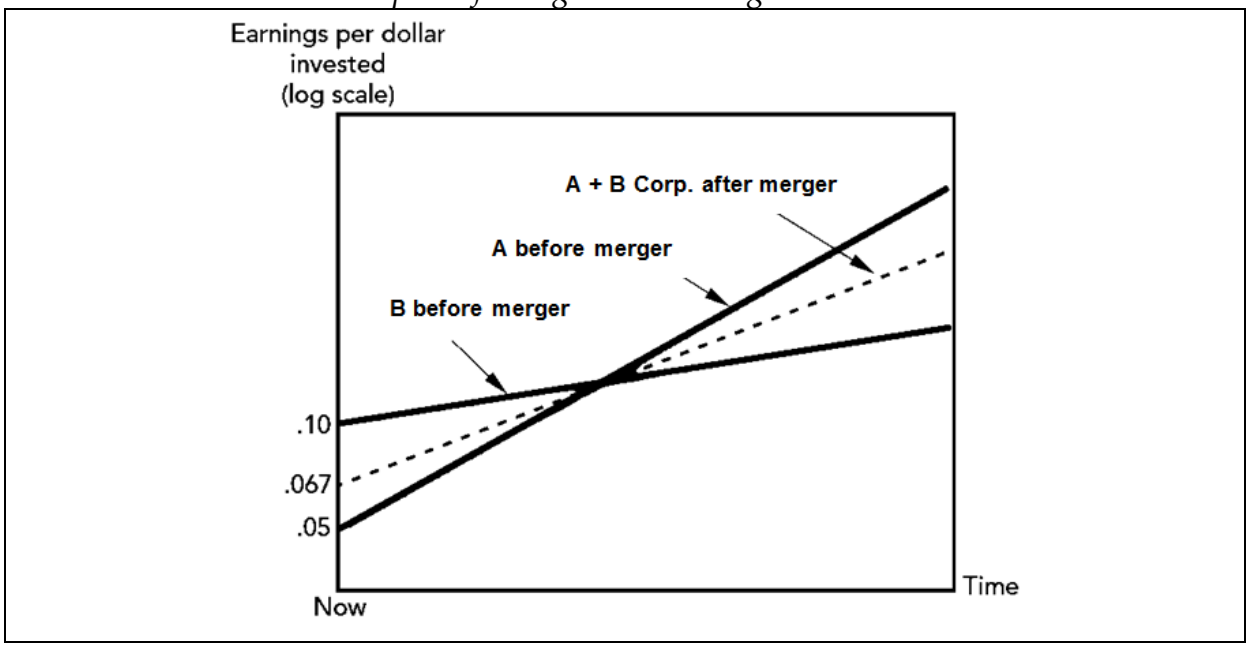

Figure 4: Impact of Merger on Earnings Growth [226]

The long-run result is indicated in Figure 4: the firm will have slower growth and a depressed price-earnings ratio. However, in the short run, earnings per share can be artificially increased but hardly in the long run. Brealey/Myers (2008) comment: "But to keep fooling investors, the firm has to continue to expand by merger at the same compound rate. Clearly, this cannot go on forever; one day expansion must slow down or stop. At this point earnings growth falls dramatically and the house of cards collapses."[227]

Building upon the "merger profit hypothesis" phenomenon, as described by Mead (1969), and his empirical findings on that phenomenon,[228] several other early studies, for instance, Conn (1973) and Melicher/Rush (1974), present empirical evidence on price-earnings ratios and economic gains and find that target firms have lower average price-earnings ratios than acquiring firms.[229] Concerning the price-earnings magic hypothesis, Palepu (1982) statess that: "[according] to the belief by the acquirers in 'P-E magic' [, …] when a firm acquires another with a lower P/E ratio than its own, the

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226 Source: Adopted with slight changes from Brealey/Myers/Franklin (2008), p. 890, figure 32.2; original source: Myers (1976), figure 1, p. 639.
227 Brealey/Myers/Franklin (2008), p. 890.
228 Mead (1969), pp. 295-306.
229 Conn (1973), pp. 754-758; Melicher/Rush (1974), pp. 141-149; with contrasting results: Westen/Mansinghka (1971), pp. 919-936.

market often values the combined earnings of the two firms at the higher P/E ratio of the conglomerate, thus producing an 'instantaneous capital gain'."[230]

Thus, the price-earnings magic hypothesis suggests that firms with low price-earnings ratios are likely to be acquired by high price-earnings ratio firms due to the market tendency to value the combined firm at the acquirer's original high price-earnings ratio. In the following, several studies used this hypothesis, but found rather weak evidence that price-earnings ratios are a significant determinant of acquisition targets.[231] This finding may be due to the fact that "this [bootstrap] game is not often played these days"[232] and is rather a phenomenon of the sixties.[233]

Nevertheless, the target undervaluation hypothesis, the acquirer overvaluation hypothesis, the Price-Earnings Magic hypothesis are consistently assuming that the target firms, in general, will have relatively lower valuation ratios and the acquirers will have relatively higher valuation ratios.

4.2.5 Agency Conflicts

Several studies investigate the impact of conflicts of interest between management and owners on acquisition likelihood. It is assumed that agency conflict related costs are alleviated by takeover induced replacement of management.[234]

Agency conflict related costs are usually resulting from managers maximizing their own private benefits, investing in their own management value to the firm, so called entrenchment investment, or conduct empire building instead of increasing the firm net present value.[235] Additional costs are resulting from the monitoring efforts related to agency conflicts, as well as the free-rider problem or delegated monitoring.[236]

The incentive for acquiring firms to take over firms with agency problems potentially accrues from the availability of additional resources and the potential for unused

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230 Palepu (1982), p. 37.

231 Stevens (1973), pp. 149-158; Melicher/Rush (1974), pp. 141-149; Harris/Stewart/Guilkey/Carleton (1982), pp. 164-184; Palepu (1982); Wansley/Lane (1983), pp. 87-98; Dietrich/Sorensen (1984), pp. 393-402; Wansley (1984), pp. 76-85; Bartley/Boardman (1986), pp. 41-55; Palepu (1986), pp. 3-35; Ambrose/Megginson (1992), pp. 575-589; Walter (1994), pp. 349-377; Meador/Church/Rayburn (1996), pp. 11-23; Barnes (1998), pp. 573-591; Barnes (1999), pp. 283-301; Barnes (2000), pp. 147-162; Cudd/Duggal (2000), pp. 105-120; Kumar/Rajib (2007), pp. 27-44; Bhabra (2008), pp. 158-175; also section 5.4.1—Price-Earnings Ratio, p. 88.

232 Brealey/Myers/Franklin (2008), p. 890.

233 Brealey/Myers (2003), p. 935.

234 Also section 4.2.3—Managerial Inefficiencies and Performance.

235 Brealey/Myers/Franklin (2008), pp.328-330.

236 Free rider-problem related cost occur when the number of shareholders is large and individual shareholders to monitor management will not be strong or effective as „everybody prefers to let someone else do", Brealey/Myers/Franklin (2008), p. 330; Brealey/Myers/Franklin (2008), pp.329-330.

profitable investment opportunities. If the expected present value of additional resources and profitable projects is higher than the merger related transaction costs, then a firm suffering from agency problems is an attractive acquisition target. Hence, Jensen/Meckling (1976) and Jensen/Ruback (1983) suggest that takeovers are external control mechanisms that alleviate agency problems.[237] The extent of agency conflict is predicted to be positively related to the attractiveness of a potential target.

As advanced by Jensen (1986), (1987) and (1988), agency problems are indicated by an increased level of free cash flow. Free cash flow as defined by Jensen is the is "cash flow in excess of that required to fund all of a firm's projects that have positive net present values when discounted at the relevant cost of capital".[238] "Such free cash flow must be paid out to shareholders if the firm is to be efficient and to maximize value for shareholders."[239] The information asymmetries between self-interested managers and shareholders, along with the monitoring difficulties suggested by the free-rider problem, often results in differing opinions as to whether the free cash flow should be returned to shareholders.

Since interest payments for debt are fixed and not subject to permanent negotiation like variable dividend payments, Jensen (1986) suggests that debt issuance enables shareholders to effectively bond managers' promise to pay out future cash flows; proposing debt as substitute for dividends as the cash flow available for spending at the discretion of managers will be reduced by fixed interest payment.[240] An increased level of leverage also increases the costs of debt financing. Thus, Jensen (1986) expects that firm value is optimized when the firm reaches its optimal debt-equity ratio, which is the point where the marginal costs of debt just offset the marginal benefits.

Therefore, the level of agency problems is potentially approximated by three financial characteristics in takeover studies: The level of free cash flow that is not paid out, dividend payout level, and degree of leverage.

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237 Jensen/Ruback (1983), pp. 5-50; Jensen/Meckling (1976), pp. 305-360.
238 Jensen (1986), p. 323; Jensen (1987), p. 112; Jensen (1988), p. 28.
239 Jensen (1987), p. 112; Jensen (1988), p. 28.
240 Jensen (1986), p. 324.

4.3 Barriers Constraining Acquisition Activities

4.3.1 Firm Size

Smaller firms will generally be restricted in their ability to acquire another firm. [241] Therefore, in this study, firm size is considered to be a barrier for firms to engage in business combinations. Empirical studies provide strong evidence that larger firms are less likely to be acquired than smaller firms.[242] Consistently, firm size as relative firm characteristic is applied in IFRS and US-GAAP as indicator for the acquirer in business combinations.[243]

Several empirical takeover studies, among them Singh (1975), Dietrich/Sorensen (1984), Hasbrouck (1985), Palepu (1986), Bartley/Boardman (1990), Ambrose/Megginson (1992), Trahan/Shawky (1992), Walter (1994), Powell (1997), Thompson (1997), Cudd/Duggal (2000), Powell (2004), Bhabra (2008) and Tsagkanos/Georgopoulos/Siriopoulos/Koumanakos (2008) report a negative relationship of firm size and acquisition likelihood.[244]

These studies explain this finding through the following hypotheses:

- smaller firms have limited resources available to bear the transaction cost of a merger, such as the
  - cost of integrating the target into the acquirer's organizational framework,[245]
  - cost related to the target's takeover defenses, [246]
  - financing cost,[247]
  - cost of searching for a desirable firm;[248]
- larger firms may be better equipped to realize operating synergies resulting from combining businesses (economies of scale or scope);[249]

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241 For example, Gaver/Gaver (1993), pp. 125-160 and Bhabra (2008), pp. 161-162.
242 See section 5.3—Size Metrics.
243 See section 3.2.1—Firm-Level vs. Owner-Level Control.
244 Singh (1975), pp. 497-515; Dietrich/Sorensen (1984), pp. 393-402; Hasbrouck (1985), pp. 351-362; Palepu (1986), pp. 3-35; Bartley/Boardman (1990), pp. 53-72; Ambrose/Megginson (1992), pp. 575-589; Trahan/Shawky (1992), pp. 81-94; Walter (1994), pp. 349-377; Powell (1997), pp. 1009-1030; Thompson (1997), pp. 37-53; Cudd/Duggal (2000), pp. 105-120; Powell (2004), pp. 35-72; Bhabra (2008), pp. 158-175; Tsagkanos/Georgopoulos/Siriopoulos/Koumanakos (2008), pp. 180-192.
245 Palepu (1982), p. 34; Palepu (1986), p. 18; Meador/Church/Rayburn (1996), p. 12; Chen/Su (1997), p. 74; Powell (1997), p. 1013; Barnes (1998), p. 581; Bhabra (2008), pp. 161-162.
246 Palepu (1982), p. 34; Palepu (1986), p. 18; Meador/Church/Rayburn (1996), p. 12; Chen/Su (1997), p. 74; Powell (1997), p. 1013; Barnes (1998), p. 581; Bhabra (2008), pp. 161-162.
247 Bhabra (2008), pp. 161-162; Gorton/Kahl/Rosen (2009), 1293.
248 Chen/Su (1997), p. 74.
249 Trahan (1993), p. 23.

- the number of firms that are larger than the target decreases as its size increases;[250]
- smaller firms acquiring a larger firm with stock would dilute the acquirer's ownership of the combined firm and perhaps lead to a loss of control for incumbent management.[251]

Therefore, it can be consistently assumed that an inverse relationship between size and acquisition likelihood exists, and that target firms are smaller than acquiring firms.

4.3.2 Asset structure and Debt-Capacity

A further constrain of merger activity relates to the debt capacity of the target firm. The attractiveness of a target may decrease with the potential for wealth transfer to the target's debt holders through merger. The target's debt capacity is proxied as the proportion of tangible fixed assets to total assets because acquiring firm could use the target's assets as security for its acquisition financing, thereby effectively lowering the acquisition cost.[252] Ceteris paribus, the "co-insurance" potential of tangible assets in (e.g. debt-financed) acquisitions potentially increases the likelihood of takeover. [253]

The ratio of tangible fixed assets to total assets, however, may also be related to acquisition likelihood as a proxy for asset-rich firms in declining industries, suggesting that asset-rich firms, particularly in declining industries, attract substantial takeover interest as a method of restructuring the firm to gain a competitive advantage relative to other firms in the industry.[254] Furthermore Eddey (1991) and Powell (2004) stress that firms with a high proportion of tangible fixed assets are potential candidates for asset striping by "raiders", which increases their acquisition likelihood.[255]

4.3.3 Payment

Acquisition activity and potential merger gains are constrained by the availability of resources to settle the payment of a possible investment in a target firm. The availability of resources, in turn, refers to firm size, the firm's liquidity, its leverage as well as other previously discussed firm characteristics, the dimensions of takeover

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250 Barnes (1998), p. 581; Ooghe/De Langhe/Camerlynck (2006), p. 72.
251 Gorton/Kahl/Rosen (2009), pp. 1291-1344.
252 Scott (1977), pp. 1-19; Stulz/Johnson (1985), pp. 501-521; Ambrose/Megginson (1992), pp. 575-589; Powell (1997), p. 1015.
253 Ambrose/Megginson (1992), pp. 575-589; Powell (1997), pp. 1009-1030; Powell (2004), pp. 35-72; Bhabra (2008), pp. 158-175.
254 Ambrose/Megginson (1992), p. 578; Powell (1997), p. 1015.
255 Powell (2004), pp. 41-42; Eddey (1991), pp. 151-171.

activity. Therefore, this study is not assuming a particular impact of the acquisition's payment on acquisition likelihood.

However, IFRS 3 and ASC 805 emphasize the means of payment together with firm size relationship as important determinants of the acquirer.[256] As outlined before, the standards suggests that when a smaller firm acquires a larger firm with stock, the acquirer's ownership of the combined firm is possibly diluted so that the owners of the smaller firm control the larger firm and the smaller form is considered the accounting acquirer.

4.3.4 Other Determinants of Merger Activity

The acquisition decision may also be affected by cultural, institutional or regulatory and other concerns. Cultural aspects refer to a firm's cultural barriers, the cost of integrating the target into the acquirer's organizational framework, and the cultural aspects in cross-border transactions.[257] Integration of a firm into another is costly. However, if the potential success of an acquisition is a question of transaction costs, the success will largely depend on the resources and size of the acquirer.

In addition, institutional factors, the equity and ownership structure, and takeover defenses might affect acquisition activity. For example, Ambrose/Megginson (1992) and Davis/Stout (1992) investigate ownership structures and report that the probability of receiving a takeover bid is positively related to the net change in institutional holdings and that blank-check preferred stock authorizations are the only common takeover defense significantly (negatively) correlated with acquisition likelihood.[258]

However, the analysis of the above-mentioned factors on takeover activity open a wide field of additional research on a different set of firm characteristics, which are not in the focus of this study. Therefore, the analysis of these factors is left to another research project.

4.4 Interim Summary of Chapter 4

This section aimed to provide a theoretical framework, connecting theories of acquisition likelihood and firm characteristics in order to describe the relationship of acquirer and target firms. Merger activity is expected to arise predominantly from

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256 See section 3.2.1—Firm-Level vs. Owner-Level Control.

257 For a framework on organizational integration strategies and cross-border integration strategies, see Bruner (2004), pp. 98-122, 891-913.

258 Ambrose/Megginson (1992), pp. 575-589.

merger gains. Merger gains and, therefore, merger activity is incentivized by certain firm characteristics of potential target firms that are attractive to acquiring firms.

The dimensions that are considered largely as incentives for merger activity relate to firms' performance and profitability, availability of resources such as liquidity, leverage and free cash flow, or valuation discrepancies that make firms, ceteris paribus, attractive as targets. Other factors, such as tax may affect the structure and timing of the mergers, and the total premium paid for the target, but are not considered to affect the merger decision per se.

Furthermore, there are some constraining factors, or barriers, that result predominantly from the limited resources of acquiring firms. Firm size, for example, limits the number of potential acquirers available. In this context, the available means of payment or the asset structure may influence successful acquisition activity.

Incentives and barriers are exposed and influenced, among other things, by the global setting, by antitrust and other business regulation, by cultural aspects, particularly with regard to the integration of one business into another, as well as by the sometimes irrational belief (pride, or hubris) of managers to earn returns from potentially unfavourable acquisitions,[259] or by the impact of changing environment due to industry or "economic shocks".

Based on this framework, a meta-analysis will be conducted in section 5 of this study, providing a detailed analysis of the findings of empirical takeover studies. In section 6, this framework is used to guide the empirical analysis of this study on relative firm characteristics of acquirers and the acquirees in business combinations.

[259] Roll (1986), pp. 197-216.

5 Meta-Analysis

Prior studies that deal with the analysis of merging firms concentrate mainly on the characteristics distinguishing targets from non-targets. In contrast, this study focuses on the distinguishing features of acquirers from their targets. As such, this approach in this study may differ from the approach of prior studies. However, these studies are the literature that is most closely related to this study. In addition, reviewing the target prediction and similar literature is expected to be important, as these studies use merger and acquisition hypotheses derived primarily from the acquirer's perspective, i.e., they ask why a firm could be attractive to an acquirer. Hence, the findings of these studies will potentially provide information regarding significant firm characteristics that are useful to further analyze.

Thirty-six prior studies on firm characteristics and acquisition likelihood have been identified. In total, these studies use more than 300 different variable definitions to measure about 14 dimensions of firm characteristics. Most variables are not uniformly applied throughout the studies. Therefore, they will be standardized by the dimensions of the theoretical framework, which has been developed in the previous section of this study. In doing so, their information content and potential contribution for this study is analyzed.

5.1 Overview: Previous Empirical Studies on Acquisition Likelihood

Table 2 gives a brief literature overview of the studies that are used for this meta-analysis. It displays authors, the dimensions and the statistical techniques that have been applied, as well as the country, the year and the sample size of each study. An "S" in Table 2 marks if firm characteristic have been statistically significant at the 1 to 10 percent level of a study, an "X" marks otherwise.

The overall findings of these studies suggest that firm size, liquidity, leverage, growth, mismatch of growth and resources, and profitability are important dimensions of determining acquisition targets. The usefulness of these dimensions and underlying variables as determinants of acquirers and target firms, the acquirees, in business combinations will be empirically analyzed in section 6—Empirical Study.[260]

[260] Section 6—Empirical Study.

Table 2

Studies on Firm Characteristics and Acquisition Likelihood

Study	Performance	Size	Valuation	Liquidity	Leverage	Growth	GRMM	Asset Structure	Industry Disturbance	Institutional	Agency	Takeover Defense	Tax	Other	Country / Period	Number of Mergers, Acquisitions / Targets, Bids / Unacquired, Non-Merging Firms[261] / Acquirers	Statistical Technique[262]
Stevens (1973)	S		X	S	S						X				USA / 1966, (1967, 1968 for validation of classification)	- / 40 / 40, A / -	M / - / DA
Melicher/Rush (1974)	S		S		S	S									USA / 1960-1969	61 conglomerate and 71 non-conglomerate firms / - / - / -	M / - / -
Singh (1975)	X	S		S	S	S					S				UK / 1963-1970, (Prior study 1955-1960)	- / 112 / 351, A / -	M / - / DA
Belkaoui (1978)	S			S	S						S				Canada / 1960-1968	- / 25 / 25, A / -	M / - / DA
Harris/Stewart/ Guilkey/ Carleton (1982)	S	S	S	S	X	S					S		S	X	USA / 1974-77	- / 106 / 1211 / -	M / P / -
Palepu (1982)	X	S	S	X	S	S	S		S						USA / 1971-1979	- / 198 / 298,A / -	M / L / -
Wansley/Lane (1983)	X	S	S	X	S	S				X	X				USA / 1975-1977	- / 89 / 44A / -	- / - / DA

[261] An "A" after the number of firms means that unsuccessful takeover bids are classified as unacquired firms; a "B" states that all takeover attempts (successful and unsuccessful) are classified as targets and/or bids.

[262] "M," "L," "P," and "DA" mean: Univariate Comparison of Means or Median (M) / Logit- (L), Probit- (P), OLS-Regression (OLS) / Discriminant Analysis (DA).

Study	Performance	Size	Valuation	Liquidity	Leverage	Growth	GRMM	Asset Structure	Industry Disturbance	Institutional	Agency	Takeover Defense	Tax	Other	Country / Period	Number of Mergers, Acquisitions / Targets, Bids / Unacquired, Non-Merging Firms[261] / Acquirers	Statistical Technique[262]
Dietrich/ Sorensen (1984)	S	S	X	X	X	X				S	S				USA / 1969-1973	- / 30 / 59 / -	- / L / -
Wansley (1984)	S	S	S	S	S	S				X	X				USA / 1975-1976	- / 44 / 44, A / -	- / - / DA
Hasbrouck (1985)		S	S	S	S										USA / 1977-1982	- / 86 / 172, B / -	M / L / -
Bartley/Boardman (1986)	X		S	X	X	X					X				USA / 1978	- / 33 / 32, B / -	M / - / DA
Palepu (1986)	X	S	S	X	S	S	S		S						USA / 1971-1979	- / 163, (30 targets for classification tests) / 256 (1087 for classification tests) A / -	- / L / -
Hannan/Rhoades (1987)	X	X			S	X								S	USA / 1971-1982	- / 201 / 845 / -	- / L / -
Bartley/Boardman (1990)	S	S	S	S	S	S				S	S		S		USA / 1979-1981	- / 41 / 153B / -	- / - / DA
Ambrose/Megginson (1992)		S	X	X	X	X	X	S		S		S			USA / 1981-1986	- / 169, 34 unsuccessful takeover bids / 267 unliquidated or otherwise delisted firms, B / -	M / L / -
Bacon/Shin/Murphy (1992)	S			X	S	S									USA / not specified	42 / 50 / 50A / -	M / L / -
Davis/Stout (1992)	S	S	S		S	S				S	S			S	USA / 1980-1990	- / 144 / - / -	- / L / -
Trahan/Shawky (1992)	S	S	S		S	X					S				USA / 1984-1986	212 / 212 / 1008 / 155	- / L / -

Study	Performance	Size	Valuation	Liquidity	Leverage	Growth	GRMM	Asset Structure	Industry Disturbance	Institutional	Agency	Takeover Defense	Tax	Other	Country / Period	Number of Mergers, Acquisitions / Targets, Bids / Unacquired, Non-Merging Firms[261] / Acquirers	Statistical Technique[262]
Trahan (1993)	S	S	X		X	X					X				USA / 1984-1986	- / 212 / 1008 / 155	- / L, OLS / -
Walter (1994)	S	S	S	X	X				S		X		S		USA / 1981-1984	- / 44 / 355, A / -	M / L / -
Meador/Church/ Rayburn (1996)	X	X	S	X	S	S				X	S			X	USA / 1981-1985	- / 100, thereof 50 horizontal mergers and 50 vertical mergers / -A / -	- / L / -
Chen/Su (1997)	X	X	S	S	S	S							X		Cross-border / US-acquisition, US-targets / 1980-1990	- / 322, thereof 161 acquired by foreign firms, 161 acquired by US-firms / 161, A / -	M / L / -
Powell (1997)	S	S	S	S	S	S		S			S				UK / 1984-1991	/ 411 targets (97 firms subject to hostile bid and 314 firms subject to friendly bid) / 532A / -	- / L / -
Thompson (1997)	S	S				S					S			S	UK / 1981-1993	1650 observations out of 200 societies, with 115 out of 200 societies disappearing through mergers / - / - / -	M / L / -
Zanakis/Zopounidis (1997)	X			X	S						X				Greece / 1983-1990	350 announced acquisitions and mergers / 350, thereof 80 firms for estimation sample and 30 firms to test models' predictive ability / A /	M / L / DA
Barnes (1998)	S	X	X	X	X	S					X				UK / 1991-1993, holdout sample for 1994	- / 82 of 323 for estimation, 16 and 13 for holdout sample / 82 of 323 for estimation, 1185 and 886 holdout sample, B / -	- / L / -
Barnes (1999)	S	X	X	X	X	S					X				UK / 1991-1993, holdout sample for 1994	- / 82 of 323 for estimation, 16 and 13 for holdout sample / 82 of 323 for estimation, 1185 and 886 holdout sample, B / -	- / L / -
Barnes (2000)	S	X	X	X	X	S					X				UK / 1991-1993, holdout sample for 1994	- / 82 of 323 for estimation, 16 and 13 for holdout sample / 82 of 323 for estimation, 1185 and 886 holdout sample, B / -	- / L / -

Study	Performance	Size	Valuation	Liquidity	Leverage	Growth	GRMM	Asset Structure	Industry Disturbance	Institutional	Agency	Takeover Defense	Tax	Other	Country / Period	Number of Mergers, Acquisitions / Targets, Bids / Unacquired, Non-Merging Firms[261] / Acquirers	Statistical Technique[262]
Cudd/Duggal (2000)	S	S	X	S	S	S	S		S						USA / 1987-1991	- / 108 and 13 in the holdout sample / 235 estimation sample and 460 holdout sample, A / -	- / L / -
Sorensen (2000)	S			S	S	X					S				n/a / 1996	350 / 286 / 217A / 232	M / L / -
Doumpos/ Kosmidou/ Pasiouras (2004)	S			S	S	X								S	UK / 2000-2002	- / 76 / 76, A / -	M / L / DA
Powell (2004)	X	S	X	S	S	X	S	X			X				UK / 1986-1995	- / 471 targets for estimation sample (81 hostile and 390 as friendly); 29 for prediction sample (4 hostile and 25 friendly) / 9420, 971 for prediction sample, A / -	- / L / -
Tsagkanos/ Georgopoulos/ Siriopoulos (2006)	S	S		S	X	X								S	Greece / 1995-2000	- / 56, thereof 21 for holdout sample / 305, 105 for estimation and 200 for holdout sample / -	- / L / -
Kumar/Rajib (2007)	S	S	S	S	S	S				S	S				India / 1993-2004	- / 215 / 490, A / 227	M / L / -
Bhabra (2008)	S	S	X	X	S	S	S	S			X				Firms listed on NYSE/ASE/NASDAQ / 1966-1992	- / 141 potential targets (thereof 99 with no missing data) and 194 program announcements / 3228 rivals of targets, B / -	M / L / -
Tsagkanos/ Georgopoulos/ Siriopoulos/ Koumanakos (2008)	X	S		X	X	X								S	Greece / 1993-2001	- / 35 / 105 / -	- / L / -

Table 2: Studies on Firm Characteristics and Acquisition Likelihood

5.2 Performance Measures

Mergers are hypothesized to improve firm efficiency. This can emerge from realization of synergy potentials, from the replacement of the former, poor or inefficient management of the target firm, or from a mix of both. Most takeover studies refer to the second approach to back up their analysis. They stress that takeovers improve the performance of the target firm after the implementation of new policies and procedures enacted by the more profitable firm after the merger.[263] In such instances, mergers are a control mechanism to discipline inefficient managers. Thus, a common hypothesis is that pre-performance is not as good as the performance of the acquiring or the non-target firms.

Efficient management is commonly measured by accounting profitability ratios such as return on assets, or return on equity. The following section displays the main finding of takeover studies based on these measures.

5.2.1 Earnings in Absolute Numbers

Earnings in absolute numbers refers to items from the income statement. Depending on the purpose of earnings analysis, the income statement commonly splits earnings into components. Usually this split is based on the nature of expense method, which calculates the individual components of the income statement as follows:

[263] Section 4.2.3—Managerial Inefficiencies and Performance.

Figure 5

Earnings Calculation Scheme, Nature of Expense Method

Net sales (Revenue)
- Cost of goods sold
= Gross profit
- SG&A expenses (Selling, General and Administrative Expenses)
= EBITDA (Earnings before Interests, Taxes, Depreciation and Amortization)
- Depreciation & amortization
= EBIT (Earnings before Interests and Taxes, Operating Profit)
- Interest expense (cost of borrowing money)
= EBT (Earnings before Taxes)
- Tax expense
= Net income (Earnings after Tax, Net Profit)

Figure 5: Earnings Calculation Scheme, Nature of Expense Method

Measures of accounting profitability like the EBIT or net income do not consider the assets or the capital to generate the earnings. Thus, only a few studies provide analysis on absolute earnings with regard to merger activity. As displayed in Table 3, only Meador/Church/Rayburn (1996) and Kumar/Rajib (2007) use these earnings measures to describe pre-merger firm characteristics. Meador/Church/Rayburn (1996) use a US-sample of 50 horizontal mergers and 50 vertical mergers between 1981 to 1985. They do not find a significant relationship between acquisition likelihood and a firm`s earnings based on EBIT.[264] However, Kumar/Rajib (2007) use data for Indian firms from 1993 to 2004 and document that acquiring companies have higher EBIT and larger net income compared to the group of target firms.[265] However, this is only found using univariate analysis and may be a result of firm size rather than profitability.

[264] Meador/Church/Rayburn (1996), pp. 11-23.
[265] Kumar/Rajib (2007), pp. 27-44.

Table 3
Absolute Earnings Measures

Absolute Earnings Measures	Obs. Relation	EBIT	Net Income	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Meador/Church/ Rayburn (1996)	+/-	X		n/a	All, Horizontal, Vertical Mergers: + 4.593; +7.458; -1.113
Kumar/Rajib (2007)	-*	S	S	Acquirer vs. Target: EBIT 257.06 > 65.1,* ; Net Income 77.58 > 14.83,*	n/a

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 3: Absolute Earnings Measures

5.2.2 Earnings per Share Ratio

The earnings per share ratio (EPS) relates earnings to shares but not to the earnings generating values.[266]

When the outstanding shares are all common stock, the ratio is calculated as follows:[267,268]

Figure 6
Earnings per Share Ratio

$$\text{Earnings per Share (of Common Stock)} = \frac{\text{Net Income}}{\text{Weighted-Average Number of Common Shares Outstanding during the Period}}$$

Figure 6: Earnings per Share Ratio

266 Wahlen/Baginski/Bradshaw (2011), p. 252.

267 When financial instruments are hold to convert to common shares, such as warrants, stock options and convertible preferred shares or bonds, a distinction is made between basic and diluted earnings per share. The diluted (also referred to as fully diluted) earnings per share is calculated, assuming that conversion occurred at the beginning of the period, thus increasing the denominator by convertible shares and, as a consequence, reducing the earnings per share ratio, for example, Penman (2010), pp. 272-273.

268 When calculating EPS, net income is referred to the past 12 months (trailing-twelve-month or recent-four-quarter-rolling earnings per share), or to a 12 month estimate (forward looking earnings per share), or a mix of both (e.g. past 6 month and a 6 month estimate), Penman (2010), p 217; Wahlen/Baginski/Bradshaw (2011) p. 1061; Coenenberg/Haller/Schultze (2009), pp. 583 ff, 1136 ff.

Even though used in one study, Kumar/Rajib (2007)[269], Table 4, earnings per share seem to be an inadequate determinant for merger activity. Therefore, this ratio is often combined with other financial performance indicators, as discussed in a following section.[270]

Table 4
Earnings per Share

Earnings per Share	Obs. Relation	EPS	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Kumar/Rajib (2007)	-*	S	Acquirer, Target: 15.95 > 2.94, *	n/a

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 4: Earnings per Share

5.2.3 Return on Assets, Return on Investment

A much better indicator for performance in the sense of accounting profitability is the rate of return on assets. Several studies use this ratio or its various derivatives (Table 5). The rate of return on total assets net book value, or in short return on assets (ROA) or sometimes also referred to as return on investment (ROI), measures the performance of the firm relative to asset value.[271]

The calculation is as follows: The numerator of the ROA ratio is usually calculated as the sum of net income[272] plus interest expense less interest related tax effects (tax shield), which is EBIT less adjusted taxes.[273] In theory, interest expenses and the tax effect of such expenses should be eliminated from net income in order to provide

269 Kumar/Rajib (2007), pp. 27-44.
270 See section 5.4—Valuation
271 Horngren/Harrison/Oliver (2012), pp. 598-599; Wahlen/Baginski/Bradshaw (2011), pp. 266-268; Gibson (2011), pp. 308-309; Penman (2010), pp. 369-371; Brealey/Myers/Franklin (2008), pp. 797-798; Coenenberg/Haller/Schultze (2009), pp. 1145-1147; Palepu/Healy/Bernard (2000), pp. 320-321.
272 Also, minority interest earnings when excluded from net income are commonly added back, Wahlen/Baginski/Bradshaw (2011), p. 259.
273 The interest tax shield is the tax effect of interest expense that is deductible from taxable net income; adjusted taxes refer to income taxes less tax shield, Wahlen/Baginski/Bradshaw (2011), p. 260; Brealey/Myers/Franklin (2008), p. 797.

information measuring a firm's success in using assets to generate earnings independent of the financing of those assets.[274]

Figure 7
Return on Assets Ratio

$$\text{R eturn on Assets} = \frac{\text{EBIT x (1 - Adjusted Tax Rate)}}{\text{Average Total Assets}}$$

Figure 7: Return on Assets Ratio

The expression in the numerator —EBIT times one less the adjusted tax rate (which is the tax rate assuming EBIT as basis for taxation)—is often referred to by acronyms such as NOPAT (net operating profit after taxes) or EBIAT (earnings before interest after taxes).[275]

The performance hypothesis[276] suggests that there is a negative relationship between earnings and takeover likelihood. Studies by Belkaoui (1978), Harris/Stewart/Guilkey/Carleton (1982), Bacon/Shin/Murphy (1992), Sorensen (2000) and Kumar/Rajib (2007) affirm this hypothesis, using the return on assets metric.[277] Belkaoui (1978) applies multivariate discriminant analysis to Canadian data for the years 1960 to 1968. Harris/Stewart/Guilkey/Carleton (1982) and Bacon/Shin/Murphy (1992) use US data, covering time periods from 1974 to 1977 and 1971 to 1982, respectively. Sorensen (2000) presents data from 1996; Kumar/Rajib (2007) uses Indian data from 1993 to 2004. The findings of these studies are based on univariate tests and multivariate analysis. Multivariate analysis was applied by Belkaoui (1978), Sorensen (2000) and Harris/Stewart/Guilkey/Carleton (1982), using MDA, logit and probit techniques.

However, studies by Singh (1975), Hannan/Rhoades (1987), Walter (1994), Meador/Church/Rayburn (1996) and Chen/Su (1997) among others do not report any

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274 Wahlen/Baginski/Bradshaw (2011), p. 259; this adjustment then leads to a ROA measure that assumes that the company is all-equity-financed, Brealey/Myers/Franklin (2008), p. 797, fn. 8; A further modification to this metric is to subtract average non-interest-bearing liabilities, like accounts payable and accrued liabilities, from average total assets in the denominator of ROA, since these items are sources of indirect financing, Wahlen/Baginski/Bradshaw (2011), p. 264.

275 Wahlen/Baginski/Bradshaw (2011), p. 261.

276 See section 4.2.3—Managerial Inefficiencies and Performance.

277 Belkaoui (1978), pp. 93-108; Harris/Stewart/Guilkey/Carleton (1982), pp. 164-184; Bacon/Shin/Murphy (1992), p. 8; Sorensen (2000), pp. 423-433; Kumar/Rajib (2007), pp. 27-44.

statistically significant results on this earnings measure. This may be caused by qualitative multicollinearity problems in these studies, as they apply several profitability variables simultaneously.

Conversely, an early study, Melicher/Rush (1974), reports a significant positive relationship between return on assets and acquirers and acquired firms in a study of conglomerate and non-conglomerate acquisitions, using US-data from the 1960s. However, their study uses only univariate analysis and does not have the discriminating power of the multivariate studies.

In sum, there is some empirical evidence suggesting that the relative performance of combining firms may be helpful for the identification of target or acquiring firms. The return on assets ratio considers both sales and accounting expenses relative to assets. However, when accounting involves a high degree of discretion, other ratios such as sales to assets could yield more valid results. This ratio is considered in a subsequent section.[278]

Table 5

Return on Assets

Return on Assets	**Obs. Rel-ation**	**Gross Profit / Total Assets**	**EBIT / Total Assets (1 Year)**	**EBT / Total Assets (1 Year)**	**Net Income / Total Assets (1 Year)**	**Net Income / Total Assets (Ind. adj., 1 Year)**	**Univariate Comparison**	**MDA-/ Logit-(L)/ Probit-(P) Coefficients** (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Stevens (1973)	n/a		X		X		n/a	Factor Analysis, n/a
Melicher/ Rush (1974)	+*/ +** /-		S		S		C: Acquirer, Acquired:[279] EBIT/TA: 0.120 < 0.141, ** NI/TA: 0.058 < 0.072, * N-C: Acquirer, Acquired:: EBIT/TA: 0.157 > 0.149 NI/TA: 0.078 > 0.075	n/a
Singh (1975)	n/a		X				n/a	MDA, n/a
Belkaoui (1978)	-**/ -***				S		n/a	MDA for Year 1, 2***, 3**, 4**, 5**, before takeover with the following values for Net Income/Total

[278] See section 5.2.5—Asset Turnover, starting p. 72.

[279] C: Conglomerate firm acquisitions; N-C: Non-conglomerate firm acquisitions.

Return on Assets	Obs. Relation	Gross Profit / Total Assets	EBIT / Total Assets (1 Year)	EBT / Total Assets (1 Year)	Net Income / Total Assets (1 Year)	Net Income / Total Assets (Ind. adj., 1 Year)	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
								Assets: -0.03333, -0.1986, -0.08349, -0.17424, -0.13008
Harris/Stewart/ Guilkey/ Carleton (1982)	+/ -***		S				Non-acquired, Acquired Firms in 1974-1975: 0.134 > 0.132; 1975-1976: 0.133 < 0.142	(P) ; 1974-1975: -0.83, -0.838; 1976-1977: -0.188, -0.189; Fixed & Random Coef. Probit, 1976-1977: -0.065***, -0.103***
Hannan/ Rhoades (1987)	+/-				X	X	n/a	(L)[280], ROA: +0.38, -4.52 adj. ROA: +0.05, -0.02
Bacon/Shin/ Murphy (1992)	-*		S		S		Earnings before interest / Total Assets: Non-merged > Merged Firms, (-)*; Net Income / Total Assets: Non-merged > Merged, (-)*	Not measured for Earnings before interest / Total Assets; (-) for Income / Total Assets
Walter (1994)	+/-				X		n/a	Hist.-Cost, Curr.-Cost-Model: +1.041, -0.025
Meador/Church/ Rayburn (1996)	+				X		n/a	All, Horizontal, Vertical Mergers: +0.670; +5.036; +8.160
Chen/Su (1997)	+/-				X		n/a	(L)[281] ; -1.711, -1.221, +2.644, +5.905
Thompson (1997)	+/-				X		n/a	1 Year Prior -10.740; 2-Year Prior -20.30; Only in deregulated sectors: +30.467
Zanakis/ Zopounidis (1997)	+/-	X	X				Non-Acquired, Acquired:°[282]- Gross Profit / TA: Year -1: 0.35< 0.41; Year -2: 0.35 < 0.4; Year -3: 0.41, 0.41 EBIT / TA: Year 1: 0.12 < 0.14; Year -2: 0.12 < 0.13; Year -3: 0.16 > 0.13	n/a[283]

280 Each first coefficient refers to acquisitions from inside of the target firm's market and, every second coefficient refers to acquisitions from outside of the target firm's market, Hannan/Rhoades (1987), p. 68.

281 This study analyzes differences between foreign and US-acquisitions. The first two coefficients refer to foreign acquisitions, 1 and 2 years prior to the announcement date; coefficients 3 and 4 refer to US-acquisitions, 1 and 2 years prior to the announcement date.

282 Data refers to 1 to 3 years prior to takeover.

283 A logit analysis was performed but the significance level of coefficients was not indicated; therefore, the coefficients are not listed in this table, Zanakis/Zopounidis (1997), p. 685.

Return on Assets	Obs. Relation	Gross Profit / Total Assets	EBIT / Total Assets (1 Year)	EBT / Total Assets (1 Year)	Net Income / Total Assets (1 Year)	Net Income / Total Assets (Ind. adj., 1 Year)	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Sorensen (2000)	-*		S				Nonmerging, Acquiring, Target-Groups: [0.0098, 0.0767] > -0.0007,*	(L)**, coef. not available
Doumpos/ Kosmidou/ Pasiouras (2004)	n/a			X			T-Test[284]; Year1 not signif., Year2 not signif., Year3 not signif.	n/a[285]
Kumar/Rajib (2007)	-*		S	S	S		Acquirer, Target: EBIT/TA: 0.114 > 0.063,* EBT/TA: 26.67 > 16.5, *; NI/TA: 0.0466 > -.0058,*	(L); Non-Acquired Firms vs. Target: EBIT/TA: +2.54, +1.388; EBT/TA: +0.001, +0.00167 NI/TA: -1.96, -1.97

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 5: Return on Assets

5.2.4 Profit Margin Ratios

Several merger studies analyze the individual components of ROA in addition to ROA itself. The return on assets can be disaggregated into profit margin and asset turnover. These ratios are often used to provide better insight into the profitability structure of businesses, revealing the sources of profitability,[286] and analyzing the trade-off between the profit margin and the asset turnover.

This restated equation of return on assets is as follows:

284 This study does not present the tested means.

285 This study displays only the classification results, and not the findings of the regression models such as coefficients and related statistics.

286 Horngren/Harrison/Oliver (2012), p. 1166; Penman (2010), p. 372; Brealey/Myers/Franklin (2008), p. 799.

Figure 8
Disaggregation of the Return on Assets Ratio

$$\text{Return on Assets} = \text{Profit Margin} \times \text{Asset Turnover}$$

$$= \frac{\text{EBIT x (1 - Adjusted Tax Rate)}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Average Total Assets}}$$

Figure 8: Disaggregation of the Return on Assets Ratio

The profit margin describes the proportion of sales that finally became earnings.[287] According to the components of the return on assets ratio, the numerator is calculated as EBIT less adjusted taxes[288] and the denominator is sales[289]:

Figure 9
Profit Margin

$$\text{Profit Margin} = \frac{\text{EBIT x (1 - Adjusted Tax Rate)}}{\text{Sales}}$$

Figure 9: Profit Margin

Several studies use the profit margin ratio to reflect profitability for acquisition likelihood even though there is no theory supporting the use of this particular ratio. Accordingly, the overall results are mixed, see Table 6.

Using univariate tests to compare means, studies by Melicher/Rush (1974), Bacon/Shin/Murphy (1992), Sorensen (2000) and Kumar/Rajib (2007) report a significant negative relationship between profit margin acquisition likelihood. Bacon/Shin/Murphy (1992) and Sorensen (2000) indicate that non-merging firms have

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287 Horngren/Harrison/Oliver (2012), p. 1166; Wahlen/Baginski/Bradshaw (2011), p. 266; Gibson (2011), p. 309; Penman (2010), p. 371; Brealey/Myers/Franklin (2008), p. 797; Coenenberg/Haller/Schultze (2009), pp. 1145-1146; Palepu/Healy/Bernard (2000), p. 324.

288 Sometimes simply net income, ignoring that parts of the profits are paid out to debt-holders as interests which leads to bias when comparing with firms of different capital structure, Brealey/Myers/Franklin (2008), p. 797, fn. 7.

289 Some modification may use revenues, not just sales, Wahlen/Baginski/Bradshaw (2011), p. 266.

higher mean profit margins than target firms do.[290] Melicher/Rush (1974) and Kumar/Rajib (2007), however, find both, a negative and positive association of a firms' profit margin and the acquisition likelihood; Melicher/Rush (1974) when using a conglomerate sample instead of a sample of non-conglomerate mergers, and Kumar/Rajib (2007) when employing EBIT-to-Sales ratio instead of EBT-to-Sales.

The multivariate techniques applied by Barnes (1998), (1999), (2000), and Tsagkanos/Georgopoulos/Siriopoulos (2006) documents a significant positive association of a firms' profit margin and the acquisition likelihood. Kumar/Rajib (2007), again, reports both, a positive and a negative relationship on acquisition likelihood, depending on the variable that is used, EBIT-to-Sales or EBT-to-Sales.[291]

In conclusion, prior literature has not found a consistent, identifiable relationship between the profit margin and acquisition likelihood that could help to identify the acquiring and target firms in business combinations. In other words, it is probable that the profit margin needs to be considered together with other ratios such as the asset turnover in order to draw conclusions how firm profitability influences acquisition likelihood.

Table 6
Profit Margin

Profit Margin	**Obs. Relation**	**EBIT / Sales**	**EBT / Sales**	**EBITDA / Sales**	**Gross Profit / Sales**	**Net Income / Sales**	**Univariate Comparison**	**MDA-/ Logit-(L)/ Probit-(P) Coefficients** (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Stevens (1973)	+** /-	S	X		X	X	Non-Acquired, Acquired; EBIT/Sales: 10.40 > 8.83	Factor Analysis; MDA: EBIT/Sales +0.108**, rank 2
Melicher/ Rush (1974)	+*** /-***					S	C: Acquirer, Acquired:[292] NI/NetSales: 0.5 < 0.61, *** N-C: Acquirer, Acquired:: NI/NetSales: 0.069 > 0.059***	n/a
Harris/Stewart/ Guilkey/ Carleton (1982)	+/-	X					Non-acquired, Acquired Firms in 1974-1975: 0.094 > 0.089; 1975-1976: 0.091 > 0.097	(P); 1974-1975: +0.867, +0.708; 1976-1977: +0.151, +0.355
Wansley/ Lane (1983), Wansley (1984)	n/a	X					n/a	Factor Analysis; LDA: n/a

290 Melicher/Rush (1974), pp. 141-149; Bacon/Shin/Murphy (1992), p. 8; Sorensen (2000), pp. 423-433; Kumar/Rajib (2007), pp. 27-44.

291 Barnes (1998), pp. 573-591; Barnes (1999), pp. 283-301; Barnes (2000), pp. 147-162; Tsagkanos/Georgopoulos/Siriopoulos (2006), pp. 183-194; Melicher/Rush (1974), pp. 141-149; Kumar/Rajib (2007), pp. 27-44.

292 C: Conglomerate firm acquisitions; N-C: Non-conglomerate firm acquisitions.

Profit Margin	Obs. Relation	EBIT / Sales	EBT / Sales	EBITDA / Sales	Gross Profit / Sales	Net Income / Sales	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Dietrich/ Sorensen (1984)	+	X					n/a	+0.35
Bacon/Shin/ Murphy (1992)	+/-*	S				S	Earnings before interest / Operating Revenue: Non-merged > Merged Firms, (-)*; Net Income / Operating Revenue: Non-merged > Merged, (-)*	(+) for Earnings before interest / Operating Revenue; Not measured for Net Income / Operating Revenue
Barnes (1998), (1999), (2000)	+**		S				n/a	(L), +4.0266**, +4.0672**
Sorensen (2000)	-**	S					Nonmerging, Acquiring, Target-Groups: [0.0057, 0.0752] > 0.0049,**	(L)**, n/a
Doumpos/ Kosmidou/ Pasiouras (2004)	n/a	S		X		X	T-Test[293]; Ebit Margin: Year1 not signif., Year2 not signif., Year3**; EBITDA Margin: Year1 not signif., Year2 not signif., Year3 not signif. Profit Margin: ; Year1 not signif., Year2 not signif., Year3 not signif.	MDA, n/a[294]
Tsagkanos/ Georgopoulos/ Siriopoulos (2006)	+*/-	S					n/a	(L): Binary Logit, Conditional Logit; -0.08581, +0.016954*
Kumar/ Rajib (2007)	+/+* -/-*/ -***	S	S				Acquirer, Target: EBIT/Sales: 0.18 < 0.19,* ; EBT/Sales: 0.056 > -0.009,*;	Non-Acquired Firms vs. Target: EBIT/Sales: -1.55, -1.93***; EBT/Sales: +1.16, +1.46**
Tsagkanos/ Georgopoulos/ Siriopoulos/ Koumanakos (2008)	-	X					n/a	(L): Classical MLE, Bootstrap MLE of Logit; -0.079, -0.2257

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 6: Profit Margin

5.2.5 Asset Turnover

The asset turnover (also referred to as the sales-to-assets or activity ratio) indicates the proportion of sales generated by an average amount of total assets (or average fixed

293 This study does not present the tested means.

294 This study displays only the classification results, and not the findings of the regression models such as coefficients and related statistics.

assets net of accumulated depreciation).[295, 296] As noted in the previous section, it is component of the ROA ratio.

Figure 10
Asset Turnover

$$\text{Asset Turnover} = \frac{\text{Sales}}{\text{Average Total Assets}}$$

Figure 10: Asset Turnover

This ratio is often referred to as measure of firm activity because it indicates how efficiently a firm uses its assets.[297] For example, if the asset turnover is high, assets may be close to capacity limits, so sales growth may only be possible with additional invested capital. Another implication of a rather high ratio would be that the firm produces high volume, low margin products.[298] Thus, interpretation of this ratio is rather ambiguous.

Throughout takeover studies it is assumed that low activity may reflect that current management has undertaken heavy investment, but has been unable to generate sales growth. It is implied that management's poor use of assets could be reversed by new management.[299] Assuming, furthermore, that the market discounts the value of the firm because of this inefficiency, the firm can be acquired at a low price.[300] Thus, firms with low activity may be more likely to be acquired.

Several studies relate asset turnover to the likelihood of becoming a target. However, few studies present significant univariate results that are consistent with the assumption that low activity may reflect poor management use of assets which could be reversed by replacement of management through merger.

Stronger evidence is suggested by multivariate results. A significant negative relationship between firms' asset turnover and acquisition likelihood is found in three

295 Wahlen/Baginski/Bradshaw (2011), pp. 285, 288.
296 Horngren/Harrison/Oliver (2012), pp. 1166-1167; Wahlen/Baginski/Bradshaw (2011), p. 266; Gibson (2011), p. 309; Penman (2010), p. 371; Brealey/Myers/Franklin (2008), p. 796; Coenenberg/Haller/Schultze (2009), pp. 1145-1146; Palepu/Healy/Bernard (2000), p. 324.
297 Revsine/Collins/Johnson (2005), p. 234.
298 Brealey/Myers/Franklin (2008), p. 796.
299 For example, Dietrich/Sorensen (1984), p. 396; Harris/Stewart/Guilkey/Carleton (1982), p. 172.
300 Walter (1994), p. 359.

US-studies: Harris/Stewart/Guilkey/Carleton (1982) uses data form 1974 to 1977, Dietrich/Sorensen (1984) analyzes the period between 1969-1973, and Walter (1994) uses a data set from 1981 to 1984.

However, other studies find the contrasting results using MDA techniques. Trahan/Shawky (1992) and Trahan (1993) use the same US-data set from 1984 to 1986, and Stevens (1973) uses a data set from the 1960s. However, the findings of Trahan/Shawky (1992) and Trahan (1993) refer to acquiring and non-acquiring firms rather than targets, so only the study by Stevens (1973) directly contradicts the performance hypothesis on acquisition likelihood in target and non-target sample. The significance, indeed, does not refer to the single variable, but to the overall MDA-model that was developed by this study.

Studies by Meador/Church/Rayburn (1996) and Barnes (1998), (1999), (2000) as well as a more recent studies by Sorensen (2000), Tsagkanos/Georgopoulos/Siriopoulos (2006) and Tsagkanos/Georgopoulos/Siriopoulos/Koumanakos (2008) do not report significant findings on this ratio. One explanation for this result could be the different treatment of the multicollinearity problems in these studies. These studies often use several profitability measures simultaneously.

In sum, empirical evidence on asset turnover supports the performance hypothesis, which is that firms with poor asset utilization are attractive acquisition targets. This suggests that performance measured by asset turnover is one potential economic indicator of control.

Table 7

Asset Turnover

Asset Turnover	**Obs. Relation**	**Sales / Total Assets (1 Year)**	**Sales / Total Assets (2 Years)**	**Sales / Fixed Assets (1 Years)**	**Univariate Comparison**	**MDA-/ Logit-(L)/ Probit-(P) Coefficients** (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Stevens (1973)	+/+**	S			Non-Acquired Acquired: 1.36 < 1.41	Factor Analysis; MDA: +0.987**, rank 3
Harris/Stewart/ Guilkey/ Carleton (1982)	+/-/ -***	S			Non-acquired, Acquired Firms in 1974-1975: 1.56 > 1.53; 1975-1976: 1.520 < 1.558	(P); 1974-1975: -0.057,-0.082; 1976-1977: -0.108, -0.154; Fixed & Random Coef. Probit, 1976-1977: -0.163, -0.605***
Wansley/ Lane (1983), Wansley (1984)	n/a	X			n/a	Factor Analysis; LDA: n/a
Dietrich/ Sorensen (1984)	-*	S			n/a	-14.80*

Asset Turnover	Obs. Relation	Sales / Total Assets (1 Year)	Sales / Total Assets (2 Years)	Sales / Fixed Assets (1 Years)	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Bartley/ Boardman (1990)	n/a	S		S	n/a	Stepwise MDA*, coefficients n/a.
Trahan/ Shawky (1992), Trahan (1993)	+/ +***/ -		S		n/a	Here:[301] Acquirer (0) vs. Non acquiring firms (1) in Food, Chem, Petro, ElectrMach, Trans, All: +0.53, +1.17, +3.32***, -0.61, +0.50, +0.31***
Walter (1994)	-**/ -***	S			n/a	Hist.-Cost, Curr.-Cost-Model: - 1.075***, -1.224**
Meador/ Church/ Rayburn (1996)	+/-	X			n/a	All, Horizontal, Vertical Mergers: +0.454; +0.178; -0.378
Chen/Su (1997)	n/a	X				(L)[302] ; +0.102, +0.009, +0.222, +0.069
Barnes (1998), (1999), (2000)	+	X			n/a	(L), +2.8631, +2.760
Sorensen (2000)	+	X		S	Nonmerging, Acquiring, Target-Groups: Sales/TA: [1.1881, 1.1271] < 1.2495; Sales/Fixed Assets: [6.6708, 6.5373] < 6.9389	(L)** for Sales / Fixed Assets, n/a
Doumpos/ Kosmidou/ Pasiouras (2004)	n/a			S	T-Test[303] here as Turnover (not further defined) / Fixed Assets: ; Year1 not signif., Year2 not signif., Year3***	MDA, n/a[304]
Tsagkanos/ Georgopoulos/ Siriopoulos (2006)	+/-	X			n/a	(L): Binary Logit, Conditional Logit; -2.279, +0.00273781
Tsagkanos/ Georgopoulos/ Siriopoulos/ Koumanakos (2008)	-	X			n/a	(L): Classical MLE, Bootstrap MLE of Logit; -0.754, -4.134

301 The original study analyzed acquirer = 1 and non-acquiring firm = 0. For purpose of comparison in this meta-analysis, the signs of the coefficients have been transformed to acquirer = 0 and non-acquiring firm = 1.

302 This study analyzes differences between foreign and US-acquisitions. The first two coefficients refer to foreign acquisitions, 1 and 2 years prior to the announcement date; coefficients 3 and 4 refer to US-acquisitions, 1 and 2 years prior to the announcement date.

303 This study does not present the tested means.

304 This study displays only the classification results, and not the findings of the regression models such as coefficients and related statistics.

Asset Turnover	Obs. Relation	Sales / Total Assets (1 Year)	Sales / Total Assets (2 Years)	Sales / Fixed Assets (1 Years)	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Kumar/ Rajib (2007)	+/ -**/ -***	S		S	Acquirer, Target: SA/TA: 0.911 > 0.82,*** ; SA/FA: 3.65 > 3.16,**	(L); Non-Acquired Firms vs. Target: SA/TA: +0.014, +0.084; SA/FA: +0.001, +0.0007

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 7: Asset Turnover

5.2.6 Return on Equity

The rate of return on equity (ROE) (as known as the return on common stocholders'equity, or return on net worth)[305] measures how much profit a firm generates with the money shareholders have invested. The return on equity is related to the equity of common shareholders as follows:[306]

Figure 11
Return on Equity

$$\text{Return on (Common) Equity} = \frac{\text{Net income - Preferred Dividends}}{\text{Average Common Stockholders' Equity}}$$

Figure 11: Return on Equity

This ratio calculates the percentage of earnings available for common stockholders divided by the average of the stockholders' equity account.[307] Therefore, this ratio is often used by investors to analyze the profitability of their investment. A time-series increase of return on equity or a cross-sectional comparison of the return on equity may be interpreted as positive trend of earnings development and as an attractive

[305] Sometimes also referred to as ROCE, in the meaning of "return on common equity", which should not be confounded with the acronym ROCE that stands for the concept of "return on capital employed", Wahlen/Baginski/Bradshaw (2011), p. 296, fn. 29.

[306] Horngren/Harrison/Oliver (2012), p. 599; Wahlen/Baginski/Bradshaw (2011), pp. 296-299; Gibson (2011), p. 314; Penman (2010), p. 371; Brealey/Myers/Franklin (2008), pp. 799-800; Coenenberg/Haller/Schultze (2009), pp. 1147-1149; Palepu/Healy/Bernard (2000), p. 320.

[307] Brealey/Myers/Franklin (2008), p. 800; Penman (2010), p. 372; Palepu/Healy/Bernard (2000), p. 320.

investment. However, the return on equity can also increase without improving the firm's efficiency, for example, when the firm replaces equity with debt, increasing leverage and decreasing shareholders' equity. Thus, a ROE-based comparison of profitability of differently levered firms and over time is a sometimes a misleading approach to evaluate a firms' overall profitability, but it can certainly be a good indicator of the profitability of the capital invested by equity owners as it suggests the average rate of future payments to shareholders. Therefore, it is possible that this ratio, which is more focused on equity investors, is a valid economic indicator for the motivation behind the acquisition of poorly managed firms. This theory is popular in takeover studies, many of which assume that a poorly managed firm's return on equity will rise after management is replaced.[308]

The findings of univariate and multivariate analysis of takeover likelihood studies with regard to the ROE ratio are displayed in Table 8. A negative relationship, consistent with the management performance hypothesis, is documented by univariate results of Melicher/Rush (1974), comparing acquirer and acquired firms using US-data from the 1960s, Kumar/Rajib (2007), employing a more recent Indian sample from 1993, and Bhabra (2008), using a large sample of NYSE/ASE/NASDAQ firms from 1966 to 1992.[309]

The univariate results of Sorenson (2000) on takeover activity and profitability measured by the ROE ratio are ambiguous.[310] Whereas the mean ROE for the group of acquiring is significantly lower than the mean ROE for the group of target firms, the group of non-merging firms has significantly lower ROA than do the target firms. Overall, the univariate tests support that the theory that lower efficiency is a reason for mergers. This is also implicitly indicated by multivariate studies of Trahan/Shawky (1992) and Trahan (1993), which suggest that acquiring firms are performing better than non-acquirers, and Barnes (1998), (1999), (2000), and Bhabra (2008) that presents 3 different data sets covering data from US-, UK-, NYSE/ASE/NASDAQ-firms from 1966 to 1993, and show in their multivariate analysis that there is a significant negative relationship between pre-merger ROE and the likelihood of becoming a target.[311]

However, Davis/Stout (1992) find a significant positive relationship, and Cudd/Duggal (2000)'s findings ambiguously document highly significant findings in both

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308 See section 4.2.3—Managerial Inefficiencies and Performance.

309 Melicher/Rush (1974), pp. 141-149; Kumar/Rajib (2007), pp. 27-44; Bhabra (2008), pp. 158-175.

310 Sorensen (2000), pp. 423-433.

311 Trahan/Shawky (1992), pp. 81-94; Trahan (1993), pp. 21-35; Barnes (1998), pp. 573-591; Barnes (1999), pp. 283-301; Barnes (2000), pp. 147-162; Bhabra (2008), pp. 158-175.

directions.[312] Both studies use logit regression and use US data for 1980 to 1990 and 1987 to 1991, respectively. As noted in Table 8, there are also studies that do not document any statistically significant findings. As these studies often apply several profitability variables simultaneously, the differences may have arisen due to differing treatment of the multicollinearity problem.

In sum, there is some evidence from the ROE ratio that profitability is a significant determinant of merger activity. The majority of studies in Table 8 have findings that are consistent with the performance hypothesis. This suggests that profitability as measured by the return on equity from the investor's perspective might be a useful indicator of the acquirer and the target in business combinations.

Table 8

Return on Equity

Return on Equity	**Obs. Rel-ation**	**Net Income / Stockholders' Equity**	**Net Income / Stockholders' Equity (Ind. adj.)**	**Net Income / (Stockholders' Equity + Total Replacement Cost)**	**Net Income / Stockholders' Equity (3 Years)**	**EBIT / Stockholders' Equity**	**EBT / Stockholders' Equity**	**Univariate Comparison**	**MDA-/ Logit-(L)/ Probit-(P) Coefficients** (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Stevens (1973)	n/a	X						n/a	Factor Analysis
Melicher/ Rush (1974)	-*/-**	S						C: Acquirer, Acquired:[313] NI/CE: 0.141 > 0.113, * N-C: Acquirer, Acquired:: NI/CE: 0.138 > 0.117, **	n/a
Belkaoui (1978)	+/ +**/ +***	S						n/a	MDA for Year 1, 2***, 3**, 4**, 5**, before takeover with the following values for Net Income/Net Worth: +0.05251, +0.03903, +0.03587, +0.08908, +0.07953
Palepu (1982), (1986)	+	X						n/a	+0.003; +0.005
Wansley/ Lane (1983), Wansley (1984)	n/a	X						n/a	Factor Analysis; LDA: n/a
Bartley/ Boardman (1986)	-	X		X				Nontarget, Target:[314] HC: 0.14 > 0.13 RC: 0.09 > 0.08	Stepwise MDA, variable failed to enter.

312 Davis/Stout (1992), pp. 605-633; Cudd/Duggal (2000), pp. 105-120.

313 C: Conglomerate firm acquisitions; N-C: Non-conglomerate firm acquisitions.

314 HC: Historical cost measure, RC: Replacement cost measure.

Return on Equity	Obs. Rel-ation	Net Income / Stockholders' Equity	Net Income / Stockholders' Equity (Ind. adj.)	Net Income / (Stockholders' Equity + Total Replacement Cost)	Net Income / Stockholders' Equity (3 Years)	EBIT / Stockholders' Equity	EBT / Stockholders' Equity	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Hannan/ Rhoades (1987)	+/-	X	X					n/a	(L)[315], ROE: +0.08, -0.28 adj. ROE: +0.05, -0.0085
Bartley/ Boardman (1990)	n/a	S				S		n/a	Stepwise MDA*, coefficients n/a.
Davis/ Stout (1992)	+/+*	S						n/a	1980-1990:[316]. +0.004*, +0.004*, +0.002, +0.001, +0.002, +0.002, +0.001, +0.001; 1983-1990: +0.004*, +0.002, +0.003, +0.002
Trahan/ Shawky (1992), Trahan (1993)	+/-/ -***	S						n/a	Here:[317] Acquirer (0) vs. Non acquiring firms (1) in Food, Chem, Petro, ElectrMach, Trans, All: -13.64***, -0.08, +15.40, -0.25, -12.22***, -0.37
Meador/ Church/ Rayburn (1996)	-	X						n/a	All, Horizontal, Vertical Mergers: -6.950; -9.868; -10.424
Chen/Su (1997)	-	X						n/a	(L)[318] ; -0.097, -1.711, -0.148, -0.913
Zanakis/ Zopounidis (1997)	+/-	X						Non-Acquired, Acquired: [319] Year -1: 0.33 > 0.19; Year -2: 0.23 < 0.3; Year -3: 0.34 < 0.73	Factor Analysis, DA (L) n/a[320]
Barnes (1998), (1999), (2000)	-*						S	n/a	(L), -1.2779*, -1.2544*
Cudd/ Duggal (2000)	+*/-*				S			n/a	(L)[321]; +0.0066*, -0.3740*, -0.3826*
Sorensen (2000)	+**/ -**					S		Nonmerging, Target-Groups: 0.1042<0.1227,** Acquiring, Target-	Factor Analysis, Logit for Method of Payment, n/a

315 Each first coefficient refers to acquisitions from inside of the target firm's market and, each second coefficient refers to acquisitions from outside of the target firm's market, Hannan/Rhoades (1987), p. 68.

316 For each period, the coefficients refer to: All bids, all successful bids, hostile bids, successful hostile.

317 The original study analyzed acquirer = 1 and non-acquiring firm = 0. For purpose of comparison in this meta-analysis, the signs of the coefficients have been transformed to acquirer = 0 and non-acquiring firm = 1.

318 This study analyzes differences between foreign and US-acquisitions. The first two coefficients refer to foreign acquisitions, 1 and 2 years prior to the announcement date; coefficients 3 and 4 refer to US-acquisitions, 1 and 2 years prior to the announcement date.

319 Data refers to 1 to 3 years prior to takeover.

320 A logit analysis and MDA have been performed in this study, but the significance level of coefficients was not indicated; therefore, the coefficients are not listed in this table, Zanakis/Zopounidis (1997), p. 685.

321 Coefficients are displayed for the unadjusted model, the model adjusted for industry distributional characteristics, and the model adjusted for both industry distributional characteristics and a twelve-month industry disturbance, Cudd/Duggal (2000), p. 113.

Return on Equity	Obs. Rel-ation	Net Income / Stockholders' Equity	Net Income / Stockholders' Equity (Ind. adj.)	Net Income / (Stockholders' Equity + Total Replacement Cost)	Net Income / Stockholders' Equity (3 Years)	EBIT / Stockholders' Equity	EBT / Stockholders' Equity	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
								Groups: 0.1999 > 0.1227,**	
Doumpos/ Kosmidou/ Pasiouras (2004)	n/a						S	T-Test[322]; Year1***, Year2 not signif., Year3 not signif.	n/a[323]
Tsagkanos/ Georgopoulos/ Siriopoulos (2006)	+/-						X	n/a	(L): Binary Logit, Conditional Logit; +0.01073, -0.00727756
Kumar/ Rajib (2007)	-/-***	S						Acquirer, Target: 12.61 > 3.25,***	(L); Non-Acquired Firms vs. Target: -0.0006, -0.00004
Bhabra (2008)	+/-/ -*/ -***	S						Acquiring firms, Competitors: Mean: 0.164 > 0.178; Median: 0.157 > 0.149; Competitors, Targets: Mean: 0.19 > 0.16,***; Median: 0.14, 0.14	(L); +1.34, −0.16***, −0.13
Tsagkanos/ Georgopoulos/ Siriopoulos/ Koumanakos (2008)	+/-						X	n/a	(L): Classical MLE, Bootstrap MLE of Logit; -0.0019, +0.0306

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 8: Return on Equity

5.2.7 Return on Capital Employed

The return on capital employed (also referred to as ROCE, but not to be confounded with ROCE in the sense of "return on common equity" which is the return on equity,) relates the earnings before interest and taxes to the average amount of long-term debt and shareholders' equity that is necessary for operating the firm during the year. The ratio is very similar to the return on equity ratio, except that it aims to analyze the profitability before interest and taxes as related to only a part of the firm's capital (this ratio serves a defined purpose that may depend on a firm's or investor's objectives).[324] Therefore, it bears advantages and drawbacks similar to the return on equity ratio. This

322 This study does not present the tested means.

323 This study displays only the classification results, and not the findings of the regression models such as coefficients and related statistics.

324 Coenenberg/Haller/Schultze (2009), p. 1148; the rate of return on capital employed is between ROA and ROE, Wahlen/Baginski/Bradshaw (2011), p. 296, fn. 29; Kwong/Munro/Peasnell (1995), p. 51.

ratio is often used to analyze the profitability of the most important operating business area of the firm, or areas with a special focus, so its use as a determinant of merger activity seems limited.

Figure 12
Return on Capital Employed

$$\text{R eturn on Capital Employed} = \frac{\text{EBIT}}{\text{Total Assets - Current Liabilities}}$$

Figure 12: Return on Capital Employed

Few studies make use of this measure, possibly because ROE is a more common ratio. Additionally, the studies that use ROCE do not further define their use of capital employed. Probably, the return on capital employed in these studies (Table 9) is just another terminology for the return on equity. Consistent with the hypothesized relationship between the acquisition likelihood of the firm and the firm's profitability, as well as consistent with the previously described findings on the ROE ratio, Powell (1997) documents a significant negative relationship between ROCE when considering takeovers between 1984 and 1991, see Table 9.[325]

Table 9
Return on Capital Employed

Return on Capital Employed	**Obs. Rel-ation**	**ROCE (not further defined)**	**Gross Profit / Capital Employed**	**Univariate Comparison**	**MDA-/ Logit-(L)/ Probit-(P) Coefficients** (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Powell (1997)	+/-/ -*/ -**		S	n/a	(L);[326] 1984-1991: -2.223**, +0.558, +0.162; Ind.adj: -1.287, +1.355, +0.929; Ind.&Econ.adj: -0.896, +1.479, +1.034; 1984-1987: +0.735; +1.637, +1.386; Ind.adj: -0.091, +1.137, +0.878; Ind.&Econ.adj: +6.378, +1.468, +1.487; 1988-1991:-3.89*, -0.892, -1.137; Ind.adj: -1.307, +1.219, +0.937; Ind.&Econ.adj: -1.072, +1.693, +1.360
Doumpos/ Kosmidou/ Pasiouras (2004)	n/a	S		T-Test[327]; Year1 not signif., Year2***, Year3 not signif.	DA, n/a[328]

325 Powell (1997), pp. 1009-1030.
326 This study uses three samples: Hostile takeovers, friendly takeovers, and a sample of both.
327 This study does not present the tested means.
328 This study displays only the classification results, and not the findings of the regression models such as coefficients and related statistics.

Return on Capital Employed	Obs. Rel-ation	ROCE (not further defined)	Gross Profit / Capital Employed	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Powell (2004)	+/-		X	n/a	(L);[329] ; -0.0045, +0.3358, +0.2629; Ind.adj: -1.287, -0.05, +1.53; Ind.&Econ.adj: +0.5237, -0.2380, -0.0913

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 9: Return on Capital Employed

5.2.8 Other Earnings Measures

Alternative metrics to measure earnings have been employed by Thompson (1997) and Doumpos/Kosmidou/Pasiouras (2004). Their findings are presented in Table 10.[330] Thompson (1997) uses a dummy variable that is set to one if a loss occurred to the firm prior the merger, otherwise zero, and documents that firms that report losses are more likely to become acquisition targets than are no loss firms. This finding is consistent with the performance hypothesis that merger is a control mechanism that transfers control from inefficient managers to efficient ones.

Table 10
Other Performance Measures

Other Performance Measures	Obs. Rel-ation	Net Income , Profit or Loss Dummy	EBIT / Size [Employees]	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Thompson (1997)	+*	S		n/a	+3.335*; +3.285*; +3.593*
Doumpos/ Kosmidou/ Pasiouras (2004)	n/a		X	T-Test[331]; Year1 not signif., Year2 not signif., Year3 not signif.	DA, n/a[332]

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 10: Other Performance Measures

329 This study uses three samples: Hostile takeovers, friendly takeovers, and a sample of both.
330 Thompson (1997), pp. 37-53; Doumpos/Kosmidou/Pasiouras (2004), pp. 191-211.
331 This study does not present the tested means.
332 This study displays only the classification results, and not the findings of the regression models such as coefficients and related statistics.

5.2.9 Market-related Performance Measures

Market-related performance measures used in empirical studies suggest that relative pre-merger market performance is significant and negatively related to acquisition likelihood. See the results presented in Table 11 for logit regressions of Palepu (1982) and (1986), as well as univariate tests by Kumar/Rajib (2007).

Table 11

Market-related Performance Measures

Other Market Related Measures	Obs. Relation	Total Stock Market Return – Capital Gains & Dividends (2 Year)	Change in Share Price (2 Years)	CAR (4 Years)	CAR (2 months prior announcement)	Average Excess Return, AER (4 Years)	Firms Stock Return less Average Excess Return, Avg. Adj.Ret.AAR (4 Years)	Yearly avg. stock returns	Yearly excess returns over sensex	Univariate Comparison	Logit (L) - / Probit (P) - Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Palepu (1982), (1986)	-**					S	S[333]			n/a	AER: -1.332**, -1.338**
Ambrose/ Megginson (1992)	+/-					X	X			Non-Target, Target: AER: -0.003 < 0.002 AAR: 0.060 > 0.064	AER: -22.007, -13.215, -3796
Trahan/ Shawky (1992)	+/+**/-	S								n/a	Here:[334] Acquirer (0) vs. Non acquiring firms (1) in Food, Chem, Petro, ElectrMach, Trans, All: -0.74, +0.70. +9.21**, +0.05, -0.18, -0.08
Meador/ Church/ Rayburn (1996)	+/-		X							n/a	All, Horizontal, Vertical Mergers: -0.001, +0.001, -0.000
Barnes (1998), (1999), (2000)	-				X					n/a	(L), -8,118.0
Kumar/ Rajib (2007)	+/-***							X	S	Acquirer, Target: Avg.StockReturn: 0.31 < 0.33, ; StockReturn over Sensex: 44.11 > 18.14,***	n/a

[333] The average adjusted return measure was not further considered in Palepu (1986), therefore, omitted in this table; significant results of this measure at the 0.05 level had a negative sign, Palepu (1982), pp. 73, 74, 79, 80.

[334] The original study analyzed acquirer = 1 and non-acquiring firm = 0. For purpose of comparison in this meta-analysis, the signs of the coefficients have been transformed to acquirer = 0 and non-acquiring firm = 1.

Other Market Related Measures	Obs. Relation	Total Stock Market Return – Capital Gains & Dividends (2 Year)	Change in Share Price (2 Years)	CAR (4 Years)	CAR (2 months prior announcement)	Average Excess Return, AER (4 Years)	Firms Stock Return less Average Excess Return, Avg. Adj.Ret.AAR (4 Years)	Yearly avg. stock returns	Yearly excess returns over sensex	Univariate Comparison	Logit (L) - / Probit (P) - Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Bhabra (2008)	-		X							Cumulative abnormal return over a period of 4 years starting in year −5 and ending in year −1: Competitors, Targets: Mean: 0.072 > −0.0079; Median: 0.118 > −0.033	(L); −0.93, −0.99

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 11: Market-related Performance Measures

5.2.10 Interim Summary—Performance Measures

Performance indicators based on accounting profitability suggest that profitability is an important discriminator between targets and non-targets. Furthermore, the findings of empirical takeover studies predominantly support the inefficient management/performance hypothesis, which suggests that mergers occur to replace poor management with more efficient management. The most important discriminators are the return on equity and the return on assets. The empirical findings presented here suggest that these ratios may be helpful in identifying the acquiring.

5.3 Size Metrics

IFRS and US-GAAP suggest that the relative size of the acquiring and target firm be considered when determining which firm is the acquirer. As outlined in section 3.2—Standards on Firm Characteristics and Control Assessment,[335] size is the only relative firm characteristic that needs to be considered and is mentioned as an important indicator of control throughout international standards.

The financial literature accordingly assumes that size discriminates the acquiring and the target firm, assuming that smaller firms are limited in their resources, larger firms are more likely to realize operating synergies, and that the number of firms that are larger than the target decreases as its size increases.[336]

335 See section 3.2—Standards on Firm Characteristics and Control Assessment.
336 See section 4.3.1—Firm Size.

Therefore, theory predicts a negative relationship between size and acquisition likelihood, in which smaller firms are more likely to become acquisition targets, and relatively larger firms are likely the acquirers.

The most frequent size metric in empirical takeover studies is total assets, or its natural logarithm. Twelve studies use this metric as proxy for size, as Table 12 documents. Other, but less frequently applied in empirical studies are sales or market capitalization of a firm as indicator for firm size.

Harris/Stewart/Guilkey/Carleton (1982), Palepu (1982) and (1986), Dietrich/Sorensen (1984), Hasbrouck (1985), Ambrose/Megginson (1992), Davis/Stout (1992), Walter (1994), Cudd/Duggal (2000), and Kumar/Rajib (2007) all show that smaller firms are more likely to be targets than non-targets or acquirers. These findings are consistent with the considerations in accountinting standards and are consistent and significant in both univariate and multivariate analysis.[337] This applies equally for all proxies of size that have been employed: total assets, sales, or equity.

However, as indicated in Table 12, some studies do not find a statistically significant relationship between acquisition likelihood and size. Other studies, such as Powell (1997), (2004), Thompson (1997), Tsagkanos/Georgopoulos/Siriopoulos (2006), Bhabra (2008), and Tsagkanos/Georgopoulos/Siriopoulos/Koumanakos (2008), sometimes report an associations in contrast to the hypothesized relationship between relative firm size (of targets and non-targets) and acquisition likelihood.

Nevertheless, the prevailing finding in the literature is that smaller firms are more likely to be target firms than non-targets, evidencing that size is an important dimension of acquisition likelihood.

[337] Trahan/Shawky (1992) and Trahan (1993) show that acquirers are larger than non-acquirers, Table 12.

Table 12
Firm Size

Firm Size	Obs. Relation	Total Assets	Total Assets less Current Liabilities	Sales	Market Value of Equity	Book Value of Equity	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Singh (1975)	-*/+*		S				Acquiring, Acquired: Log (Size): 4.37 > 3.6, *	MDA*, +100
Harris/ Stewart/ Guilkey/ Carleton (1982)	-/-*/ -***	S					Non-acquired, Acquired Firms in 1974-1975: 445.7 > 107.5, *; 1975-1976: 563.7 > 131.3, *	(P); 1974-1975: -0.068, -0.066, -0.065; 1976-1977: -0.139***, -0.127***, -0.139***; Fixed & Random Coef. Probit, 1976-1977: -0.145***, -0-172***
Palepu (1982), (1986)	-**					S	n/a	-0.0005**, -0.0005**, -0.0004**, -0.0004**,
Wansley/ Lane (1983), Wansley (1984)	n/a			S		X	n/a	Factor Analysis; LDA: Natural log of sales** with Rank 1, 1, 1, 1, 1, 1, merged firm mean 4.652, non-merged firm mean 5.953, n/a for book value of equity
Dietrich/ Sorensen (1984)	-**				S		n/a	-7.24**
Hasbrouck (1985)	+/-*				S		Non-Target, Target in Size-matched sample: 5.575 < 5.582 Industry-matched sample: 6.217 > 5.582, *	Industry-matched sample: -0.592*, -0.592*
Hannan/ Rhoades (1987)	-	X					n/a	(L)[338], -0.10E -4, 0.80E – 4, -0.10E -4, 0.81E -4, -0.31E – 5, 0.15E -4, -0.14E -5, 0.15E- 4
Bartley/ Boardman (1990)	n/a				S		n/a	Stepwise MDA*, coefficient values and direction n/a.
Ambrose/ Megginson (1992)	-/-***	S					Non-Target, Target: $ million: 1573.080 > 788.605, ***	-0.0001, -0.0001, -0.0001
Davis/ Stout (1992)	-/-***				S		n/a	1980-1990:[339] -0.055 -0.064 -0.060 -0.066 -0.067 -0.088 -0.083 -0.098.; 1983-1990: -0.075***, -0.091***, -0.096, -0.149
Trahan/ Shawky (1992), Trahan (1993)	-/-*			S			n/a	Here:[340] Acquirer (0) vs. Non acquiring firms (1) in Food, Chem, Petro, ElectrMach, Trans, All: -0.23, -0.39*, -0.64, -0.16*, -0.16, -0.10*
Walter (1994)	-***	S					n/a	Hist.-Cost, Curr.-Cost-Model: -2.330***, -2.512***
Meador/ Church/ Rayburn (1996)	+/-	X		X			n/a	All, Horizontal, Vertical Mergers: TA: +0.000; +0.003; -0.002; Sales: -0.000, -0.003, +0.000

[338] Each first coefficient refers to acquisitions from inside of the target firm's market and, each second coefficient refers to acquisitions from outside of the target firm's market, Hannan/Rhoades (1987), p. 68.

[339] For each period, the coefficients refer to: All bids, all successful bids, hostile bids, successful hostile.

[340] The original study analyzed acquirer = 1 and non-acquiring firm = 0. For purpose of comparison in this meta-analysis, the signs of the coefficients have been transformed to acquirer = 0 and non-acquiring firm = 1.

Firm Size	Obs. Relation	Total Assets	Total Assets less Current Liabilities	Sales	Market Value of Equity	Book Value of Equity	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Chen/Su (1997)	+/-	X		X			n/a	(L)[341]; TA: -0.0001, +0.0001, -0.0001, +0.0001; Sales: +0.0001, -0.0001, -0.0002, -0.0001
Powell (1997)	+/+*/ +**/ -/-*/ -**	S					n/a	(L);[342] ; 1984-1991: +0.310*, -0.236*, -0.102**; Ind.adj: +0.315*, -0.22*, -0.09**; Ind.&Econ.adj: +0.140, -0.236*, -0.13; 1984-1987: +0.406*; -0.171**, -0.022; Ind.adj: +0.450*, -0.155**, -0.005; Ind.&Econ.adj: +0.096, -0.221, -0.114; 1988-1991:+0.229**, -0.325*, -0.192*; Ind.adj: +0.215**, -0.272*, -0.154*; Ind.&Econ.adj: +0.244, -0.228, -0.115
Thompson (1997)	-*/ +*/ +***	S					n/a	All sectors:-0.467*, - 0.440*, - 0.448*,- 0.292*; Only in deregulated sectors: +0.460*,+0.389*, +0.354***
Barnes (1998), (1999), (2000)	-				X		n/a	(L), -2999x10^{6}, -0.03414x10
Cudd/ Duggal (2000)	-/-*	S					n/a	(L)[343]; -0.0001*, -0.3209*, -0.3039*
Powell (2004)	+/+*/- /-*	S					n/a	(L);[344] ; +0.2262*, -0.1876*, -0.1068*; Ind.adj:+3.2019*, -2.7181*, -1.5644*; Ind.&Econ.adj:+2.8333, -0.3769, +0.2746
Tsagkanos/ Georgopoulos/ Siriopoulos (2006)	+**			S			n/a	(L): Binary Logit, Conditional Logit; +0.02758**, +0.008195**
Kumar/ Rajib (2007)	+/-/ -*/-**	S		S	S		Acquirer, Target: TA: 3868.07 > 782.41,** ; LOGA: 2.61 > 1.9,* ; SA: 1402.67 > 344.58,** ; LOGS: 2.47 > 1.66,* ; MV: 1336.16 > 383.76,*	(L); Non-Acquired Firms vs. Target: LOGAssets: +0.43, +0.7002; LOGSales: -0.66, -1.084**
Bhabra (2008)	+/+*/ +*** /-*	S			S		TA,$m. Acquiring firms, Competitors: Mean: 2261.30 > 868.60,*; Median: 704.20 > 129.40,*; Competitors, Targets: n/a; MV,$m.: Acquiring firms, Competitors: Mean: 2261.30 > 868.60,*; Median: 704.20 > 129.40,*; Competitors, Targets: Mean: 944.75 < 1023.5; Median: 144.00 < 463.6, *;	(L); Nat. log of MV of Common Shares Outstanding : +1.31*

341 This study analyzes differences between foreign and US-acquisitions. The first two coefficients refer to foreign acquisitions, 1 and 2 years prior to the announcement date; coefficients 3 and 4 refer to US-acquisitions, 1 and 2 years prior to the announcement date.

342 This study uses three samples: Hostile takeovers, friendly takeovers, and a sample of both.

343 Coefficients are displayed for the unadjusted model, the model adjusted for industry distributional characteristics, and the model adjusted for both industry distributional characteristics and a twelve-month industry disturbance, Cudd/Duggal (2000), p. 113.

344 This study uses three samples: Hostile takeovers, friendly takeovers, and a sample of both.

Firm Size	Obs. Relation	Total Assets	Total Assets less Current Liabilities	Sales	Market Value of Equity	Book Value of Equity	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Tsagkanos/ Georgopoulos/ Siriopoulos/ Koumanakos (2008)	+**/-			S			n/a	(L): Classical MLE, Bootstrap MLE of Logit; -0.2257, +0.0387**

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 12: Firm Size

5.4 Valuation Ratios

Section 4.2.4—Valuation Discrepancies and Merger Activity outlined that valuation discrepancies can be a major motives for business combinations.[345] The valuation related hypotheses suggest that target firms are undervalued and acquiring firms are overvalued, resulting in a negative association of firm value and the likelihood of a firm to be acquired. Valuation in empirical studies is often assessed by investment valuation ratios. These ratios usually compare firms' market data with components of the firms' financial statements to analyze, for example, future growth. Popular ratios used in market research are the price-earnings ratio and/or the price-to-book ratio.[346]

5.4.1 Price-Earnings Ratio

The **price-earnings ratio** (P/E ratio) compares the current price of a company's shares with the amount of earnings it generates.[347] This ratio provides information on how much to pay for each MU (money unit) of current earnings. The (share) price, in the numerator, is expected to reflect the market's anticipation of value to be added from future earnings.[348] Empirical studies examining the relation between price-earnings

345 See section 4.2.4—Valuation Discrepancies and Merger Activity.

346 Simple price-earnings are the predominant technique in analysts' normal valuation activity, Gibson (2011), p. 481; Trombetta (2004), p. 345; Barker (1999), p. 195; Demirakos/Strong/Walker (2004), p. 229; Asquith/Mikhail/Au (2005), p. 278.

347 Coenenberg/Haller/Schultze (2009), pp. 1138 f; Penman (2010), pp. 49 f.; Wahlen/Baginski/Bradshaw (2011), pp. 1061 f; Gibson (2011), pp. 349 f;

348 Penman (2010), pp. 49 f; Wahlen/Baginski/Bradshaw (2011), pp. 1061.

ratios, risk and growth provide consistent evidence that 50 to 70 percent of the variability in price-earnings ratios across firms relates to risk and growth.[349]

The price-earnings ratio compares the present value of future earnings to current earnings, which is often interpreted as follows: if the market expects more future earnings than current earnings, the ratio is high; if the market expects lower future earnings than current earnings, the ratio is low.[350,351] However, if low price-earnings stock is expected to be undervalued, it might be considered a good investment at a bargain price with the hope that its performance will improve over time. The opposite view is that high price-earnings stock is likely to be high growth stock.

Earnings measurement and accounting issues may influence the price-earnings ratio.[352] For example, if the price-earnings ratio's current earnings measure is based on historical earnings (trailing or lagged price-earnings ratio) and not on earnings estimates (forward looking price-earnings ratio), then unusual and non-recurring gains or losses that are not expected to persist in future earnings must be removed in order to calculate a price-earnings ratio that reflects persistent earnings.[353] To avoid this, the price-earnings ratio can also be calculated by using estimated future earnings[354] to align the forward looking numerator of the price-earnings ratio with a denominator of the same time perspective. However, there is no convention on the calculation, and the reliability of a price-earnings ratio based on earning forecast is only as good as the forecast. As such, forecast errors may distort the forward-looking price-earnings ratio.

The price-earnings ratio is as follows:

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349 Beaver/Morse (1978), pp. 65 ff.; Zarowin (1990), pp. 439 ff.; Wahlen/Baginski/Bradshaw (2011), pp. 1063 ff, 1069.

350 In so far, the P/E ratio also reflects the market's anticipation of current earnings growth. Wahlen/Baginski/Bradshaw (2011), p. 1069; Empirical studies of P/E ratios and future earnings growth suggest a systematic tendency towards mean reversion in percentage earnings to a level in the midteens over time, Penman (1996), pp. 235 ff.; Easton (2004), pp. 73 ff.; Bernard/Thomas (1990), pp. 305 ff.

351 The P/E ratio is commonly used for a quick comparison with P/E ratios of investment alternatives by comparing the current P/E ratio with the development of the firm's P/E ratio in past, or with the industry-average P/E ratio, as well as with the P/E ratio of a similar firm; Wahlen/Baginski/Bradshaw (2011), p. 1062; For the S&P 500 over the last 50 years it has been 16.2, see Penman (2010), pp. 49 f.; P/E ratios for the S&P 500 and the dow index were low in the seventies with medians less than 10 and higher in the nineties with medians of 20 and 33 in 2000, Penman (2010), pp. 50, 194; similar Wahlen/Baginski/Bradshaw (2011), pp. 1063f; however, in the past, P/E ratios substantially varied in size over time and across industries; Wahlen/Baginski/Bradshaw (2011), pp. 1063f.

352 Penman (2010), pp. 194 ff.; Wahlen/Baginski/Bradshaw (2011), pp. 1059 ff.

353 Another analogous problem that would bias the P/E ratio lies in the extent of conservatism of a firm's accounting principles: if earnings are temporarily increased by transitory gains or temporarily decreased by transitory losses, Wahlen/Baginski/Bradshaw (2011), pp. 1061, 1063, 1065.

354 Wahlen/Baginski/Bradshaw (2011), p. 1061.

Figure 13
Price-to-Earnings Ratio

$$\text{Price-to-Earnings Ratio} = \frac{\text{Stock Price per Share}}{\text{Earnings per Share}}$$

Figure 13: Price-to-Earnings Ratio

As shown in Table 12, the price-earnings ratio is applied in several empirical studies of merger activity. A number of studies, including Melicher/Rush (1974), Harris/Stewart/Guilkey/Carleton (1982), and Kumar/Rajib (2007), find statistically significant negative relationships between acquisition likelihood price-earnings ratios.[355]

Melicher/Rush (1974) and Harris/Stewart/Guilkey/Carleton (1982) use US-data from 1960 to 1969 and 1974 to 1977, respectively. Kumar/Rajib (2007) provide evidence on Indian data for mergers between 1993 to 2004.

While Melicher/Rush (1974) and Kumar/Rajib (2007) only run univariate tests, Harris/Stewart/Guilkey/Carleton (1982) finds the same result between the price-earnings ratio, using a probit regression.

However, studies by Palepu (1982), (1986), Dietrich/Sorensen (1984), Walter (1994), Meador/Church/Rayburn (1996), Barnes (1998), (1999), (2000), Cudd/Duggal (2000), and Bhabra (2008), presented in Table 13, report a positive, but statistically not significant relationship of the price-earnings ratio an acquisition likelihood in their multivariate analysis. Overall, there is only limited evidence that the price-earnings ratio is a significant determinant of merger activity.

[355] Melicher/Rush (1974), pp. 141-149; Harris/Stewart/Guilkey/Carleton (1982), pp. 164-184; Kumar/Rajib (2007), pp. 27-44.

Table 13
Price-Earnings Ratio

Price-Earnings Ratio	Obs. Rel-ation	Market Price / Earnings	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Stevens (1973)	n/a	X	n/a	Factor Analysis
Melicher/Rush (1974)	-*	S	C: Acquirer, Acquired:[356] P/E: 18.499 > 14.145, * N-C: Acquirer, Acquired:: P/E: 21.022 > 16.683, *	n/a
Harris/Stewart/Guilkey/ Carleton (1982)	-*/ -***	S	Non-acquired, Acquired Firms in 1974-1975: 14.32 > 11.42, ***; 1975-1976: 8.56 > 5.48, *	(P); 1974-1975: -0.018***, -0.018***, -0.018***, -0.018***, -0.016***, -0.015***; 1976-1977: -0.061***, -0.059***, -0.059***, -0.056***, -0.072***, -0.064***; Fixed & Random Coef. Probit, 1976-1977: -0.065***, -0.103***
Palepu (1982), (1986)	+	X	n/a	+0.0065, +0.0099, +0.0031, +0.0041
Wansley/Lane (1983), Wansley (1984)	n/a	S	n/a	Factor Analysis; LDA: Price-Earnings** with Rank 2, 5, 3, 5, 2, 5, merged firm mean 7.295, non-merged firm mean 14.666
Dietrich/Sorensen (1984)	+	X	n/a	+0.43
Bartley/Boardman (1986)	-	X	Non-Target, Target: P/E (8-month prior): 8.56 > 7.50 P/E (12-month low): 7.48 > 6.31	Stepwise MDA, variable failed to enter.
Ambrose/Megginson (1992)	-	X	Non-Target, Target: 13.330 > 13.205	-0.0017, -0.0012, -0.0015
Walter (1994)	+	X	n/a	Hist.-Cost, Curr.-Cost-Model: +0.032, +0.192
Meador/Church/ Rayburn (1996)	+	X	n/a	All, Horizontal, Vertical Mergers: +0.001; +0.010; +0.000
Barnes (1998), (1999), (2000)	+	X	n/a	(L), +0.8885, +0.8671
Cudd/Duggal (2000)	+	X	n/a	(L)[357]; +0.0001, +0.0209, +0.0242
Kumar/Rajib (2007)	-/-***	X	Acquirer, Target: 19.10 > 5.92,***	(L); Non-Acquired Firms vs. Target: -0.0015

356 C: Conglomerate firm acquisitions; N-C: Non-conglomerate firm acquisitions.

357 Coefficients are displayed for the unadjusted model, the model adjusted for industry distributional characteristics, and the model adjusted for both industry distributional characteristics and a twelve-month industry disturbance, Cudd/Duggal (2000), p. 113.

Price-Earnings Ratio	Obs. Relation	Market Price / Earnings	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Bhabra (2008)	+/-	X	Acquiring firms, Competitors: Mean: 11.38, 13.21; Median: 9.71, 9.65; Competitors, Targets: Mean: 13.73 > 11.24; Median: 9.33 > 9.64	(L); +1.01, −0.99, +1.00

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 13: Price-Earnings Ratio

5.4.2 Price-Earnings to Growth Ratio

While the price-earnings ratio is a popular investment valuation metric, the price-earnings to growth ratio **(**PEG ratio) extends the price-earnings ratio by including growth opportunities. The PEG ratio compares the market expected earnings growth of the price-earnings ratio to forecasted earnings growth (usually analysts' forecasts of future growth or realized prior growth rates).[358] To compute the PEG ratio, the price-earnings ratio is divided by an estimated earnings growth rate multiplied by 100:

Figure 14
Price-to-Earnings to Growth Ratio

$$\text{Price-Earnings to Growth Ratio} = \frac{\text{Price-Earnings Ratio}}{\text{Earnings per Share Growth Rate x 100}}$$

Figure 14: Price-to-Earnings to Growth Ratio

As a rule of thumb, a PEG ratio equal to one indicates that the price-earnings ratio is as high as the growth rate of earnings. If the PEG ratio is higher (lower) than one, the stock may be over (under)-valued. As such, the PEG ratio is interpreted as the market expectation future earnings per share growth, implying that the expected rate of return

358 Penman (2010), pp. 216-217.

is high (low) and suggesting a buy (sell) recommendation.[359] However, future growth assumptions, accounting issues, as well as inconsistencies with the use of forward-looking or trailing price-earnings ratios may influence the PEG ratio as a heuristic (similar to the issues that arise with price-earnings ratio analysis).[360]

No study thus far has analyzed the relationship between the PEG ratio and takeover activity. This may be because data on the price-earnings and price-to book metrics is much more widely applied.

5.4.3 Price-to-Book Ratio

Similar to the concept of the price-earnings ratio, which compares the value of expected future earnings implied in the share price to current earnings, the price-to-book ratio (P/B ratio or market-to-book ratio) compares expected future earnings as implied in a firm's market value of equity to the book value of the shareholders' investment in the firm.[361,362]

The price-to-book ratio is calculated by dividing the stock price by the book value per share:

Figure 15
Price-to-Book Ratio

$$\text{Price-to-Book Ratio} = \frac{\text{Stock Price per Share}}{\text{Book Value per Share}}$$

Figure 15: Price-to-Book Ratio

As the book value of net assets is based on accounting principles and methods, the price-to-book ratio depends to a large extent on the level of accounting

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359 Coenenberg/Haller/Schultze (2009), pp. 1139 f; Easton (2004), p. 77; Brealey/Myers/Franklin (2008), p. 798.

360 For example, Wahlen/Baginski/Bradshaw (2011), 1068 ff.

361 Wahlen/Baginski/Bradshaw (2011), pp. 1045-1055; Penman (2010), pp.149-173.

362 Several empirical studies find that price-to-book ratios are good predictors of future growth, Bernard (1994), pp. 1-37; Penman (1996), pp. 253-259; Wahlen/Baginski/Bradshaw (2011), p. 1058; Penman finds that future profitability is more related to price-to-book ratios than to P/E ratios, Penman (1996), p. 256; Penman (2010), pp. 413-418.

conservatism.[363] However, over a sufficiently long period, the impact of accounting principles will diminish.[364, 365]

Consistent with the findings of empirical takeover studies with regard to the price-earnings ratio, several studies using the price-to-book ratio, as presented in Table 14, document a significant negative relationship between this valuation ratio and takeover likelihood. Univariate tests finding a significant negative relationship are documented by the US-studies of Bartley/Boardman (1986), Davis/Stout (1992), Walter (1994), Meador/Church/Rayburn (1996), and by the cross-country study by Chen/Su (1997). These studies all find a significant negative relationship using logit regression, so their findings support the valuation hypothesis.

However, few studies, such as Bartley/Boardman (1986), which uses US-data from 1978 and MDA-technique, and Powell (1997), which uses UK-data from 1986-1995, find significant positive results. As indicated in Table 14, there are also a few studies that do not find significant results in either direction.

In total, the US-studies applying logit regressions in their tendency support the assumption that acquired firms have lower pre-merger price-to-book ratios. This is consistent with the findings provided by studies using other valuation ratios, like the price-earnings ratio, presented above. In sum, valuation, measured by the price-to-book ratio or price-earnings ratio, is potentially helpful to identify the acquiring and the target firms in business combinations.

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363 Pae/Thornton/Welker (2005) analyze the link between earnings conservatism and price-to-book ratios. They find that earnings conservatism is negatively associated with the price-to-book ratio and that earnings conservatism's negative association with the price-to-book ratio is primarily an accrual phenomenon (accounts for 87 percent earnings conservatism), not a cash flow phenomenon (respectively 13 percent), Pae/Thornton/Welker (2005), pp. 693-717.

364 Wahlen/Baginski/Bradshaw (2011), p. 1065.

365 Additionally, price-to-book ratios vary over industries: Assets of banks and insurers are primarily financial investment assets and closer to market values than, for example, pharmaceutical firms in the chemical industry, which may have high off-balance sheet assets due to not yet capitalized research and development costs, Wahlen/Baginski/Bradshaw (2011), p. 1056; Penman (2010), p. 418.

Table 14
Price-to-Book Ratio

Price-to-Book Ratio	**Obs. Relation**	**Market Price / Book Value**	**Univariate Comparison**	**MDA-/ Logit-(L)/ Probit-(P) Coefficients** (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Palepu (1982), (1986)	-	X	n/a	-0.0044, -0.0117, -0.0051, -0.0126
Wansley/ Lane (1983), Wansley (1984)	n/a	S	n/a	Factor Analysis; LDA: Market Value to Book Value** with Rank 5, 2, 5, 2, 4, 2 merged firm mean 0.440, non-merged firm mean 0.563
Bartley/ Boardman (1986)	+/+**/ -**/-***	S	Non-Target, Target:[366] HC (8-month prior): 1.05 > 0.89, *** RC (8-month prior): 0.75 > 0.57, ** HC (12-month low): 0.92 > 0.75, ** RC (12-month low): 0.66 > 0.48, **	Stepwise MDA: HC (8-month prior): +0.99 RC (8-month prior): +1.00*** HC (12-month low): +1.04*** RC (12-month low): +1.00**, +0.63**
Ambrose/ Megginson (1992)	+	X	Non-Target, Target: 1.466 < 1.928	+0.020, +0.025, +0.026
Davis/Stout (1992)	-**	S	n/a	1980-1990:[367] -0.224**; -0.227**, -0.197**, -0.195**, -0.272**, -0.257**, -0.310**, -0.305**; 1983-1990: -0.228**, -0.212**, -0.274**, -0.318**
Walter (1994)	-**	S	n/a	Hist.-Cost, Curr.-Cost-Model: -2.405**, -.1.480**
Meador/ Church/ Rayburn (1996)	-/-**	S	n/a	All, Horizontal, Vertical Mergers: -0.453; -1.122**; -0.143
Chen/Su (1997)	-/-**	S	n/a	(L)[368] ; -0.231, -0.384**, -0.016, -0.200
Powell (1997)	+/ +*/ -	S	n/a	(L);[369] ; 1984-1991: +0.218*, -0.016, +0.032; Ind.adj: +0.199*, -0.031, +0.019; Ind.&Econ.adj: +0.268**, -0.159, -0.025; 1984-1987: -0.222; -0.123, -0.141; Ind.adj: -0.014, +0.025, +0.000; Ind.&Econ.adj: +0.043, -0.237, -0.04; 1988-1991:+0.325*, +0.050, +0.098; Ind.adj: +0.289*, +0.027, +0.077; Ind.&Econ.adj: +0.281, -0.055, +0.013
Barnes (1998), (1999), (2000)	+	X	n/a	(L), +0.5771, +0.7683
Cudd/ Duggal (2000)	-	X	n/a	(L)[370]; -0.0331, -0.0766, -0.0661
Powell (2004)	+/-	X	n/a	(L);[371] ; +0.0120, -0.0026, +0.0009; Ind.adj:-0.0055, -0.0003, -0.0002; Ind.&Econ.adj:-0.1241, +0.0715, +0.0392

366 HC: Historical cost measure, RC: Replacement cost measure.

367 For each period, the coefficients refer to: All bids, all successful bids, hostile bids, successful hostile.

368 This study analyzes differences between foreign and US-acquisitions. The first two coefficients refer to foreign acquisitions, 1 and 2 years prior to the announcement date; coefficients 3 and 4 refer to US-acquisitions, 1 and 2 years prior to the announcement date.

369 This study uses three samples: Hostile takeovers, friendly takeovers, and a sample of both.

370 Coefficients are displayed for the unadjusted model, the model adjusted for industry distributional characteristics, and the model adjusted for both industry distributional characteristics and a twelve-month industry disturbance, Cudd/Duggal (2000), p. 113.

371 This study uses three samples: Hostile takeovers, friendly takeovers, and a sample of both.

Price-to-Book Ratio	Obs. Relation	Market Price / Book Value	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Kumar/ Rajib (2007)	-	X	Acquirer, Target: 2.68 > 2.16	(L); Non-Acquired Firms vs. Target: -0.000579

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 14: Price-to-Book Ratio

5.4.4 Market Value-to-Replacement Cost / Q-Measures

The valuation hypothesis suggests that a firm is an attractive acquisition target if its current market value is less than the cost of replacing its assets.[372] The economic rationale behind this is that a firm that wishes to invest in a new business has the choice of whether to purchase the individual assets or to acquire a business which is already in place. An acquisition will take place if the acquisition alternative is cheaper than the other. In other words, a takeover bid of a low Q-firm is an attempt to acquire valuable resources at a cost below that of de novo investment.[373] The impact is usually measured by the market value of assets—referred to the replacement value of assets, or Tobin's Q or simply Q—and the relationship of takeover likelihood.

Replacement values are not directly observable. Therefore, they are approximated in several takeover studies by the market-to-book concept.[374] The only study that analyzes replacement costs as reported by firms and model-based replacement values is Hasbrouck (1985). His model based replacement costs upon an algorithm suggested by Parker (1977) and Hasbrouck (1981) as follows:[375]

> "An estimate for the average age of the plant was obtained as *l*=(accumulated depreciation)/(current depreciation expense). The replacement value for net plant as then estimated by restating the reported net plant using the consumer price index: $(\text{net plant, replacement value})_t = (\text{net plant, book value})_t \times [CPI_t/CPI_{t-1}]$.
>
> The replacement value of inventory was generally taken as the book value if the reported method was FIFO or retail, which is approximately correct

372 For example, Palepu (1982), p. 35; Komlenovic/Mamun/Mishra (2011), p. 246.
373 Hasbrouck (1985), p. 353.
374 For example, Palepu (1982), p. 35; see section 5.4.3—Price-to-Book.
375 Parker (1977), pp. 69-96; Hasbrouck (1981) cited after Hasbrouck (1985), p. 357.

provided inventory turnover is not too slow. Firms which used LIFO valuation also reported a LIFO reserve, which was added to the reported inventory to obtain the equivalent FIFO value."[376]

Hasbrouck (1985)'s results are presented in Table 15. He finds a statistically significant relationship between Q-measures and the acquisition likelihood of firms that is consistent with the valuation hypothesis. This suggests the use of the Q-measure and its derivatives in identifying acquirer and target firms in business combination.

Table 15
Q-Measures

Q-Measures	Obs. Relation	Market Value of Equity / (Replacement Value of Assets - Market Value of Liabilities)	(Market Value of Equity + Market Value of Liabilities) / Replacement Value of Assets	(Book Value of Assets + Market Value of Common Equity –Book Value of Common Equity) / Total Book Value of Assets	Univariate Comparison	Logit (L) - / Probit (P) - Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Hasbrouck (1985)	-*/-**	S	S		Non-Target, Target in Size-matched sample: Q-Equity: 1.225 > 0.840, * Q-Total Assets: 1.142 > 0.905, * Industry-matched sample: Q-Equity: 1.161 > 0.840, * Q-Total Assets: 1.094 > 0.905, *	Size-matched sample: Q-Equity: -0.648*, -0.581** Q-Total Assets not tested; Industry-matched sample: Q-Equity: -0.623*, -0.629* Q-Total Assets not tested.
Kumar/ Rajib (2007)	+/-**			S	Acquirer, Target: 2.14 > 1.42,**	+0.070

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 15: Q-Measures

5.4.5 Price-to-Sales Ratio

Due to differences in accounting principles and the methods which measure a firm's earnings, financial research seeks more reliable stock valuation indicators that are not greatly impacted by accounting differences. For example, the price-to-sales ratio (P/S ratio) might potentially be such a ratio. Like the price-earnings ratio, it indicates how much to pay for each MU (money unit) of current sales. While this ratio is considered to be largely immune from accounting influences, sales ultimately must produce

376 Hasbrouck (1985), p. 357, fn. 6.

profits and this important information is missing in the P/S ratio.[377] Furthermore, sales can be greatly influenced by accounting practices like grossing up commissions or barter transactions in advertising.[378]

The P/S ratio is often calculated by dividing the stock price per share by sales or revenues per share:[379]

Figure 16
Price-to-Sales Ratio

$$\text{Price-to-Sales Ratio} = \frac{\text{Stock Price per Share}}{\text{Sales per Share}}$$

Figure 16: Price-to-Sales Ratio

However, no study thus far has used the price-to-sales ratio to investigate takeover likelihood. This may be due to other, more popular valuation ratios in market research, such as price-earnings and price-to-book ratios.

5.4.6 Earnings Yield

The earnings yield is the inverse of the price-earnings ratio and is a measure of current earnings[380] related to the market price of a share. Assuming that current earnings are a good measure for future earnings, then it indicates the proportion of earnings that would be generated by each MU investment in the current stock price.

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377 This ratio can be interpreted also as indicating expected growth in sales. The median historical P/S ratio is 0.9, but in the period 1997-2000, during the "dot-com bubble", the P/S ratio was commonly used and not unusual for new technology firms to trade at over 20 times sales, Penman (2010), p. 83.

378 Penman (2010), p. 9.

379 However, conceptually more consistent would be the calculation of an unlevered P/S ratio because leverage does not produce sales (before interests and taxes). The same applies to calculate an (unlevered) price-to-ebit ratio, Penman (2010), p. 79.

380 See section 5.4.1—Price-Earnings Ratio.

Figure 17
Earnings Yield

$$\text{Earnings Yield} = \frac{\text{Earnings per Share}}{\text{Stock Price per Share}}$$

Figure 17: Earnings Yield

Investors usually compare the expected earnings yield of a broad market index, such as S&P 500, with prevailing interest rates, such as current 10-year treasury yield, to assess whether stocks are overpriced.[381] It is assumed that stocks are overpriced if the earnings yields are lower than the bond yields.[382]

However, as in shown in Table 15, only one empirical takeover study has used this ratio to analyze takeover likelihood.

Table 16
Earnings Yield

Earnings Yield	Net Income / Market Value of Shares	Cash Flow / Market Value of Shares
Bartley/Boardman (1990)	S, Stepwise MDA*, coefficients n/a	S, Stepwise MDA*, coefficients n/a

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 16: Earnings Yield

5.4.7 Interim Summary—Valuation Measures

Prior literature has shown that valuation measures are important discriminators between targets, non-acquiring, and acquiring firms. The findings of empirical takeover studies additionally support the suggestions of the valuation hypotheses that firms with relatively high valuation discrepancies are likely acquisition targets. The most important discriminators are the price-earnings and price-to-book ratios, suggesting that these ratios should be considered when identifying the acquiring firm in business combinations.

381 Penman (2010), pp. 214-216.
382 Penman (2010), p. 215.

5.5 Liquidity Metrics

As stressed in section 4.2.1.2.2—Liquidity,[383] literature frequently expects firms' liquidity to be positively related to acquisition likelihood, assuming that more liquid firms are attractive takeover targets. However, the relation between liquidity and takeover likelihood is seems questionable, as there is the possibility that acquisition likelihood depends on the interaction between growth opportunities and leverage.[384] Nevertheless, several studies use liquidity ratios to analyze takeover activity.

In contrast to long-term solvency, liquidity primarily considers a firm's short-term liquidity and refers to a firm's ability to meet current payments to short-term creditors (suppliers, short-term paper holders, employees, or tax authorities) and long-term creditors holding debt that is almost to maturity.[385] However, the ability to pay short-term obligations may also be indicative of a firm's ability to pay long-term debt. If the firm cannot survive the short term, there is no long term.[386] The most common short-term liquidity measures are the level of working capital, the current ratio, the quick ratio, the cash ratio, the cash conversion cycle and, its inverse, the working capital turnover.

5.5.1 Working Capital

The **working capital** (also known as net working capital or the working capital ratio) compares current assets to current liabilities in absolute numbers, by subtracting current liabilities from current assets, as follows: [387]

Figure 18
Working Capital

Working Capital = Current Assets - Current Liabilities

Figure 18: Working Capital

383 See section 4.2.1.2.2—Liquidity.
384 Section 4.2.2.2—Internal Growth and Merger Activity.
385 Penman (2010), p. 700.
386 Penman (2010), p. 700.
387 Horngren/Harrison/Oliver (2012), p. 733; Wahlen/Baginski/Bradshaw (2011), p. 365; Gibson (2011), pp. 228-229; Penman (2010), p. 371; Brealey/Myers/Franklin (2008), p. 145; Coenenberg/Haller/Schultze (2009), pp. 1067-1068; Palepu/Healy/Bernard (2000), p. 322.

Positive working capital indicates that a firm is able to meet its short-term obligations; if a firm's current liabilities exceed its current assets, it may run into financial problems. Nevertheless, this ratio does not indicate how much time a company has to pay its current obligations, or how many days it takes to convert current assets, especially inventories and accounts receivable, to cash. As such, this measure suffers from some deficiencies.

The takeover studies presented in Table 17 document the results of using working capital as a determinant of takeover likelihood.

Harris/Stewart/Guilkey/Carleton (1982) and Hasbrouck (1985) provide statistically significant results from univariate tests and logit regressions supporting the hypothesis that liquidity, as measured by the level of working capital, is positively related to takeover likelihood.[388] Harris/Stewart/Guilkey/Carleton (1982) extends this analysis by considering the interaction between liquidity and other variables such as growth. Other studies using logit regression do not provide significant findings. This may be due to multicollinearity issues because many of these studies use multiple measures of liquidity.

Overall, there is some indication that liquidity is a determinant of acquisition likelihood.

Table 17
Working Capital Measures

Working Capital Measures	**Obs. Rel-ation**	**Working Capital (scaled by Size[Total Assets])**	**Working Capital (scaled by Size[Sales])**	**Working Capital plus Replacement Cost of Inventory (scaled by Size[Total Assets; Total Assets + Replacement Cost of Inventory])**	**Current Financial Assets – Current Liabilities (scaled by Size[Total Assets; Market Value of Equity])**	**Univariate Comparison**	**MDA-/ Logit-(L)/ Probit-(P) Coefficients** (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Stevens (1973)	+, -**	S	X			Net Working Capital/Total Assets: Non-Acquired, Acquired: 34.99 < 40.66	Factor Analysis; MDA: NWC/TA –0.033**, rank 4
Belkaoui (1978)	-/-**/ -***	S				n/a	MDA for Year 1, 2***, 3**, 4**, 5**, before takeover with the following values for Working Capital/Total Assets: -0.02427, -0.05758, 0.02146, -0.30738, -0.18708
Harris/ Stewart/	+/+**/ +***/-	S				Non-acquired, Acquired Firms in	(P); 1974-1975: +1.767***, +1.533***, +1.808***, +1.571***,

388 Harris/Stewart/Guilkey/Carleton (1982), pp. 164-184; Hasbrouck (1985), pp. 351-362.

Working Capital Measures	Obs. Relation	Working Capital (scaled by Size[Total Assets])	Working Capital (scaled by Size[Sales])	Working Capital plus Replacement Cost of Inventory (scaled by Size[Total Assets; Total Assets + Replacement Cost of Inventory])	Current Financial Assets – Current Liabilities (scaled by Size[Total Assets; Market Value of Equity])	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Guilkey/ Carleton (1982)						1974-1975: 0.346 < 0.413, **; 1975-1976: 0.351 < 0.365,	+1.703***, +1.471***; 1976-1977: -0.101, -0.612, -0.140, -0.624, +0.122, -0.437
Wansley/ Lane (1983), Wansley (1983)	n/a	X				n/a	Factor Analysis; LDA: n/a
Has-brouck (1985)	+*/ +*** /-				S	Non-Target, Target in Size-matched sample: 0.017 < 0.095, * Industry-matched sample: 0.101 > 0.095	Size-matched sample: +1.027***, +1.084*** Industry-matched sample: -0.298, -0.287
Bartley/ Boardman (1986)	-	X		X		Non-Target, Target:[389] HC: 0.32 > 0.29 RC: 0.29 > 0.27	Stepwise MDA, variable failed to enter.
Bartley/ Boardman (1990)	n/a	S				n/a	Stepwise MDA*, coefficients n/a
Bacon/ Shin/ Murphy (1992)	-	X				Non-merged > Merged, (-)	Not measured.
Meador/ Church/ Rayburn (1996)	n/a	X	X			n/a	All, Horizontal, Vertical Mergers: Net Working Capital / Total Assets: +1.472; +4.594; +1.833; Net Working Capital / Sales: -0.627, -5.062, -2.843
Zanakis/ Zopou-nidis (1997)	-	X				Non-Acquired, Acquired: [390] Year -1: 0.21 > 0.19; Year -2: 0.12 > 0.1; Year -3: 0.12 > 0.09	n/a, Factor Analysis, DA [391]
Barnes (1998), (1999), (2000)	+/-	X				n/a	(L), +0.6538, -0.4983

389 HC: Historical cost measure, RC: Replacement cost measure.

390 Data refers to 1 to 3 years prior to takeover.

391 A logit analysis was performed but the significance level of coefficients was not indicated; therefore, the coefficients are not listed in this table, Zanakis/Zopounidis (1997), p. 685.

Working Capital Measures	Obs. Rel-ation	Working Capital (scaled by Size[Total Assets])	Working Capital (scaled by Size[Sales])	Working Capital plus Replacement Cost of Inventory (scaled by Size[Total Assets; Total Assets + Replacement Cost of Inventory])	Current Financial Assets – Current Liabilities (scaled by Size[Total Assets; Market Value of Equity])	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Sorensen (2000)	+/-	X				Nonmerging, Acquiring, Target-Groups: 0.1901, 0.2178, 0.21	n/a
Kumar/ Rajib (2007)	+/- -**	S	X			Acquirer, Target: WC/TA: 0.16 > 0.021,** ; WC/SA: 0.23 < 0.44	(L); Non-Acquired Firms vs. Target: WC/TA: -0.11, -0.44** ; WC/SA: +0.01, -0.021

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 17: Working Capital Measures

5.5.2 Current Ratio

The **current ratio** relates current assets to current liabilities and conceptually ascertains whether a company's short term assets (cash and equivalents, short-term investments, receivables, prepaid expenses and inventories) are readily available to pay the short-term liabilities (trade payable, short-term debt, accrued liabilities) coming due within the following year.[392] The ratio is calculated as follows:

Figure 19
Current Ratio

$$\text{Current Ratio} = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

Figure 19: Current Ratio

[392] Horngren/Harrison/Oliver (2012), pp. 214, 733; Wahlen/Baginski/Bradshaw (2011), pp. 363-364; Gibson (2011), pp. 229-230; Penman (2010), pp. 700, 703; Brealey/Myers/Franklin (2008), p. 795; Coenenberg/Haller/Schultze (2009), pp. 1062-1066; Revsine/Collins/Johnson (2005), p. 234, Palepu/Healy/Bernard (2000), p. 324.

A rule of thumb for interpreting this ratio is the firm is highly liquid when the ratio is above 1.5;[393] a ratio of one is the lower but common bound, and a ratio lower than one is considered rather risky.[394] Besides this rule of thumb, industry averages serve as important benchmarks; for example, a current ratio of 1.0 may considered risky in industries with large inventories, but considered quite good in industries with no inventories.[395]

Although this ratio is extensively used, it is not free from potential misinterpretation. For example, the firm may not be able convert the components of current assets into cash quickly enough to meet current obligations. Inventories typically take the longest time to convert to cash, as they first have to be sold and converted into receivables, and then have to be paid.[396] As such, a current ratio of 1.0 or higher might be interpreted as good, although the current assets consist of a high proportion of inventories which are difficult to sell, and, at the same time, current liabilities that need to be paid shortly. In other words, if the components of the current ratio do not have matching maturities, the current ratio is potentially misleading, and, therefore, a biased indicator of firm's short-term liquidity. For this reason, the cash conversion period of the current ratio's components might also need to be considered.[397] This would allow for separation of liquid and not so liquid components of the current ratio. Unfortunately, the balance sheet only approximately provides this information.[398]

Despite the criticisms previously mentioned, the current ratio is a commonly used indicator of short-term liquidity. Empirical studies that focused on financial distress, bankruptcy and bond defaults have found strong predictive power of the current ratio:[399]

This measure has been applied in a number of takeover prediction studies, including Belkaoui (1978), Chen/Su (1997), and Kumar/Rajib (2007). These studies document a positive relationship between the firm's liquidity, as measured by the current ratio, and its takeover likelihood.[400] This is consistent with hypothesis that liquidity is a takeover

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393 Until the mid-1960s and in many industries until the 1980s, firms typically maintained a current ratio of at least 2.0. This changed towards a current ratio of 1.0 to 1.5, which is common today. It is seen as a consequence of better control of receivables and/or inventory, Gibson (2011), p. 229; Wahlen/Baginski/Bradshaw (2011), p. 363.

394 Horngren/Harrison/Oliver (2012), p. 214, 733; Wahlen/Baginski/Bradshaw (2011), p. 363.

395 Horngren/Harrison/Oliver (2012), p. 214, 733; Penman (2010), p. 703.

396 Under historical cost accounting, the carrying amounts for inventories usually understate their cash value, unless impaired due to the lower-cost-or-market rule, Penman (2010), p. 701; Gibson (2011), p. 230.

397 See section 5.5.6—Working Capital Turnover Ratios.

398 Coenenberg/Haller/Schultze (2009), pp. 1164;

399 Wahlen/Baginski/Bradshaw (2011), p. 363.

400 Belkaoui (1978), pp. 93-108; Chen/Su (1997), pp. 71-82; Kumar/Rajib (2007), pp. 27-44.

motive. However, some studies find conflicting results. For example, Belkaoui (1978) uses Canadian data from the 1960s for his MDA and finds a negative relationship between liquidity and takeover likelihood. Moreover, several studies do not document any statistical significant relation between takeover likelihood and the current ratio. This may be due to the multicollinearity concerns previously mentioned. Meador/Church/Rayburn (1996), Zanakis/Zopounidis (1997), Sorensen (2000), Kumar/Rajib (2007), and Belkaoui (1978) apply at least 4 short-term liquidity measures simultaneously.[401]

Hence, there is only slight evidence that liquidity, as measured by the current ratio, is a determinant for takeover likelihood. The results of the relevant studies are presented in Table 18.

Table 18
Current Ratio

Current Ratio	Obs. Relation	Current Assets / Current Liabilities	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Belkaoui (1978)	+/+**/ +***/-**	S	n/a	MDA for Year 1, 2***, 3**, 4**, 5**, before takeover with the following values for Current Assets/Current Liabilities: +0.00286, +0.00824, -0.00323, +0.00628, +0.00566
Dietrich/ Sorensen (1984)	+	X	n/a	+2.24
Bartley/ Boardman (1990)	n/a	S	n/a	Stepwise MDA*, coefficients n/a.
Meador/ Church/ Rayburn (1996)	+/-	X	n/a	All, Horizontal, Vertical Mergers: -0.066; -0.321; +0.354
Chen/Su (1997)	+/+*/ +***/-	S	n/a	(L)[402] ; +0.354***, +0.766*, +0.216, -0.079
Zanakis/ Zopounidis (1997)	+/-	X	Non-Acquired; Acquired: [403] Year -1: 1.47 > 1.25; Year -2: 1.27 < 1.28 ; Year -3:1.22 < 1.62	n/a, Factor Analysis, DA [404]
Barnes (1998), (1999), (2000)	-	X	n/a	(L), -0.4539, -0.4623

401 Meador/Church/Rayburn (1996), pp. 11-23; Zanakis/Zopounidis (1997), pp. 678-687; Sorensen (2000), pp. 423-433; Kumar/Rajib (2007), pp. 27-44.

402 This study analyzes differences between foreign and US-acquisitions. The first two coefficients refer to foreign acquisitions, 1 and 2 years prior to the announcement date; coefficients 3 and 4 refer to US-acquisitions, 1 and 2 years prior to the announcement date.

403 Data refers to 1 to 3 years prior to takeover.

404 A logit analysis was performed but the significance level of coefficients was not indicated; therefore, the coefficients are not listed in this table, Zanakis/Zopounidis (1997), p. 685.

Current Ratio	Obs. Relation	Current Assets / Current Liabilities	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Sorensen (2000)	+/-	X	Nonmerging, Acquiring, Target-Groups: 2.2943, 2.6444, 2.5812	n/a
Doumpos/ Kosmidou/ Pasiouras (2004)	n/a	S	T-Test[405]; Year1**, Year2**, Year3*	DA, n/a[406]
Tsagkanos/ Georgopoulos/ Siriopoulos (2006)	+	X	n/a	(L): Binary Logit, Conditional Logit; +0.1917, +0.00006913
Kumar/ Rajib (2007)	+/+***/-	S	Acquirer, Target: 1.95 > 1.85,*	(L), Non-Acquired Firms vs. Target: +0.22***, +0.0185
Tsagkanos/ Georgopoulos/ Siriopoulos/ Koumanakos (2008)	+	X	n/a	(L): Classical MLE, Bootstrap MLE of Logit; +0.099, +0.886

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 18: Current Ratio

5.5.3 Quick Ratio

A further ratio used to measure liquidity is the quick ratio (also known as the quick assets ratio or the acid-test ratio). The quick ratio adjusts for some of the previously mentioned measurement problems of the current ratio by excluding the least-liquid components of current assets (inventories and prepaid expenses) that may potentially overstate the liquidity of a firm. The quick ratio indicates whether the firm could pay all its current liabilities if they became due immediately.[407] The quick ratio is calculated as follows:

405 This study does not present the tested means.

406 This study displays only the classification results, and not the findings of the regression models such as coefficients and related statistics.

407 Horngren/Harrison/Oliver (2012), p. 735; Wahlen/Baginski/Bradshaw (2011), pp. 364-365; Gibson (2011), p. 330; Penman (2010), p. 371; Brealey/Myers/Franklin (2008), p. 795; Coenenberg/Haller/Schultze (2009), p. 1066; Revsine/Collins/Johnson (2005), p. 234, Palepu/Healy/Bernard (2000), p. 331.

Figure 20
Quick Ratio

$$\text{Quick Ratio} = \frac{\text{Cash \& Equivalents + Marketable Securities + Accounts Receivables}}{\text{Current Liabilities}}$$

Figure 20: Quick Ratio

While considered to be more reliable than the current ratio, the quick ratio is subject to some of the same interpretative issues as the current ratio. It also assumes the liquidation of accounts receivable to meet current obligations without taking in account the time for converting them into cash.[408]

The empirical evidence suggests there is a significantly negative relationship between takeover likelihood and the quick ratio, which is in contrast to the liquidity hypothesis. The results of these studies are displayed in Table 19. The studies by Belkaoui (1978) and Kumar/Rajib (2007) find a significant negative relation using Canadian data from the 1960s and Indian data from the 1993 to 2001.

Table 19
Quick Ratio

Quick Ratio	Obs. Relation	Quick Ratio	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Belkaoui (1978)	+**/ -/-*** /-**	S	n/a	MDA for Year 1, 2***, 3**, 4**, 5**, before takeover with the following values for Quick Assets/Current Liabilities: -0.0108, -0.01202, +0.03049, +0.01923, -0.00831
Bartley/ Boardman (1990)	n/a	S	n/a	Stepwise MDA*, coefficients n/a.
Zanakis/ Zopounidis (1997)	+/-	X	Non-Acquired, Acquired: [409] Year -1: 0.91 > 0.75; Year -2: 0.48 < 0.73; Year -3: 0.69 < 0.7	n/a, Factor Analysis, DA [410]
Sorensen (2000)	+/-	X	Nonmerging, Acquiring, Target-Groups: 1.7962, 2.1861, 2.0931	n/a

408 See section 5.5.5—Cash Conversion Cycle.

409 Data refers to 1 to 3 years prior to takeover.

410 A logit analysis was performed but the significance level of coefficients was not indicated; therefore, the coefficients are not listed in this table, Zanakis/Zopounidis (1997), p. 685.

Quick Ratio	Obs. Relation	Quick Ratio	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Doumpos/ Kosmidou/ Pasiouras (2004)	n/a	S	T-Test[411]; Year1***, Year2 not signif., Year3 not signif.	DA, n/a[412]
Kumar/ Rajib (2007)	-/-*/-***	S	Acquirer, Target: 1.016 > 0.73,*	(L); Non-Acquired Firms vs. Target: -0.31***, -0.021

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 19: Quick Ratio

5.5.4 Cash Ratio

The before mentioned limitations of the quick ratio and the current ratio are mostly corrected by the cash ratio, which measures short-term liquidity by ignoring inventories and other less-liquid current assets such as accounts receivables.[413] The ratio is calculated as follows:

Figure 21
Cash Ratio

$$\text{Cash Ratio} = \frac{\text{Cash \& Equivalents + Marketable Securities}}{\text{Current Liabilities}}$$

Figure 21: Cash Ratio

The cash ratio only considers the most liquid short-term assets, so is the most stringent and conservative. It is seldom equal to or higher than 1.0. Analysts give seldom this ratio too much weight as it is not realistic to expect that a firms holds excess cash for liabilities that are not yet mature. Therefore, not many firms will have enough cash and cash equivalents to immediately cover all current liabilities. If accounts receivable and inventory can be converted to cash to meet current obligations within a congruent

411 This study does not present the tested means.

412 This study displays only the classification results, and not the findings of the regression models such as coefficients and related statistics.

413 Gibson (2011), p. 231; Penman (2010), p. 701; Brealey/Myers/Franklin (2008), p. 795; Coenenberg/Haller/Schultze (2009), p. 1066; Palepu/Healy/Bernard (2000), p. 331.

timeframe (the cash conversion cycle), then it is not necessary to have a cash ratio of approximately 100 percent.

Nevertheless, some studies consider this ratio in their analysis of the association between liquidity and takeover likelihood, since large amounts of cash may also signal unused investment capacities and such firms may be attractive takeover targets.[414]

Indeed, the results are mixed. The study by Chen/Su (1997) reports a significant negative relationship that contrasts the predicted association of liquidity and the likelihood of becoming a takeover target,[415] while Belkaoui (1978)'s MDA model reports coefficient with ambiguous signs.[416] The usefulness of this indicator needs to be further tested before drawing reliable conclusions.

Table 20
Cash Ratio

Cash Ratio	Obs. Relation	Cash Ratio	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Belkaoui (1978)	+/+**/+***/ -**	S	n/a	MDA for Year 1, 2***, 3**, 4**, 5**, before takeover with the following values for Cash/Current Liabilities: +0.00431, +0.0047, -0.01461, -0.01725, +0.03342
Chen/ Su (1997)	+/-/-**	S	n/a	(L)[417] ; -0.395, -0.702**, -0.125, +0.401

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 20: Cash Ratio

414 See section 5.11—Agency Conflict Measures.
415 Chen/Su (1997), pp. 71-82.
416 Belkaoui (1978), pp. 93-108.
417 This study analyzes differences between foreign and US-acquisitions. The first two coefficients refer to foreign acquisitions, 1 and 2 years prior to the announcement date; coefficients 3 and 4 refer to US-acquisitions, 1 and 2 years prior to the announcement date.

5.5.5 Cash Conversion Cycle

The **cash conversion cycle** (also known as cash-to-cash cycle)[418] describes the average number of days that a company requires for working capital financing compared to the average number of days that a company provides working capital financing.

Figure 22
Components of the Cash Conversion Cycle

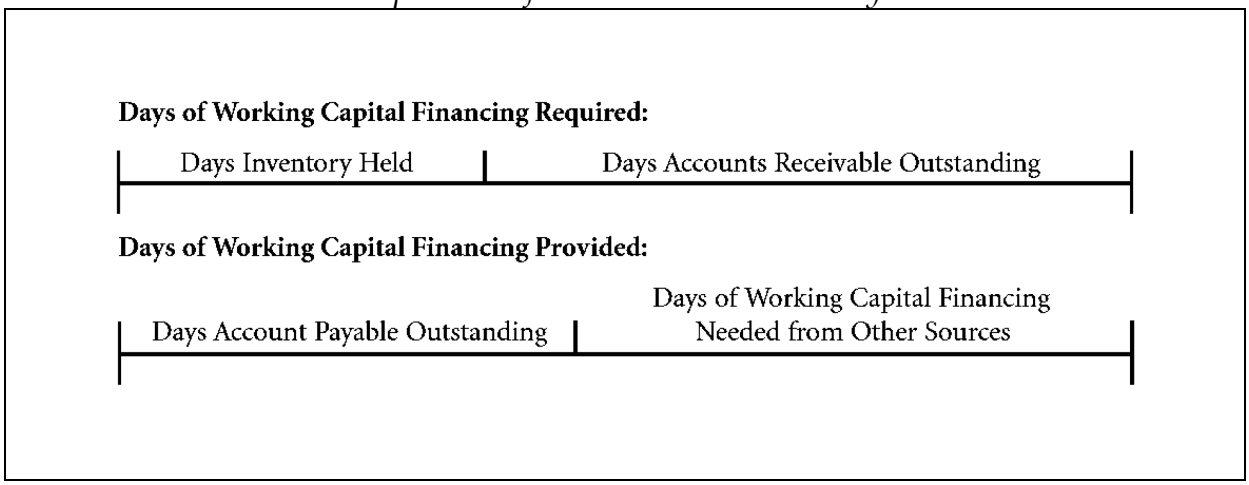

Figure 22: Components of the Cash Conversion Cycle[419]

Hence, the average number of days a firm needs additional working capital financing[420] is indicated by the average number of days a firm needs to convert its accounts receivables and inventory into cash, less the number of days the firm has to pay current liabilities to its suppliers.[421] This informs about the quickness of firm's conversion of working capital to cash. The shorter the period, the more liquid is a company. The calculation of average number of days a firm needs additional working capital financing is as follows:

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418 Wahlen/Baginski/Bradshaw (2011), p. 367.

419 Source: Adopted from Wahlen/Baginski/Bradshaw (2011), p. 367.

420 The average number of days a firm needs additional working capital financing itself is sometimes referred to as cash conversion cycle, Revsine/Collins/Johnson (2005), p. 236.

421 Wahlen/Baginski/Bradshaw (2011), p. 367; Horngren/Harrison/Oliver (2012), pp. 211, 257; Gibson (2011), p. 227; Coenenberg/Haller/Schultze (2009), pp. 1051-1052 Brealey/Myers/Franklin (2008), p. 796; Revsine/Collins/Johnson (2005), pp. 234-237.

Figure 23
Days of Additional Working Capital Financing

Average number of days a firm needs additional working capital financing = + Days Inventories Outstanding + Days Accounts Receivables Outstanding - Days Accounts Payables Outstanding

with:

$$\text{Days Inventory Outstanding} = \frac{\text{Average Inventory Balance}}{\text{Cost of Goods Sold per Day}}$$

$$\text{Days Accounts Payables Outstanding} = \frac{\text{Average Accounts Payable Balance}}{\text{Cost of Goods Sold per Day}}$$

$$\text{Days Accounts Receivables Outstanding} = \frac{\text{Average Accounts Receivable Balance}}{\text{Net Sales per Day}}$$

Figure 23: Days of Additional Working Capital Financing

Only few empirical takeover studies consider these measures and derivative metrics. Their results are described in Table 21. Tsagkanos/Georgopoulos/Siriopoulos (2006) find a significant positive relationship between creditor's payment time and takeover likelihood. They use Greek data from 1995 to 2000, and their results suggest that firms that have more time to pay suppliers are more attractive takeover targets.[422] To some extent, this supports the hypothesis that firms with higher liquidity are more attractive takeover targets. However, these findings are limited to a Greek dataset only.

422 Tsagkanos/Georgopoulos/Siriopoulos (2006), pp. 183-194.

Table 21
Cash Conversion Cycle-Metrics

Cash Conversion Cycle-Metrics	Obs. Relation	Debtors' collection time, in days = (Average receivables/ net sales) x 365	Creditors' payment time, in days = (Average trade creditors/ purchases) x 365	No. of days goods held in stock = (Average stock level/ cost of net sales) x 365	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Doumpos/ Kosmidou/ Pasiouras (2004)	n/a	S	X		T-Test[423]; Debtor's Collection Time: Year1**, Year2**, Year3**; Creditor's Payment Time: Year1 not signif., Year2 not signif., Year3 not signif.	DA, n/a[424]
Tsagkanos/ Georgo-poulos/ Siriopoulos (2006)	+/+***/-	X	S	X	n/a	(L): Binary Logit, Conditional Logit; Debtor's Collection Time: -0.003613, +0.00109494 Creditor's Payment Time: -0.000219, + 0.00815294*** No. of days goods held in stock: +0.002451, -0.00607482
Tsagkanos/ Georgo-poulos/ Siriopoulos/ Koumanakos (2008)	+/-	X	X	X	n/a	(L): Classical MLE, Bootstrap MLE of Logit; Debtor's Collection Time: - -0.000183, -0.0045 Creditor's Payment Time: +0.00142, -0.0020 No. of days goods held in stock: +0.0040, + 0.0040

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 21: Cash Conversion Cycle-Metrics

5.5.6 Working Capital Turnover Ratios

Similar to the cash and operating cycle ratios, working capital turnover ratios indicate the average time until firms convert accounts receivables into cash or sell their inventory. Accounts receivables turnover and inventory turnover are calculated by dividing 365, the number of days in a year, by the days of accounts receivables outstanding and days inventory outstanding, respectively. These calculations are shown below:[425]

423 This study does not present the tested means.

424 This study displays only the classification results, and not the findings of the regression models such as coefficients and related statistics.

425 Wahlen/Baginski/Bradshaw (2011), pp. 389-390; Revsine/Collins/Johnson (2005), pp. 234-236.

Figure 24
Accounts Receivables Turnover

$$\text{Accounts Receivables Turnover} = \frac{\text{Net Sales}}{\text{Average Accounts Receivables Balance}}$$

Figure 24: Accounts Receivables Turnover

Figure 25
Inventories Turnover

$$\text{Inventories Turnover} = \frac{\text{Cost of Goods Sold}}{\text{Average Inventories Balance}}$$

Figure 25: Inventories Turnover

While the turnover ratios for accounts receivables and inventory are the most common, also other turnover ratios are calculated.[426] The cash turnover ratio, for example, indicates the efficiency with which cash is managed. It is calculated by dividing sales by the average cash balance from the balance sheet. Similarly, the current assets turnover, which measures the efficiency with which all current assets are managed, is calculated by dividing sales by average current assets.[427]The accounts payable turnover ratio indicates the firm's pattern of payments to suppliers.[428] It is calculated according as follows:

Figure 26
Accounts Payables Turnover

$$\text{Accounts Payable Turnover} = \frac{\text{Inventory Purchases}}{\text{Average Accounts Payable Balance}}$$

Figure 26: Accounts Payables Turnover

426 Wahlen/Baginski/Bradshaw (2011), p. 389.
427 Wahlen/Baginski/Bradshaw (2011), p. 390.
428 Revsine/Collins/Johnson (2005), p. 236.

As presented in Table 17, several studies use working capital turnover measures to estimate takeover likelihood. These studies primarily use turnover ratios such as sales divided by current assets or cost of goods sold divided by inventory. However, the findings do not indicate that there is a statistically significant relationship between working capital turnover metrics and acquisition likelihood.

Table 22
Working Capital Turnover Ratios

Working Capital Turnover	**Obs. Rel-ation**	**Sales / Accounts Receivables**	**Sales / Current Assets**	**Sales / Inventories**	**Sales / (Current Assets - Inventory)**	**Sales / Liquid Assets**	**Cost of Goods Sold / Inventory**	**Debtors Turnover = Turnover / Trade Debtors**	**Univariate Comparison**	**MDA-/ Logit-(L)/ Probit-(P) Coefficients** (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Stevens (1973)	n/a				X		X		n/a	Factor Analysis, n/a
Bartley/ Boardman (1990)	n/a	S					S		n/a	Stepwise MDA*, coefficients n/a.
Meador/ Church/ Rayburn (1996)	+						X		n/a	All, Horizontal, Vertical Mergers: +0.049; +0.046; +0.055
Sorensen (2000)	+/-	S	X	S					Non-merging, Acquiring, Target-Groups: Sales / Acc.Rec.: 8.4407, 7.5763, 8.3332; Sales / Current Assets: 3.2692, 2.89, 2.957; Sales / Inventories: 11.4886, 11.5759, 11.184	(L)** for Sales / Acc.Rec. and Sales / Inventories, Coef. n/a
Doumpos/ Kosmidou/ Pasiouras (2004)	n/a						X	S	T-Test[429] Stock Annual Change: ; Year1 not signif., Year2 not signif., Year3 not signif. Debtors' Turnover; Year1 not signif., Year2 not signif., Year3***	DA, n/a[430]

[429] This study does not present the tested means.
[430] This study displays only the classification results, and not the findings of the regression models such as coefficients and related statistics.

Working Capital Turnover	Obs. Rel-ation	Sales / Accounts Receivables	Sales / Current Assets	Sales / Inventories	Sales / (Current Assets - Inventory)	Sales / Liquid Assets	Cost of Goods Sold / Inventory	Debtors Turnover = Turnover / Trade Debtors	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Kumar/ Rajib (2007)	-					X			Acquirer, Target: 3.59 > 3.53	n/a

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 22: Working Capital Turnover Ratios

5.5.7 Other Measures for Short-term Liquidity used in Prediction Studies

In addition to the previously described liquidity measures, several studies use alternate ratios that describe liquidity. Most of them are measures that relate the company's level of cash and other current assets to size measures like total assets, net assets, or the market value of equity. However, these measures provide mixed suggestions to liquidity as indicator of target firms in takeover prediction studies.

As shown in Table 23, the studies using these alternate liquidity measures are contradictory:

Belkaoui (1978) uses cash and equivalents as liquidity measure, and applies MDA techniques. This study shows varying relationships between liquidity and takeover likelihood, depending on the year prior to takeover, in which liquidity was measured. Hasbrouck (1985) and Bhabra (2008) use current assets and net liquid assets, respectively, which are positively related to takeover likelihood in these studies. However, both studies use only less strong univariate statistics. Other studies find a statistically significant negative relationship between alternate liquidity measures and takeover likelihood using multivariate techniques: Powell (1997) and (2004) finds this negative relationship using UK data from 1984 to 1995, and Cudd/Duggal (2000) also finds a negative relationship using US data from 1987 to 1991. As such, these studies contradict the assumption that firms with lower liquidity are more likely targets.

5.5.8 Interim Summary—Liquidity Measures

In sum, there is some evidence that liquidity matters. Since the sign of the association between liquidity ratios and takeover likelihood varies among studies, it would be rash to conclude a specific directional impact of liquidity on takeovers.

One explanation for the conflicting results may be that some studies use multiple measures for liquidity simultaneously. Hence, the results of these studies may be conflicted due to qualitative multicollinearity issues. The inconsistent results may also be due to poor proxies. It could be that the market does not consider liquidity to be measured by excess cash, but by better general solvency and additional financial capacity. This, indeed, is more precisely measured using long-term solvency ratios than short-term solvency measures. Furthermore, strong long-term solvency usually implies that short-term borrowings are paid. These studies could also be conflicted because growth is not considered. As mentioned in section 4.2.2.2—Internal Growth and Merger Activity, growth could have a directional impact.[431]

Another interpretation of the results on liquidity ratios in takeover studies is that liquidity is a multifaceted determinant of acquisition likelihood. On the one hand, with lower liquidity the desirability of a target decreases as the potential for wealth transfer to the target's debt- and shareholders through merger increases. In this case, acquirers might be generally interested in acquiring rather liquid firms. On the other hand, illiquid firms, or their assets, might be available at a bargain price. In this case, poor liquidity could attract bidders.

[431] See section 4.2.2.2—Internal Growth and Merger Activity.

Table 23

Other Measures for Short-term Liquidity

Other Measures for Short-term Liquidity	Obs. Relation	Cash & Equivalents (scaled by Size[Market Value of Equity; Sales; Total Assets], see below)	Net Liquid Assets (scaled by Size[Total Assets] , see below)	(Net) Current Assets (scaled by Size[Sales; Total Assets; Net Assets] , see below)	Quick Assets (scaled by Size[Sales; Total Assets]; Current Assets, see below)	Working Capital (scaled by Size[Sales; Number of Employees], see below)	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Singh (1975)	**-*/-***			X [Net Assets, 1 and 3 Years Average]; S [Net Assets, 2 Years Average]			Acquiring, Acquired: 2-year average liquidity: -5.63 > -13.42, ***	MDA*, -0.5
Belkaoui (1978)	**+/ +**/ +***/ -/ -**/ -***	S [Sales; Total Assets]		S [Sales; Total Assets]	S [Sales; Total Assets]	S [Sales]	n/a	MDA for Year 1, 2***, 3**, 4**, 5**, before takeover with the following values for Cash/Sales: -0.00941, -0.01057, -0.04834, 0.00726, -0.05233; for Cash/Total Assets: +0.11758, +0.15185, +0.12712, +0.15114, -0.23027; for Current Asset/Sales: -0.00255, -0.01728, 0.02637, -0.00153, -0.00639; for Current Asset/Total Assets: -0.0328, -0.00583, -0.05502, +0.16184, 0.07621; for Quick Asset/Sales: -0.00102, -0.00031, -0.04474, -0.00409, -0.01536; for Quick Assets/Total Assets: 0.04061, 0.05671, -0.15501, -0.2104, -0.0384; for Working Capital/Total Assets: -0.02427, -0.05758, 0.02146, -0.30738, -0.18708; for Working Capital/Sales: 0.00458, 0.01253, -0.01134, +0.00526, +0.022
Palepu (1982), (1986)	**-**		X (3 Year Average)				n/a	-0.005, -0.008
Wansley/ Lane (1983), Wansley (1984)	**n/a**	X [Market Value of Equity]					n/a	Factor Analysis; LDA: n/a
Hasbrouck (1985)	**+**/ +*****			X [Market Value of Equity]			Non-Target, Target in Size-matched sample: 0.527 < 0.705, ** Industry-matched sample: 0.527 < 0.705, ***	Not measured.

Other Measures for Short-term Liquidity	Obs. Relation	Cash & Equivalents (scaled by Size[Market Value of Equity; Sales; Total Assets], see below)	Net Liquid Assets (scaled by Size[Total Assets] , see below)	(Net) Current Assets (scaled by Size[Sales; Total Assets; Net Assets] , see below)	Quick Assets (scaled by Size[Sales; Total Assets]; Current Assets, see below)	Working Capital (scaled by Size[Sales; Number of Employees], see below)	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Bartley/ Boardman (1990)	**n/a**	S [Market Value of Equity]					n/a	Stepwise MDA*, coefficients n/a.
Ambrose/ Megginson (1992)	**+/-**		X [3 Year Average]				Non-Target, Target: 0.315 > 0.300	+0.050, +0.111, +0.098
Walter (1994)	**+**				X [Total Assets]		n/a	Hist.-Cost, Curr.-Cost-Model: +0.179, +0.353
Meador/ Church/ Rayburn (1996)	**+**	X [n/a]					n/a	All, Horizontal, Vertical Mergers: +0.011; +0.044; +0.000
Powell (1997)	**+/ -*/ -****	S [Total Assets]					n/a	(L);[432] ; 1984-1991: -7.333*, -1.052, -1.942**; Ind.adj: -7.26*, -1.051, -1.966**; Ind.&Econ.adj: -3.47, +3.501, +2.093; 1984-1987: -6.033; -0.392, -1.332; Ind.adj: -5.653, -0.414, -1.185; Ind.&Econ.adj: -4.026, +1.677, -0.55; 1988-1991:-9.453*, -2.562**, -3.343*; Ind.adj: -9.963*, -2.333, -3.32*; Ind.&Econ.adj: -4.097, +4.358, +3.131
Zanakis/ Zopounidis (1997)	**+/-**	X [Total Assets]					Non-Acquired, Acquired: [433] Year -1: 0.06, 0.06; Year -2: 0.05 < 0.06; Year -3: 0.07 > 0.05	Factor Analysis, DA , n/a[434]
Cudd/ Duggal (2000)	**+/-***	S [Total Assets, 3Yr average]					n/a	(L)[435]; -1.3123*, +0.0501, -+0.1132

[432] This study uses three samples: Hostile takeovers, friendly takeovers, and a sample of both.

[433] Data refers to 1 to 3 years prior to takeover.

[434] A logit analysis was performed but the significance level of coefficients was not indicated; therefore, the coefficients are not listed in this table, Zanakis/Zopounidis (1997), p. 685.

[435] Coefficients are displayed for the unadjusted model, the model adjusted for industry distributional characteristics, and the model adjusted for both industry distributional characteristics and a twelve-month industry disturbance, Cudd/Duggal (2000), p. 113.

Other Measures for Short-term Liquidity	Obs. Relation	Cash & Equivalents (scaled by Size[Market Value of Equity; Sales; Total Assets], see below)	Net Liquid Assets (scaled by Size[Total Assets] , see below)	(Net) Current Assets (scaled by Size[Sales; Total Assets; Net Assets] , see below)	Quick Assets (scaled by Size[Sales; Total Assets]; Current Assets, see below)	Working Capital (scaled by Size[Sales; Number of Employees], see below)	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Sorensen (2000)	**+**	X [Total Assets]		X [Total Assets]	X [Current Assets]		Non-merging, Acquiring, Target-Groups: Cash / Total Assets: 0.1007, 0.097, 0.1117; Current Assets / Total Assets: 0.4719, 0.4634, 0.5046; Quick Assets / Current Assets: 0.7698, 0.7751, 0.7796	n/a
Doumpos/ Kosmidou/ Pasiouras (2004)	**n/a**					X [Employee]	T-Test[436]; Year1 not signif., Year2 not signif., Year3 not signif.	DA, n/a[437]
Powell (2004)	**-/-*/ -** -*** **	S [Total Assets]					n/a	(L);[438] ; -3.8441**, -1.3409**, -1.5729*; Ind.adj-Model:-0.3427**, -0.1371*, -0.1547*; Ind.&Econ.adj-Model:-0.4982, -0.2883, -0.3124***
Kumar/ Rajib (2007)	**-*** **	S [Total Assets]					Acquirer, Target: 0.105 > 0.069,***	(L), Non-Acquired Firms vs. Target: n/a
Bhabra (2008)	**+**/ -/ -***		X [n/a]				Acquiring firms, Competitors: Mean: 0.031 < 0.07,**; Median: 0.021 < 0.044,**; Competitors, Targets: Mean: 0.121 > 0.032, *; Median: 0.1 > 0.032, *	(L); −0.45

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 23: Other Short-term Liquidity Measures

436 This study does not present the tested means.
437 This study displays only the classification results, and not the findings of the regression models such as coefficients and related statistics.
438 This study uses three samples: Hostile takeovers, friendly takeovers, and a sample of both.

5.6 Leverage, Long-term Solvency and Debt Capacity Metrics

In addition to short-run liquidity, which refers to the firm's ability to finance its operating activities and meet current obligations, firms need to finance projects in the long-term. Funding generates liquidity, which permits investing in new profitable projects and thus generates higher earnings growth (after funding cost), so financial leverage gives the firm flexibility to enhance shareholders' returns.[439] However, higher leverage means higher cash outflows, which in turn increases the credit default risk[440] and may constrain the debt-capacity of the firm. Low leverage ratios suggest that a firm has capacity to assume more debt, for example, to finance further projects, all else equal.[441] Therefore, firms with low financial leverage could be attractive takeover targets.

However, the opposite association between leverage and acquisition likelihood is also plausible if leverage interacts with other firm characteristics. For example, when a firm seeking for growth acquires a financially restricted, highly levered firm, which has high-growth opportunities.[442] Or, if a high-levered firm becomes illiquid and is sold for a bargain price.

Long-term solvency risk ratios or debt ratios refer to a firm's capital structure and the firm's ability to generate enough cash to repay long-term debt as it matures.[443] The ratios most commonly used to gain insight in a firm's debt structure are solvency stock measures, such as the debt ratio, the debt-equity ratio, and the capitalization ratio, and solvency flow measures, such as the interest coverage ratio and the cash flow to debt ratio. Since the risk of credit default is highly linked to profitability, persistent earnings prospects are an important indicator in assessing the long-term solvency related risk.[444]

The information content of these ratios is, indeed, only as good as the underlying accounting data that is used for computation. Contingencies, such as unrecognized obligations from lawsuits, risk of recourse of receivables, derivative financial instruments that may heavily impact interest rates or exchange rates, and other

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439 Wahlen/Baginski/Bradshaw (2011), p. 370.

440 Penman (2010), pp. 704-705.

441 Gibson (2011), p. 265; Penman (2010), p. 703; Palepu/Healy/Bernard (2000), p. 655.

442 See section 4.2.2.2.2—Growth-Resource Mismatch.

443 Horngren/Harrison/Oliver (2012), p. 737; Wahlen/Baginski/Bradshaw (2011), p. 370; Gibson (2011), pp. 264-269; Penman (2010), p. 702; Brealey/Myers/Franklin (2008), pp. 793-795; Coenenberg/Haller/Schultze (2009), p. 1054; Revsine/Collins/Johnson (2005), pp. 237-239; Palepu/Healy/Bernard (2000), pp. 655, 658-661.

444 Wahlen/Baginski/Bradshaw (2011), pp. 370, 390.

unbalanced debt, such as leases or debt in special purpose entities, may significantly impact long-term solvency measures.[445]

5.6.1 Debt Ratio

The **debt ratio** measures the percentage of a firm's total debt (including short-term liabilities, reserves, deferred tax liabilities, non-controlling interests, redeemable preferred stock, and any other noncurrent liability; not including stockholder's equity)[446] compared to the firm's total assets. Therefore, the debt ratio indicates the firm's capital structure.[447] A lower ratio, ceteris paribus, suggests that a firm is less constrained by debt-holders; a higher ratio signals the company is more leveraged, has higher credit payment obligations, and, therefore, has a higher likelihood of financial distress. However, this measure is not indicative about the character of debt (i.e., whether it is short-term, long-term, current or non-current), and when it will mature. The debt ratio also includes operational liabilities such as accounts payable and taxes payable, which are necessary to fund day-to-day operations.[448] In addition, some components of debt, such as reserves, deferred taxes, non-controlling interests, and redeemable preferred stock, may never require repayment. Thus, many versions of the debt ratio are in financial research, whether academic or professional. The general debt ratio formula is as follows:[449]

Figure 27
Debt Ratio

$$\text{Debt Ratio} = \frac{\text{Total Liabilities}}{\text{Total Assets}}$$

Figure 27: Debt Ratio

445 Wahlen/Baginski/Bradshaw (2011), pp. 370, 390.
446 Gibson (2011), pp. 265.
447 Horngren/Harrison/Oliver (2012), pp. 214; 737; Wahlen/Baginski/Bradshaw (2011), p. 371; Gibson (2011), pp. 264-268; Penman (2010), p. 702; Brealey/Myers/Franklin (2008), pp. 793-794; Coenenberg/Haller/Schultze (2009), pp. 1055; Revsine/Collins/Johnson (2005), pp. 237-239.
448 Gibson (2011), p. 265.
449 Modifications of this ratio include a consideration of leases and other off-balance sheet obligations in the numerator that also generate a series of fixed payments, Brealey/Myers/Franklin (2008), pp. 793-794; Wahlen/Baginski/Bradshaw (2011), pp. 371, 493; Revsine/Collins/Johnson (2005), p. 238.

Consistent with the assumption that leverage is negatively related to the likelihood of becoming a takeover target, the MDA analyses of Stevens (1973), Singh (1975) ,and Belkaoui (1978), the logit analysis Hannan/Rhoades (1987), and the univariate tests of Melicher/Rush (1974) and Singh (1975) report statistically significant negative associations between the relative leverage of firms and their acquisition likelihood.[450] The early studies by Stevens (1973), Melicher/Rush (1974), Singh (1975), and Belkaoui (1978) applied discriminant analysis besides univariate tests and used data sets from the 1960s. Whereas Singh (1975) is a UK study, Stevens (1973), Melicher/Rush (1974) and Belkaoui (1978) analyze US-data. Hannan/Rhoades (1987) provide results based on US data from 1971 to 1982.

In contrast to these studies, Table 24 presents the findings of Wansley/Lane (1983), Wansley (1984), Bacon/Shin/Murphy (1992), Meador/Church/Rayburn (1996), and Kumar/Rajib (2007), all of which document a statistically significant positive relationship.[451] However, Wansley/Lane (1983) and Wansley (1984) use less interpretative linear discriminant analysis for US firms in 1975 and 1976, and Bacon/Shin/Murphy (1992) present their US-findings on the debt ratio only for univariate analysis, Meador/Church/Rayburn (1996) use data from the 1980s, but present findings only if long-term debt is considered, and Kumar/Rajib (2007) apply their testings based solely on Indian data from 1993 to 2004.

In total, the evidence from multivariate takeover prediction studies tends to support the assumption that leverage and takeover likelihood are negatively associated. However, there is some indication that the direction of this relationship in certain situation varies, suggesting that the relationship between leverage and takeover likelihood can be negative or positive.

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450 Stevens (1973), pp. 149-158; Stevens (1973), pp. 149-158; Singh (1975), pp. 497-515; Singh (1975), pp. 497-515; Hannan/Rhoades (1987), pp. 67-74.

451 Wansley/Lane (1983), pp. 87-98; Wansley (1984), pp. 76-85; Wansley (1984), pp. 76-85; Meador/Church/Rayburn (1996), pp. 11-23; Kumar/Rajib (2007), pp. 27-44.

Table 24
Debt Ratio

Debt Ratio	Obs. Relation	Book Value Long-term Debt / Total Assets	Book Value Total Debt / Total Assets	Book Value Total Debt / Total Assets (2 Years)	Book Value Total Debt / Total Assets (3 Years)	Book Value Equity / Total Assets	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Stevens (1973)	+*/ -*	X /S	X				Long-Term Liabilities / Total Assets: Non-Acquired Acquired 22.31 > 13.77*	Factor Analysis; MDA: Long-Term Liabilities / Total Assets +0.111**, rank 1
Melicher/ Rush (1974)	-*		S				C: Acquirer, Acquired:[452] Total Debt/TA: 0.463 > 0.314, * Total Leverage//TA: 0.564 > 0.357, * N-C: Acquirer, Acquired:: Total Debt/TA: 0.363, 0.299, * Total Leverage//TA: 0.431, 0.354, *	n/a
Singh (1975)	-/-*	X		S	X		Acquiring, Acquired: 22.78 > 17.72 Gearing, expressed as long-term liabilities, plus preference capital, as a percentage of total capital and reserves, plus long-term liabilities:	MDA*, -0.5
Belkaoui (1978)	+**/ -/-**/ -***	S					n/a	MDA for Year 1, 2***, 3**, 4**, 5**, before takeover with the following values for LT Debt+Preferred/Total Assets: -0.00317, -0.0189, +0.11576, -0.01842, -0.02801
Harris/ Stewart/ Guilkey/ Carleton (1982)	-		X				Non-acquired, Acquired Firms in 1974-1975: 0.993 > 0.968; 1975-1976: 0.985, 0.918	(P); Fixed & Random Coef. Probit, 1976-1977: -0.165, -0.209
Wansley/ Lane (1983), Wansley (1984)	+**	S					n/a	Factor Analysis; LDA: Long-term debt to total assets** with Rank 3, 4, 2, 4, 5, 4, merged firm mean + 0.151, non-merged firm mean + 0.220
Dietrich/ Sorensen (1984)	-	X					n/a	-3.37
Hannan/ Rhoades (1987)	-/-*/ -**		X			S	n/a	(L)[453], Debt/TA-Ratio:[454] -0.40, -0.42, -0.40, -0.42, -0.60, -0.80, -0.60, -0.80 Equity/TA-Ratio:[455] -22.05, -29.46* - 22.00**, -30.07*, -21.82**, -26.34*, -21 .19**, -26.55*

452 C: Conglomerate firm acquisitions; N-C: Non-conglomerate firm acquisitions.

453 Each first coefficient refers to acquisitions from inside of the target firm's market and, each second coefficient refers to acquisitions from outside of the target firm's market, Hannan/Rhoades (1987), p. 68.

454 Refers to Bank's loan-to-asset ratio during the year priot to the merger.

455 Refers to Bank capital-asset ratio during the year priot to the merger.

Debt Ratio	Obs. Relation	Book Value Long-term Debt / Total Assets	Book Value Total Debt / Total Assets	Book Value Total Debt / Total Assets (2 Years)	Book Value Total Debt / Total Assets (3 Years)	Book Value Equity / Total Assets	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Bacon/ Shin/ Murphy (1992)	+*	S					Non-merged < Merged, (+)*	Not measured.
Walter (1994)	+/-		X				n/a	Hist.-Cost, Curr.-Cost-Model: +1.012, -0.278
Meador/ Church/ Rayburn (1996)	+/ +**/-	S/ X					n/a	All, Horizontal, Vertical Mergers: Long-term Dbt / TA: +9.857**; +20.367**; +4.760 Total Liabilities / Total Assets: -3.933, -7.523, +0.602
Zanakis/ Zopouni-dis (1997)	+/-		X			X	Non-Acquired, Acquired: [456] Debt / TA Year -1: 0.74 > 0.6; Year -2: 0.69 > 0.68; Year -3: 0.71 < 0.73; Net Worth / Total Assets : Year -1: 0.24 < 0.29; Year -2: 0.29 > 0.28; Year -3: 0.27 > 0.25	DA, n/a[457]
Barnes (1998), (1999), (2000)	+/-	X					n/a	(L), +0.2307, -0.1908
Sorensen (2000)	+		X				Nonmerging, Acquiring, Target-Groups: 0.1889, 0.1797, 0.1961	n/a
Doumpos/ Kosmidou/ Pasiouras (2004)	n/a					S	T-Test[458]; Year1*, Year2*, Year3*	DA, n/a[459]
Kumar/ Rajib (2007)	+/+*/ +***	S	S				Acquirer, Target: LT/TA: 0.203 < 0.306; TDbt/TA: 0.32 < 0.44,* ;	(L); Non-Acquired Firms vs. Target: LT/TA: +0.34, +0.478***, +1.16***; TDbt/TA: not measured.

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 24: Debt Ratio

456 Data refers to 1 to 3 years prior to takeover.

457 A logit analysis was performed but the significance level of coefficients was not indicated; therefore, the coefficients are not listed in this table, Zanakis/Zopounidis (1997), p. 685.

458 This study does not present the tested means.

459 This study displays only the classification results, and not the findings of the regression models such as coefficients and related statistics.

5.6.2 Debt-Equity Ratio

The **debt-equity** ratio is also an indicator for the leverage of a firm. It computes the relationship between a firm's total liabilities and its total shareholders' equity. A ratio higher than 1.0 means that the firm is financing its assets with more debt than equity.[460] Thus, all else equal, the higher the debt-equity ratio, the higher the financial risk the firm is facing.[461]

Figure 28
Debt-Equity Ratio

$$\text{Debt-Equity Ratio} = \frac{\text{Total Liabilities}}{\text{Shareholders' Equity}}$$

Figure 28: Debt-Equity Ratio

Takeover studies by Palepu (1982), (1986), Davis/Stout (1992), Meador/Church/Rayburn (1996), and Cudd/Duggal (2000) use logit analysis and provide evidence on US-data from 1971 to 1991. These studies suggest there is a strong, statistically significant negative relationship between leverage, as measured by the debt-to-equity ratio, and acquisition likelihood. These findings are consistent with the hypothesized association.[462] Palepu (1982) and (1986) and Cudd/Duggal (2000) included additionally a growth-resource-mismatch in their studies.

However, not all studies have found results to support the hypothesized association between leverage and takeover likelihood. Powell (2004) finds that the relationship between leverage and acquisition likelihood can be either positive or negative depending on the use of economy-weighted values of the debt-equity ratio. This study uses UK-data from 1986 to 1995. Meanwhile, studies by Trahan/Shawky (1992), Trahan (1993), Chen/Su (1997), Powell (1997), and Bhabra (2008) document a statistically significant positive relationship between debt-to-equity and takeover

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460 Horngren/Harrison/Oliver (2012), p. 738; Wahlen/Baginski/Bradshaw (2011), p. 371; Gibson (2011), p. 268; Penman (2010), p. 702; Brealey/Myers/Franklin (2008), pp. 793-794; Coenenberg/Haller/Schultze (2009), pp. 1055.

461 Modifications of this ratio include a consideration of leases and other off-balance sheet obligations in the numerator that also generate a series of fixed payments, Brealey/Myers/Franklin (2008), pp. 793-794; Wahlen/Baginski/Bradshaw (2011), pp. 371, 493.

462 Palepu (1982); Palepu (1986), pp. 3-35; Davis/Stout (1992), pp. 605-633; Meador/Church/Rayburn (1996), pp. 11-23; Cudd/Duggal (2000), pp. 105-120.

activity based on logit regressions;[463] even after controlling for a growth-resource-mismatch. Powell (1997) uses a large sample of UK firms form the eighties and beginning of the nineties. Chen/Su (1997) base their findings on an international sample from the 1980s, and Trahan/Shawky (1992) and Trahan (1993) use a US-dataset from 1984 to 1986. Additionally, as displayed in Table 25, the majority of the statistically significant univariate results suggest a positive association.

Thus, findings on leverage are mixed. Although debt-to-equity is significant in several studies, the direction of its impact is rather ambiguous.

[463] Trahan/Shawky (1992), pp. 81-94; Trahan (1993), pp. 21-35; Chen/Su (1997), pp. 71-82; Powell (1997), pp. 1009-1030; Bhabra (2008), pp. 158-175.

Table 25

Debt-Equity Ratio

Debt-to-Equity Ratio	Obs. Relation	Book Value Long-term Debt / Book Value of Equity	Book Value Long-term Debt / Market Value of Equity	Book Value Liabilities / (Book Value of Equity + Replacement Cost)	Market Value Long-term Debt / Market Value of Equity	Market Value Total Liabilities / Market Value of Equity	Book Value Liabilities / Book Value of Equity	Book Value Liabilities / Book Value of Equity (3 Years)	Book Value Equity / Book Value of Long-term Debt	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Stevens (1973)	n/a	X	X							n/a	Factor Analysis
Palepu (1982), (1986)	-**	S								n/a	-0.0035**, -0.0034**
Wansley/ Lane (1983), Wansley (1984)	n/a	X								n/a	Factor Analysis; LDA: n/a
Hasbrouck (1985)	+/+***/-				S	S				Non-Target, Target in Size-matched sample: LtDbt./MVEQ: 0.535 < 0.722, *** TotalDbt/MVEQ: 1.045 < 1.331 *** Industry-matched sample: LtDbt./MVEQ: 0.560 < 0.722 TotalDbt/MVEQ: 1.052 < 1.331, ***	Size-matched sample: LtDbt./MVEQ: +0.126 TotalDbt/MVEQ mot measured. Industry-matched sample: LtDbt./MVEQ: -0.011, TotalDbt/EQ mot measured.
Bartley/ Boardman (1986)	+***/ -/-***			X			X			Non-Target, Target:[464] HC: 1.21 > 1.10, RC: 0.74 > 0.68	Stepwise MDA: HC : +0.64, +0.66, +0.48*** RC: -0.61***
Bartley/ Boardman (1990)	n/a		S				S			n/a	Stepwise MDA*, coefficients n/a.

[464] HC: Historical cost measure, RC: Replacement cost measure.

Debt-to-Equity Ratio	Obs. Rel-ation	Book Value Long-term Debt / Book Value of Equity	Book Value Long-term Debt / Market Value of Equity	Book Value Liabilities / (Book Value of Equity + Replacement Cost)	Market Value Long-term Debt / Market Value of Equity	Market Value Total Liabilities / Market Value of Equity	Book Value Liabilities / Book Value of Equity	Book Value Liabilities / Book Value of Equity (3 Years)	Book Value Equity / Book Value of Long-term Debt	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Ambrose/ Megginson (1992)	+	X								Non-Target, Target: 0.502 < 1.269	Not included in the Logit Models.
Davis/ Stout (1992)	-*/-** /-***		S							n/a	1980-1990:[465] -0.828*, -0.915*, -0.850*, -0.910**, -0.907**, -0.960**, -0.976**, -0.896***; 1983-1990: -0.747**, -0.796**, -0.939**, -1.049**
Trahan/ Shawky (1992), Trahan (1993)	+/+***/-						S			n/a	Here:[466] Acquirer (0) vs. Non acquiring firms (1) in Food, Chem, Petro, ElectrMach, Trans, All: +0.01, +1.84***, -0.49, +0.01, +0.06, -0.03
Meador/ Church/ Rayburn (1996)	-/-**/ -***	X	S							n/a	All, Horizontal, Vertical Mergers: Long-term Dbt / Net Stockholder's Equity: -0.461, -1.116, -0.416 Long-term Dbt / Net Market Value of Equity: -0.928***, -1.711**, -0.402
Chen/ Su (1997)	+/+***						S			n/a	(L)[467] ; +0.083, +0.143, +0.008, +0.198***
Powell (1997)	+/+*/ +**/-						S			n/a	(L);[468] ; 1984-1991: -1.071, +1.238**, +0.782; Ind.adj: -0.635, +1.443**, +1.012; Ind.&Econ.adj: -0.503, +0.453, +0.167; 1984-1987: -2.107; -0.276, -0.693; Ind.adj: -2.344, -0.351, -0.793; Ind.&Econ.adj: +2.195, -0.264, +0.069; 1988-1991:-0.857, +1.930*, +1.438*; Ind.adj: +0.081, +2.340*,

[465] For each period, the coefficients refer to: All bids, all successful bids, hostile bids, successful hostile.

[466] The original study analyzed acquirer = 1 and non-acquiring firm = 0. For purpose of comparison in this meta-analysis, the signs of the coefficients have been transformed to acquirer = 0 and non-acquiring firm = 1.

[467] This study analyzes differences between foreign and US-acquisitions. The first two coefficients refer to foreign acquisitions, 1 and 2 years prior to the announcement date; coefficients 3 and 4 refer to US-acquisitions, 1 and 2 years prior to the announcement date.

[468] This study uses three samples: Hostile takeovers, friendly takeovers, and a sample of both.

Debt-to-Equity Ratio	Obs. Rel-ation	Book Value Long-term Debt / Book Value of Equity	Book Value Long-term Debt / Market Value of Equity	Book Value Liabilities / (Book Value of Equity + Replacement Cost)	Market Value Long-term Debt / Market Value of Equity	Market Value Total Liabilities / Market Value of Equity	Book Value Liabilities / Book Value of Equity	Book Value Liabilities / Book Value of Equity (3 Years)	Book Value Equity / Book Value of Long-term Debt	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
											+1.913*; Ind.&Econ.adj: -0.211, +1.208, +0.777
Barnes (1998), (1999), (2000)	+	X								n/a	(L), +1.7175, +1.7227
Cudd/ Duggal (2000)	-/-**							S		n/a	(L)[469]; -0.0009**, -0.0316, -0.0258
Doumpos/ Kosmidou/ Pasiouras (2004)	n/a						S		S	T-Test[470] Gearing: Year1*, Year2*, Year3*; Shareholder's Fund / Long-term Liabilities: Year1**, Year2 not signif., Year3**	DA, n/a[471]
Powell (2004)	+/+*/-**						S			n/a	(L);[472] ; -0.9177, +0.7123, +0.4819; Ind.adj-Model:+0.1517, +0.1551*, +0.1510*; Ind.&Econ.adj-Model:-0.4140, -0.3932**, -0.4007**
Tsagkanos/ Georgopoulos/ Siriopoulos (2006)	+/-						X			n/a	(L): Binary Logit, Conditional Logit; -0.1367, +0.00006913
Kumar/ Rajib (2007)	+/-/-*		X				S			Acquirer, Target: LT/MV: 1.25 < 3.424; DER: 1.5 > 1.086,*	(L); Non-Acquired Firms vs. Target: LT/MV: -0.027; DER: -0.003, -0.0036

469 Coefficients are displayed for the unadjusted model, the model adjusted for industry distributional characteristics, and the model adjusted for both industry distributional characteristics and a twelve-month industry disturbance, Cudd/Duggal (2000), p. 113.

470 This study does not present the tested means.

471 This study displays only the classification results, and not the findings of the regression models such as coefficients and related statistics.

472 This study uses three samples: Hostile takeovers, friendly takeovers, and a sample of both.

Debt-to-Equity Ratio	Obs. Rel-ation	Book Value Long-term Debt / Book Value of Equity	Book Value Long-term Debt / Market Value of Equity	Book Value Liabilities / (Book Value of Equity + Replacement Cost)	Market Value Long-term Debt / Market Value of Equity	Market Value Total Liabilities / Market Value of Equity	Book Value Liabilities / Book Value of Equity	Book Value Liabilities / Book Value of Equity (3 Years)	Book Value Equity / Book Value of Long-term Debt	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Bhabra (2008)	+/+**/ +*/-		S							Acquiring firms, Competitors: Mean: 0.54 < 0.74,**; Median: 0.34 < 0.49,*; Competitors, Targets: Mean: 0.38, 0.38; Median: 0.34 > 0.31	(L); +3.99**, +1.09, +2.15
Tsagkanos/ Georgopoulos/ Siriopoulos/ Koumanakos (2008)	+/-						X			n/a	(L): Classical MLE, Bootstrap MLE of Logit; -0.051, +0.0717

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 25: Debt-Equity Ratio

5.6.3 Further Solvency Stock Measures

The capitalization ratio (also known as the long-term debt ratio) focuses on the capital base rather than on current financing. It compares the long-term debt to total capitalization, where total capitalization consists of long-term debt, preferred stock, and common stockholders' equity.[473] The capitalization ratio is calculated as follows:

Figure 29
Capitalization Ratio

$$\text{Capitalization Ratio} = \frac{\text{Long-term Debt}}{\text{Long-term debt + Shareholders' Equity}}$$

Figure 29: Capitalization Ratio

However, even though this ratio may be a good indicator of long-term leverage, it has so far never been used as indicator for takeover likelihood.

The fixed asset to equity ratio and the current debt to net worth ratio measure the ratio between shareholders' equity and fixed assets[474] or current liabilities, [475] respectively. The higher the ratios are, the greater the risk of financial distress.

Figure 30
Fixed Assets to Equity Ratio

$$\text{Fixed Assets to Equity Ratio} = \frac{\text{Fixed Assets}}{\text{Shareholders' Equity}}$$

Figure 30: Fixed Assets to Equity Ratio

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473 Wahlen/Baginski/Bradshaw (2011), pp. 371-372; Gibson (2011), p. 269; Penman (2010), p. 317;

474 Conservative modifications of the fixed assets to equity ratio subtract intangibles from shareholders' equity to obtain tangible net worth, Gibson (2011), p. 269.

475 Gibson (2011), p. 269.

Figure 31
Current Liabilities to Equity Ratio

$$\text{Current Liabilities to Equity Ratio} = \frac{\text{Current Liabilities}}{\text{Shareholders' Equity}}$$

Figure 31: Current Liabilities to Equity Ratio

No study thus far has used these solvency stock measures for empirical evaluation of acquisition likelihood.

5.6.4 Interest Coverage Ratio

As debt financing assumes that management can earn more on borrowed funds than it pays for interest on these funds (effect of tax shields), several ratios, so called solvency flow measures, consider the relation between a firm's earnings, interest expenses, and the weighted average cost of capital. Therefore, these ratios may be used as indicators for the relation between profitability and credit risk.[476]

The interest coverage ratio (or times interest earned ratio) is used to assess the ability of a firm to pay interest expenses[477] on outstanding debt; it can be considered a margin of safety provided by operations to serve debt, and, therefore, indicates the degree of risk associated with the debt policy of the firm.[478] The ratio divides earnings before interest and taxes (EBIT) by the company's interest expenses during the same period. The lower the ratio, the less the company's interest expenses are covered by its earnings. As a broad rule of thumb, it is considered that if a firm's interest coverage ratio falls below 2,[479] its credit risk will increase. The higher the coverage ratio the better the firm's ability to meet its obligations; an interest coverage ratio greater than 4 or 5 indicates additional debt capacity. [480]

476 Penman (2010), pp. 702-703.
477 Modifications sometimes add operating leases, payments to pensions and/or capitalized interests to compute the interest coverage ratio; Wahlen/Baginski/Bradshaw (2011), p. 373, 379; sometimes also calculated as the "fixed charge coverage" ratio; Gibson (2011), pp. 262-263.
478 Horngren/Harrison/Oliver (2012), pp. 738-739; Wahlen/Baginski/Bradshaw (2011), pp. 373, 379; Gibson (2011), pp. 261-262; Penman (2010), pp. 702-703; Palepu/Healy/Bernard (2000), p. 333.
479 Wahlen/Baginski/Bradshaw (2011), p. 379.
480 Wahlen/Baginski/Bradshaw (2011), p. 379.

Figure 32
Interest Coverage Ratio

$$\text{Interest Coverage Ratio} = \frac{\text{EBIT}}{\text{Interest Expenses}}$$

Figure 32: Interest Coverage Ratio

The interest coverage ratio together with the capitalization ratio (or one of the other previously mentioned leverage ratios) should serve as a good indicator for the riskiness of debt-financing. For example, a company with a relatively high leverage ratio is considered to have a healthy capital structure if the interest coverage ratio is also high. As noted above, a high interest coverage ratio indicates substantial additional debt capacity. On the other hand, an investment is risky when the firm has both high leverage and a relatively low interest coverage ratio.

Because interest coverage measures debt capacity rather than leverage, most empirical studies on acquisition likelihood expect to find a positive relationship between the interest coverage ratio and takeover likelihood. Such a finding would be consistent with the leverage hypothesis because firms with high interest coverage are expected to be attractive takeover targets.

As predicted, literature has generally found the positive relationship predicted by the leverage hypothesis. Whereas the results of univariate tests are mixed, the statistically superior logit regression as executed in the studies of Bacon/Shin/Murphy (1992) report a significant positive relationship, which supports the hypothesis that firms with higher debt capacity are more likely to become acquisition targets.[481]

A major critique of the interest coverage ratio is that it considers earnings measures rather than cash flow measures when assessing long-term solvency. As debt obligations are settled in cash and not in earnings, a common variant of the interest coverage ratio is to use cash flow from operations plus interest payments and income taxes in the numerator and cash payments for interest in the denominator.[482] Hence, the cash flow based interest coverage ratio is informative about a firm's ability to pay interest from earnings that are already converted to cash. The ratio is calculated as follows:

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481 Bacon/Shin/Murphy (1992), p. 8.
482 Wahlen/Baginski/Bradshaw (2011), p. 379; Gibson (2011), p. 263; Palepu/Healy/Bernard (2000), p. 333.

Figure 33
Cash Flow-based Interest Coverage Ratio

$$\text{Interest Coverage Ratio based on Cash Flows} = \frac{\text{Operating Cash Flow + Interest and Income Tax Payments}}{\text{Payments for Interests}}$$

Figure 33: Cash Flow-based Interest Coverage Ratio

The cash-flow measure is applied in the study of Sorensen (2000). However, the results of the univariate tests document an unexpected statistically significant negative relationship.[483]

Table 26
Interest Coverage Ratios

Interest Coverage Ratio	Obs. Relation	EBIT / Interest Expenses	EBIT / Interest Payments	(EBIT – Tax) / Interest Expenses	Cash Flow / Interest Expenses	(Interests + Preferred Dividens) / (EBIT + Minority Interests)	Interest Expenses / Earnings	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Dietrich/ Sorensen (1984)	-	X						n/a	-1.38
Bartley/ Boardman (1990)	n/a					S		n/a	Stepwise MDA*, coefficients n/a.
Bacon/ Shin/ Murphy (1992)	+*/ +***/ -*			S			S	Net income plus interest expense / interest expense: Non-merged > Merged Firms, (-)*; Long-term debt interest / total revenue: Non-merged < Merged, (+)*	(+)*** Net income plus interest expense / interest expense; Not measured for Long-term debt interest / total revenue
Trahan/ Shawky (1992), Trahan (1993)	+/ +***/ -/-***						S	n/a	Here:[484] Acquirer (0) vs. Non acquiring firms (1) in Food, Chem, Petro, ElectrMach, Trans, All: -1.09, -3.60, +7.58***, +0.53, -3.26***, +0.0037

[483] Sorensen (2000), pp. 423-433.

[484] The original study analyzed acquirer = 1 and non-acquiring firm = 0. For purpose of comparison in this meta-analysis, the signs of the coefficients have been transformed to acquirer = 0 and non-acquiring firm = 1.

Interest Coverage Ratio	Obs. Relation	EBIT / Interest Expenses	EBIT / Interest Payments	(EBIT – Tax) / Interest Expenses	Cash Flow / Interest Expenses	(Interests + Preferred Dividens) / (EBIT + Minority Interests)	Interest Expenses / Earnings	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Barnes (1998), (1999), (2000)	+/-		X					n/a	(L), +0.4221, -0.07316
Sorensen (2000)	+**/ -**	S			S			Nonmerging, Acquiring, Target-Groups: EBIT / Int.: 3.9488, 9.011, 4.2179,** Cash Flow / Int. 5.6024, 10.2957, 5.3843,**	n/a
Kumar/ Rajib (2007)	+/-*	S						Acquirer, Target: 8.09 > 6.07,*	(L), Non-Acquired Firms vs. Target: +0.0008, +0.00022

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 26: Interest Coverage Ratios

5.6.5 Further Solvency Flow Measures

The cash flow to debt ratio indicates a company's ability to pay its debt obligations with cash from operations.[485] This ratio provides the operating cash flow to total debt. The higher this ratio, the greater the likelihood that the firm will be able to meet its debt obligations on time.[486]

Figure 34
Cash Flow to Debt Ratio

$$\text{Cash Flow to Debt Ratio} = \frac{\text{Operating Cash Flow}}{\text{Total Debt}}$$

Figure 34: Cash Flow to Debt Ratio

Despite the solvency information provided by this ratio, it has not been considered in empirical takeover studies so far.

485 Wahlen/Baginski/Bradshaw (2011), pp. 373-374; Penman (2010), p. 702.

486 The more conservative approach calculates the cash flow ratio on the basis of free cash flow (operating cash flow less capital expenditure).

A further ratio that measures the likelihood that a company will meet its debt obligations is the solvency ratio.[487] Instead of operating cash flow, it considers earnings. A popular way to calculate this ratio is to divide net income after tax by total debt. A smaller solvency ratio may indicate a higher risk of default on a company's debt obligations. So far, there is little evidence on this ratio in takeover studies (Table 27).

Figure 35
Solvency Ratio

$$\text{Solvency Ratio} = \frac{\text{Net income (after Tax)}}{\text{Total Debt}}$$

Figure 35: Solvency Ratio

Table 27
Solvency Ratio

Solvency Ratio	**Obs. Relation**	**Solvency Ratio**	**Univariate Comparison**	**Logit (L) - / Probit (P) - Coefficients** (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Kumar/Rajib (2007)	+/-/-*	S	Acquirer, Target: 3.18 > 3.11,*	(L); Non-Acquired Firms vs. Target: +0.02, -0.012

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 27: Solvency Ratio

5.6.6 Other Measures related to Leverage

Other measures related to leverage provide only limited information on the impact of leverage in acquisition likelihood. Univariate tests of Zanakis/Zopounidis (1997) report a significant negative relationship between acquisition likelihood and uncommon measures of leverage such as (long term debt + current liabilities)/working capital, or long term (debt + current liabilities) / cash flow. Their sample consists of 350 announced acquisitions and mergers of Greek firms between 1983 and 1990. The other studies presented in Table 28 use alternate ratios such as current liabilities to

487 See Coenenberg/Haller/Schultze (2009), pp. 1147-1156.

total debt or short-term liabilities to total assets, and did not document any significant association.

Table 28

Other Long-term Solvency Ratios

Other Long-term Solvency Ratios	Obs. Rel-ation	Current Liabilities / Total Debt	Debt / Current Assets	(EBT + Depreciation) / Capital Expenditure	Interest / (Cash + Marketable Securities)	Short-term Liabilities / Total assets	(Long-term Debt + Current Liabilities) / Working Capital	(Long-term Debt + Current liabilities)/ Cash Flow	Long-term Debt	Net Worth / (Net Worth + Long-term Debt)	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Stevens (1973)	n/a				X						n/a	Factor Analysis
Harris/ Stewart/ Guilkey/ Carleton (1982)	+/-			X							Non-acquired, Acquired Firms in 1974-1975: 2.47 < 4.50; 1975-1976: 2.49 > 2.25	(P) 1976-1977: -0.032, -0.047
Wansley/ Lane (1983), Wansley (1984)	n/a					X					n/a	Factor Analysis; LDA: n/a
Zanakis/ Zopounidis (1997)	+/ -/ -***						S	S		X	Acquired, Non-Acquired: [488] (Long-term Debt + Current Liabilities)/Working Capital: Year -1: 8.3 > -8.45; Year -2: 0.34 < 0.41; Year -3: 34.88 >-2.62 ;*** (Long-term Debt + Current Liabilities)/ Cash Flow: Year -1: 8.22 > 34.88; Year -2: 22 < 10.77; Year -3: 57.02 >22.86, ***; Net Worth/ (Net Worth + Long-term Debt): Year -1: 0.73 > 0.71; Year -2: 0.79 < 0.8; Year -3: 0.77 > 0.7	DA, n/a[489]
Sorensen (2000)	+/-	S	X								Non-merging, Acquiring, Target-Groups: Current Liabilities / Total Debt: 0.6545, 0.6463, 0.6611; Debt / Current Assets 1.0732, 0.8188, 0.9621	(L)** for Current Liabilities / Total Debt, Coef. n/a

488 Data refers to 1 to 3 years prior to takeover.

489 A logit analysis was performed but the significance level of coefficients was not indicated; therefore, the coefficients are not listed in this table, Zanakis/Zopounidis (1997), p. 685.

Other Long-term Solvency Ratios	Obs. Rel-ation	Current Liabilities / Total Debt	Debt / Current Assets	(EBT + Depreciation) / Capital Expenditure	Interest / (Cash + Marketable Securities)	Short-term Liabilities / Total assets	(Long-term Debt + Current Liabilities) / Working Capital	(Long-term Debt + Current liabilities)/ Cash Flow	Long-term Debt	Net Worth / (Net Worth + Long-term Debt)	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Kumar/ Rajib (2007)	-								X		Acquirer, Target: 473.33 > 385.25	n/a

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 28: Other Long-term Solvency Ratios

5.6.7 Interim Summary—Leverage Measures

Overall, the relative solvency characteristics of acquiring, non-acquired firms and target firms based on long-term solvency ratios such as the debt-to-assets ratio and the debt-to-equity ratio serve as strong indicators for acquisition likelihood.

Studies using logit analysis, which is considered superior to other statistical techniques when interaction between the firm characteristics is expected, report a statistically significant negative relationship between the debt-to-assets ratio and acquisition likelihood. This result is consistent with the prevalent expectations in financial literature.

However, there are also studies that report conflicting results on this association. To some extent, these results are based on univariate analysis. Since univariate tests focus only on one feature as determinant, interactions with other variables are ignored.

An explanation for the contrasting results is that leverage not only measures debt capacity, but is also reflective of agency problems. This would explain the positive relationship.[490]

It is also possible that other features of the target firm's debt capacity were not or just sparsely analyzed in empirical studies so far but need to be considered as well (e.g., the interest coverage and the firm's potential to repay debt). Ratios relating the firm's earnings and operating cash flow to debt related induced cash outflows are rarely considered.

Another explanation that has been previously suggested is that multicollinearity problems have been treated differently among these studies. For example, Stevens

490 See section 4.2.5—Agency Conflicts.

(1973), Harris/Stewart/Guilkey/Carleton (1982), Wansley/Lane (1983), Wansley (1984), Meador/Church/Rayburn (1996), Zanakis/Zopounidis (1997), Barnes (1998), (1999), (2000), Trahan/Shawky (1992), Trahan (1993) and Kumar/Rajib (2007) use at least two leverage measures simultaneously, notwithstanding further correlation with other ratios such as liquidity and profitability.

Thus, there is much to suggest a negative association, but the overall results are mixed.

5.7 Growth Measures

Section 4.2.2—Growth – Make or Buy analyzed the various motivations to acquire growing firms.[491] Several takeover studies assume that growing firms are potential acquisition candidates.

The firm's growth potential, is often measured using trend analysis.[492] Trend analysis expresses the change in certain financial statement items like sales, earnings, and assets, as well as the change in stock market data such as the market value of shares or the return on shareholders's investment. In order to obtain sustainable growth, extraordinary items are eliminated. The trend analysis is commonly performed on an annual basis or as the percentage change relative to a base year. However, there are some drawbacks. This form of analysis assumes, for example, that an observed past trend is sustainable and will continue in the future. Alternative measures are discussed in section 5.7.2—Investment .[493]

The following section analyzes the findings of premerger growth relations of acquiring, or non-targets, and takeover targets.

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491 See section 4.2.2—Growth – Make or Buy.
492 Penman (2010), pp. 314-315.
493 See section 5.7.2—Investment and Spending for Growth.

5.7.1 Common Growth Measures

Sales growth is commonly defined as the change in sales divided by the prior period's sales:[494]

Figure 36
Sales Growth

$$\text{Sales Growth} = \frac{\text{Change in Sales}}{\text{Prior Period's Sales}}$$

Figure 36: Sales Growth

In contrast to the commonly expected positive relationship, studies by Palepu (1982), (1986), Powell (1997), Cudd/Duggal (2000) and Bhabra (2008) document the opposite when using logit analysis. They provide statistically significant evidence that there is a negative relationship between growth and acquisition likelihood.

Only few studies, such as Meador/Church/Rayburn (1996) and Kumar/Rajib (2007) document a significant positive relationship between acquisition likelihood and the firms' 2-year sales growth. Trahan/Shawky (1992) and Trahan (1993) report both positive and negative findings on acquisition activity depending on industries.

Studies using other growth measures than sales growth find similar results. Their measures include total assets growth (Table 31), earnings growth (Table 30), net assets (Table 32), and market capitalization growth (Table 33). Using logit regressions Meador/Church/Rayburn (1996), Thompson (1997), and Davis/Stout (1992) report a significantly negative relationship between growth (measured by assets or employment) and acquisition likelihood. No study using logit regression has found a significantly positive relationship between these growth measures and acquisition likelihood. In sum, the impact of individual growth measures using past sales, assets or earnings development find a rather unexpected negative association towards acquisition likelihood. This could be explained by the growth-resource imbalance hypothesis, which suggests that also low-growth, but resource rich firms are attractive acquisition targets.[495] This would be consistent with the mixed findings of liquidity and leverage ratios described above. Another explanation may be that past

494 Penman (2010), p. 316.
495 See section 4.2.2.2.2—Growth-Resource Mismatch.

development does not necessarily predict future development, and alternative measures (e.g., market valuation ratios or investment policies) are more appropriate measures of expected or future growth. The latter is described in the subsequent section.

Table 29
Sales Growth Measures

Sales Growth	Obs. Relation	1-Year Sales Growth	2-Year Sales Growth	3-Year Sales Growth	5-Year Sales Growth	Sales Growth (time not further defined)	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Harris/ Stewart/ Guilkey/ Carleton (1982)	-/-***					S	Non-acquired, Acquired Firms in 1974-1975: 0.211 > 0.152, ***; 1975-1976: 0.124 > 0.109	(P) ; 1974-1975: -0.755, -8.28; Fixed & Random Coef. Probit, 1976-1977: -0.029, -0.035
Palepu (1982), (1986)	-**			S			n/a	-0.0245**, -0.0261**
Wansley/ Lane (1983), Wansley (1984)	+			S			n/a	Factor Analysis; LDA: Compound growth in net sales** with Rank 4, 3, 4, 3, 3, 3, 3, merged firm mean +0.147, non-merged firm mean +0.114
Bartley/ Boardman (1990)	n/a				S		n/a	Stepwise MDA*, coefficients n/a.
Ambrose/ Megginson (1992)	-			X			Non-target, Target: 10.890 > 9.710	-0.540, -0.516, -0.585
Trahan/ Shawky (1992) , Trahan (1993)	+/ +***/ -***		S				n/a	Here:[496] Acquirer (0) vs. Non acquiring firms (1) in Food, Chem, Petro, ElectrMach, Trans, All: +6.85***, -3.16***, +6.53, +0.66, +0.44, +0.07
Meador/ Church/ Rayburn (1996)	+/+***		S				n/a	All, Horizontal, Vertical Mergers: +0.000, +0.013***, +0.003

[496] The original study analyzed acquirer = 1 and non-acquiring firm = 0. For purpose of comparison in this meta-analysis, the signs of the coefficients have been transformed to acquirer = 0 and non-acquiring firm = 1.

Sales Growth	Obs. Relation	1-Year Sales Growth	2-Year Sales Growth	3-Year Sales Growth	5-Year Sales Growth	Sales Growth (time not further defined)	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Chen/ Su (1997)	+	X					n/a	(L)[497] ; +0.412, +0.137, -0.127, +0.048
Powell (1997)	+/-/ -**		S				n/a	(L);[498] ; 1984-1991: -0.194, +0.012, -0.054; Ind.adj: -0.086, +0.018, -0.033; Ind.&Econ.adj: -2.99*, -0.392, -0.93**; 1984-1987: -0.249; -0.428, -0.4; Ind.adj: -1.062, -0.644, -0.677; Ind.&Econ.adj: -3.209, -1.738, -2.077**; 1988-1991: -0.145, +0.060, -0.011; Ind.adj: -0.072, +0.013, -0.031; Ind.&Econ.adj: -3.152**, -0.327, -0.937
Barnes (1998), (1999), (2000)	+/-**		S	X			n/a	(L), 2-Year: -0.09404**, -0.01231** 3-Year: +0.001755, +0.001595
Cudd/ Duggal (2000)	-/-*			S			n/a	(L)[499]; -0.0204*, -0.1236, -0.1499
Sorensen (2000)	-				X		Non-merging, Acquiring, Target-Groups: 24.1916, 29.4699, 20.6894	n/a
Powell (2004)	+/ +**/ -		X				n/a	(L);[500] ; -0.0425, +0.0070, +0.0040; Ind.adj-Model:+0.0002, +0.0001, +0.0001; Ind.&Econ.adj-Model:+0.0113, +0.0766**, +0.0675**
Tsagkanos/ Georgo-poulos/ Siriopoulos (2006)	+/-					X	n/a	(L): Binary Logit, Conditional Logit; +0.01777, -0.00532592
Kumar/ Rajib (2007)	+**/ +* **/ -**		S				Acquirer, Target: 0.48 > 0.18,**	(L); Non-Acquired Firms vs. Target: +0.70**, +0.489***
Bhabra (2008)	+/ -/-*/ -**			S			Acquiring firms, Competitors: Mean: 0.145 < 0.20; Median: 0.115 > 0.13;	(L); −0.04**, −0.17**, −0.15**

497 This study analyzes differences between foreign and US-acquisitions. The first two coefficients refer to foreign acquisitions, 1 and 2 years prior to the announcement date; coefficients 3 and 4 refer to US-acquisitions, 1 and 2 years prior to the announcement date.

498 This study uses three samples: Hostile takeovers, friendly takeovers, and a sample of both.

499 Coefficients are displayed for the unadjusted model, the model adjusted for industry distributional characteristics, and the model adjusted for both industry distributional characteristics and a twelve-month industry disturbance, Cudd/Duggal (2000), p. 113.

500 This study uses three samples: Hostile takeovers, friendly takeovers, and a sample of both.

Sales Growth	Obs. Relation	1-Year Sales Growth	2-Year Sales Growth	3-Year Sales Growth	5-Year Sales Growth	Sales Growth (time not further defined)	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
							Competitors, Targets: Mean: 0.16 > 0.12, **; Median: 0.14 > 0.1, *	
Tsagkanos/ Georgopoulos/ Siriopoulos/ Koumanakos (2008)	-					X	n/a	(L): Classical MLE, Bootstrap MLE of Logit; -0.00195, -0.0053

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 29: Sales Growth Measures

Table 30

Earnings Growth Measures

Earnings Growth	Obs. Relation	1-Year EPS Growth	2-Year EPS Growth	5-Year EPS Growth	1-Year EBIT Growth	2-Year EBIT Growth	3-Year EBIT Growth	3-Year EBT Growth	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Melicher/ Rush (1974)	-/-***			S					C: Acquirer, Acquired:[501] EPS Regression Trend: 0.182 > 0.126, *** EPS Regression R2: 0.781 > 0.695, *** N-C: Acquirer, Acquired: EPS Regression Trend: 0.130 > 0.107 EPS Regression R2: 0.768 > 0.689, ***	n/a
Singh (1975)	+*/ -/-*				X	S	X		Acquiring, Acquired: 2-year avg. profitability: 13.83 > 12.07; 2-year perc. change in profitability: 0.23 > -4.2, *; 1&3year data not available.	MDA*, +5.0
Wansley/ Lane (1983),	n/a	X	X						n/a	Factor Analysis; LDA: n/a

[501] C: Conglomerate firm acquisitions; N-C: Non-conglomerate firm acquisitions.

Earnings Growth	Obs. Relation	1-Year EPS Growth	2-Year EPS Growth	5-Year EPS Growth	1-Year EBIT Growth	2-Year EBIT Growth	3-Year EBIT Growth	3-Year EBT Growth	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Wansley (1984)										
Bartley/ Boardman (1986)	n/a	X							Non-Target, Target:[502] 0.18, 0.18	Stepwise MDA, variable failed to enter
Meador/ Church/ Rayburn (1996)	+		X						n/a	All, Horizontal, Vertical Mergers: +0.155, +0.054, +0.232
Barnes (1998), (1999), (2000)	+							X	n/a	(L), +3.1925, +3.1840

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 30: Earnings Growth Measures

Table 31

Assets Growth Measures

Assets Growth	Obs. Relation	1-Year Assets Growth	2-Year Assets Growth	1-Year Fixed Assets Growth	1-Year Real Assets Growth	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Meador/ Church/ Rayburn (1996)	-/-***		S			n/a	All, Horizontal, Vertical Mergers: -0.002, -0.027***, -0.006
Chen/ Su (1997)	-/+	X				n/a	(L)[503] ; -0.511, +0.299, -0.115, -0.056
Thompson (1997)	+/- /-*				S	n/a	(L); 1 Year Prior -7.773*; 2-Year Prior -1.542; Only in deregulated sectors: + 2.137
Doumpos/ Kosmidou/	n/a			X		T-Test[504]; Year1 not signif., Year2 not signif., Year3 not signif.	DA, n/a[505]

502 HC: Historical cost measure, RC: Replacement cost measure.

503 This study analyzes differences between foreign and US-acquisitions. The first two coefficients refer to foreign acquisitions, 1 and 2 years prior to the announcement date; coefficients 3 and 4 refer to US-acquisitions, 1 and 2 years prior to the announcement date.

504 This study does not present the tested means.

Assets Growth	Obs. Relation	1-Year Assets Growth	2-Year Assets Growth	1-Year Fixed Assets Growth	1-Year Real Assets Growth	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Pasiouras (2004)							
Kumar/ Rajib (2007)	-**		S			Acquirer, Target: 0.308 > 0.25,**	(L); Non-Acquired Firms vs. Target: -0.18, -0.13

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 31: Assets Growth Measures

Table 32
Net Assets Growth Measures

Net Assets Growth	Obs. Relation	Net Assets Growth	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Singh (1975)	-/+*	S	Acquiring, Acquired: Growth: 142.92 > 127.93; measured by the growth of "net assets" over the last three years and expressed as an index, with t-3 = 100..	MDA*, +0.5
Wansley/ Lane (1983), Wansley (1984)		X	n/a	Factor Analysis; LDA: n/a

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 32: Net Assets Growth Measures

505 This study displays only the classification results, and not the findings of the regression models such as coefficients and related statistics.

Table 33
Market Capitalization Growth

Market Cap Growth	Obs. Relation	3 Year Percentage Change in Share Price	Growth in Market Deposits (3 Years)	Growth in the Bank's Deposits (3 Years)	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Wansley/ Lane (1983), Wansley (1984)	n/a	X			n/a	Factor Analysis; LDA: n/a

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 33: Market Capitalization Growth

Table 34
Other Growth Measures

Other Growth Measures	Obs. Relation	Employment Growth	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Davis/ Stout (1992)	-/-*/ -**/ -***	S	n/a	1980-1990:[506] -0.012**, -0.009, -0.011***, -0.006, -0.008, -0.008, -0.006, -0.004; 1983-1990: -0.011***, -0.010***, -0.005, -0.003

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 34: Other Growth Measures

5.7.2 Investment and Spending for Growth

The firm's growth potential is often analyzed using trend analysis.[507] A drawback of this type of analysis is that it assumes that the previous growth rate will continue in in the following years.

[506] For each period, the coefficients refer to: All bids, all successful bids, hostile bids, successful hostile.

[507] Trend analysis expresses the change of certain financial statement items like sales, earnings and assets, as well as the change of stock market data such as the market value of shares or the return on shareholder's investment. When executing a trend analysis, extraordinary items are usually eliminated. The trend analysis is commonly done on a year-to-year basis or as the percentage change relative to a basis year, Penman (2010), pp. 314-315.

Moreover, comprehensive and persistent future growth, which eventually leads to growth in stockholder returns, is difficult to identifiy by the trend of only one financial statement item. Future growth can be complex and dependent on the interaction of many different trends in firm characteristics. For example, if a firm with growing sales suffers with an even higher growth rate for cost of sales because the firm's profit margin is low, a trend showing strong sales growth may be meaningless. Similarly, a trend in asset growth would be misleading if total asset growth is financed by expensive debt that offsets earnings and creates an increased enterprise risk.

Hence, other potential indicators of firm growth potential should be considered. This section presents the findings of takeover studies that use growth indicators related to the investment policy and strategy, such as the percentage of capital expenditure, advertising expenditure, research & development expenditure (R&D), or dividend growth rates to measure the firm's growth potential. The findings of these studies are presented in Table 35. They do not clearly suggest that firms with a certain investment (or spending) strategy, which potentially could reflect future growth, are more likely to become takeover targets. Multivariate analysis in this context seldom finds statistically significant relationship between a certain spending strategy and acquisition likelihood that may allow for a valid conclusion. Certainly, more research is necessary on these future growth indicators.

Table 35

Future Growth-related Measures

Future Growth-related Measures	**Obs. Rel-ation**	**Capital Expenditure (scaled by Size[Total Assets])**	**Advertising Expenditure (scaled by Size[Sales])**	**R&D Expenditure (scaled by Size[Sales])**	**Export Percentage (scaled by Size[Sales])**	**Overhead Expense (scaled by Size[Total Assets])**	**Remunerations (scaled by Size[Sales])**	**Dividends' Growth (3 Years)**	**Univariate Comparison**	**MDA-/ Logit-(L)/ Probit-(P) Coefficients** (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Dietrich/ Sorensen (1984)	-	X							n/a	-0.24
Bartley/ Boardman (1990)	n/a			S					n/a	Stepwise MDA*, coefficients n/a.

Future Growth-related Measures	Obs. Relation	Capital Expenditure (scaled by Size[Total Assets])	Advertising Expenditure (scaled by Size[Sales])	R&D Expenditure (scaled by Size[Sales])	Export Percentage (scaled by Size[Sales])	Overhead Expense (scaled by Size[Total Assets])	Remunerations (scaled by Size[Sales])	Dividends' Growth (3 Years)	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Bacon/ Shin/ Murphy (1992)	-***					S			Non-merged > Merged Firms, (-)***	(+)
Trahan/ Shawky (1992), Trahan (1993)	+/-	X							n/a	Here:[508] Acquirer (0) vs. Non acquiring firms (1) in Food, Chem, Petro, ElectrMach, Trans, All: -22.18, +6.07, +38.54, -8.90, +14.16, +1.04
Chen/ Su (1997)	-/-**			S					n/a	(L)[509] ; -17.418*, -25.525**, -3.799, -12.354**
Barnes (1998), (1999), (2000)	+**/-						X	X	n/a	(L), Remuneration / Sales: +0.01542**, +0.01536**; Dividend Growth: -0.04857, -0.01516
Tsagkanos/ Georgopoulos/ Siriopoulos (2006)	-				X				n/a	(L): Binary Logit, Conditional Logit; -0.02655, -0.02655
Kumar/ Rajib (2007)	+/ +**/ +***/ -*/ -**	S	S	S					Acquirer, Target: CAP/TA: 0.058 < 0.061,** ; ADV/SA: 0.0097 < .011,*** ; RD/SA: 0.032 >.004,*	(L); Non-Acquired Firms vs. Target: CAP/TA: +1.34, -1.45; ADV/SA: +11.62, +20.02*; RD/SA: -26.44**, -7.779
Tsagkanos/ Georgopoulos/ Siriopoulos/ Koumanakos (2008)	-				X				n/a	(L): Classical MLE, Bootstrap MLE of Logit; -0.01975, -0.052

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 35: Future Growth-related Measures

5.7.3 Interim Summary—Growth Measures

To conclude, few studies that apply individual growth measures report a statistically significant relationship between acquisition likelihood and firm growth in the expected direction. The predominant finding suggests a negative relationship. Additionally, the

[508] The original study analyzed acquirer = 1 and non-acquiring firm = 0. For purpose of comparison in this meta-analysis, the signs of the coefficients have been transformed to acquirer = 0 and non-acquiring firm = 1.

[509] This study analyzes differences between foreign and US-acquisitions. The first two coefficients refer to foreign acquisitions, 1 and 2 years prior to the announcement date; coefficients 3 and 4 refer to US-acquisitions, 1 and 2 years prior to the announcement date.

findings of studies that use alternative measures for future growth approximated by the spending or investment policy of a firm are weak. Therefore, and considering the mixed findings on liquidity and leverage, a priori, no specific impact of growth and acquisition likelihood can be assumed from empirical studies. As discussed in connection with growth-resource mismatches, a joint consideration of multiple factors seems appropriate and is analyzed in the next section.

5.8 Growth-Resource Mismatch Measures

Section 4.2.2.2.2—Growth-Resource Mismatch stressed that there are situations in which the joint consideration of resources and growth is necessary to make reasonable conclusions on acquisition likelihood.[510] This potentially explains the mixed findings with regard to liquidity and leverage described in section 5.5—Liquidity and 5.6—Leverage, Long-term Solvency and Debt Capacity.[511]

The predominant hypothesis towards this metric is that acquisition targets are more likely to have a mismatch between growth and financial resources (liquidity and leverage).

Five studies investigated the impact of a growth-resource imbalance using logit regression (Table 36). The findings of three of these studies are consistent with the GRMM hypothesis, reporting statistically significant positive results. The other two studies do not report significant associations. Palepu (1982) and (1986) successfully uses the average 3-year ratio of net liquid assets to total assets to measure liquidity, a book value based debt-to-equity ratio as measure for leverage, and the average three year sales trend as a growth metric. He uses US data from the 1970s. Ambrose/Megginson (1992) attempt to repeat Palepu's studies, using the same variables, but cannot find a significant relationship. However, their US-data for the period 1981 to 1986 also includes unsuccessful takeovers in the group of targets, whereas Palepu (1982), (1986) do not. Cudd/Duggal (2000), which uses a slightly different liquidity metric finds a significant relationship. In his study, unsuccessful bids are classified according to the methodology of Palepu (1982), (1986). Powell (1997) documents a positive, but not statistically significant, relationship, and uses UK data from 1984 to 1991. Bhabra (2008) supports the findings of prior studies by reporting a statistically positive association between GRMM and acquisition likelihood on more recent, international data. It is noteworthy that Bhabra (2008)

[510] See section 4.2.2.2.2—Growth-Resource Mismatch.
[511] Section 5.5—Liquidity; 5.6—Leverage, Long-term Solvency and Debt Capacity.

includes unsuccessful bids as target firms in his sample, which, as previously noted, is in contrast to Palepu (1982) and (1986).

On the whole, three of five studies have found a growth-resource imbalance to be a good indicator of takeover likelihood in a multivariate analysis. Hence, this variable may be also a useful indicator to differentiate acquirer and target firms in business combinations.

Table 36

Growth-Resource Mismatch Measures

GRMM Measures	Obs. Relation	GRMM	Liquidity Measure of GRMM	Leverage Measure of GRMM	Growth Measure of GRMM	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Palepu (1982), (1986)	+**/ +***	S	X (Net Liquid Assets / Total Assets, 3 Year Average)	S (Book Value of long-term Debt / Book Value of Equity)	S (3 Year Average Sales Growth)	n/a	+0.5467**, +0.4432***, +0.4616**, +0.4024***
Ambrose/ Megginson (1992)	-	X	X (Net Liquid Assets / Total Assets, 3 Year Average)	X (Book Value of long-term Debt / Book Value of Equity)	X (3 Year Average Sales Growth)	Non-Target, Target: 0.281 > 0.243	-0.072, -0.048, -0.098
Cudd/ Duggal (2000)	+*	S	S (Net Cash / Total Assets, 3 Year Average)	S (Book Value of Debt / Book Value of Equity, 3 Year Average)	S (3 Year Average Sales Growth)	n/a	(L)[512]: +0.5630*, +0.6534*, +0.6950*
Powell (2004)	+	S	S (Cash and Marketable Securities/ Total Assets, 3 Year Average)	S (Book Value of Debt / Book Value of Equity)	X (2 Year Average Sales Growth)	n/a	(L);[513] ; +0.2006, +0.2613, +0.2466; Ind.adj:+0.0424, +0.2458, +0.2125
Bhabra (2008)	+*/ +**/ +***	S	X (Net Liquid Assets / Total Assets, 3 Year Average)	S (Book Value of long-term Debt / Market Value of Equity)	S (3 Year Average Sales Growth)	n/a	(L); +2.27**, +2.85*, +2.24*, + 2.81*

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 36: Growth-Resource Mismatch Measures

5.9 Asset Structure

Section 4.3.2—Asset structure and Debt-Capacity described rationales for why asset structure potentially affects acquisition likelihood. It is assumed, that the proportion of tangible assets on the balance sheet influences the firms' attractiveness as acquisition

512 Coefficients are displayed for the unadjusted model, the model adjusted for industry distributional characteristics, and the model adjusted for both industry distributional characteristics and a twelve-month industry disturbance, Cudd/Duggal (2000), p. 113.

513 This study uses three samples: Hostile takeovers, friendly takeovers, and a sample of both.

target.[514] Asset structure is measured by tangible (or fixed assets) divided by total assets (Table 37).

Figure 37
Asset Structure

$$\text{Asset Structure} = \frac{\text{Tangible Assets}}{\text{Total Assets}}$$

Figure 37: Asset Structure

Consistent with the hypothesized relationship, Ambrose/Megginson (1992), Powell (1997) and (2004) and Bhabra (2008) report a statistically significant positive relationship between asset structure and acquisition likelihood in multivariate analysis (Table 37).

Bhabra (2008) report also a negative relationship in one of three models using the asset structure variable. Bhabra (2008) suppose that multicollinearity issues in model 1 of this study may have caused this significantly negative relationship between asset structure and acquisition likelihood.

In conclusion, the proportion of a firm's tangible assets appears to be a good discriminator for takeover likelihood when target and non-acquired firms are considered.

Table 37
Asset Structure

Asset Structure	**Obs. Relation**	**Tangible Assets (1 Year Average)**	**Tangible Fixed Assets (1 Year Average)**	**Tangible Fixed Assets (3 Year Average)**	**Univariate Comparison**	**MDA-/ Logit-(L)/ Probit-(P) Coefficients** (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Ambrose/ Megginson (1992)	+**		S		Non-Target, Target: 0.589 < 0.666, **	+0.914**, +0.999**, +1.022**

[514] See section 4.3.2—Asset structure and Debt-Capacity.

Asset Structure	Obs. Relation	Tangible Assets (1 Year Average)	Tangible Fixed Assets (1 Year Average)	Tangible Fixed Assets (3 Year Average)	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Powell (1997)	+/ +**/ -			S	n/a	(L);[515] ; 1984-1991: +0.785, +0.109, +0.376; Ind.adj: +0.641, +0.151, +0.330; Ind.&Econ.adj: +2.423**, +1.492**, +1.762**; 1984-1987: +1.268; +1.247**, +1.327**; Ind.adj: +0.158, +0.724, +0.628; Ind.&Econ.adj: +3.996**, +2.246, +2.353; 1988-1991:+0.117, -1.334, -0.806; Ind.adj: +0.570, -0.861, -0.419; Ind.&Econ.adj: +2.007, +0.798, +1.374
Powell (2004)	+/-			X	n/a	(L);[516] ; +0.3115, -0.2979, -0.1506; Ind.adj:+0.1211, -0.1571, -0.1070; Ind.&Econ.adj:+0.0443, -0.3375, -0.2184
Bhabra (2008)	+*/ -/ -**	S			Acquiring firms, Competitors: Mean: 0.36, 0.36; Median: 0.32 > 0.30; Competitors, Targets: Mean: 0.27 < 0.35, *; Median: 0.21 < 0.32, *	(L); −0.13**, +5.08*, +4.40*

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 37: Asset Structure

5.10 Industry Disturbance Metrics

Literature assumes that targets are likely found in industries that are subjected to economic shocks and are associated with a greater number of mergers.[517] The industry disturbance hypothesis suggests that, for example, the occurrence of other mergers in an industry increases the likelihood of more mergers occurring in the same industry, assuming a positive relationship between firms in disturbed industries and acquisition likelihood.

The studies of Walter (1994), Chen/Su (1997), and Cudd/Duggal (2000) support this hypothesis.[518] In contrast, Palepu (1982), (1986)[519] find a negative association and explains: "One possible interpretation of this result is that the acquisition waves triggered by the industry disturbances have a life of less than one year. Under this scenario, an industry effect may cause a group of firms in an industry to become

515 This study uses three samples: Hostile takeovers, friendly takeovers, and a sample of both.
516 This study uses three samples: Hostile takeovers, friendly takeovers, and a sample of both.
517 See section 4.2.2.1—External Growth through Merger.
518 Walter (1994), pp. 349-377; Chen/Su (1997), pp. 71-82; Cudd/Duggal (2000), pp. 105-120.
519 Palepu (1982); Palepu (1986), pp. 3-35.

desirable targets. Given an active acquisition market, all these potential targets are acquired by bidders in a short period of time. The following year, in the presence of the new equilibrium, there will be few likely targets in that industry. If the evidence is interpreted this way, it is consistent with the industry disturbance hypothesis with the modification that the industry effects are usually short-lived." [520]

However, the variables that measure economic disturbance in the studies described in Table 38 are not homogenous: While Palepu (1982), (1986), Walter (1994) and Cudd/Duggal (2000) use previous merger activity in an industry[521] to predict economic shocks,[522] Chen/Su (1997) analyze the level of economic disturbance using stock price volatility in the 2-year period prior the announcement of the takeover, measured as the difference between the highest price per share and the lowest price per share divided by the earnings per share.[523]

More recent studies waive the variable of industry disturbance. Espahbodi/Espahbodi (2003), for example, argue that the use of a "dummy variable that takes a value of one if any other firm with the same four-digit SIC code is taken over in the previous year [, will …] most likely take a value of one for all firms", given the frequency of industries takeovers of recent years.[524]

Table 38
Industry Disturbance Metrics

Industry Disturbance	**Obs. Rel-ation**	**3-Level of acquisition activity in firm's industry**	**2-Level of acquisition activity in firm's industry**	**(Highest Price Per Share - lowest Price Per Share) / Earnings Per Share**	**Univariate Comparison**	**MDA-/ Logit-(L)/ Probit-(P) Coefficients** (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Palepu (1982), (1986)	-**		S		n/a	-0.7067**, -0.6900**, -0.5802**, -0.5608**
Walter (1994)	+/+***	S			n/a	Hist.-Cost, Curr.-Cost-Model: +0.465, +0,537***
Chen/ Su (1997)	+/ +**/ +***/-			S	n/a	(L)[525] ; +0.021***, +0.027**, -0.012, +0.014

520 Palepu (1986), p. 22; similarly Palepu (1982), p. 42.
521 Cudd/Duggal (2000), p. 108.
522 Palepu (1986), p. 17; Similar Palepu (1982), p. 34; Cudd/Duggal (2000), p. 108.
523 Chen/Su (1997), p. 74.
524 Espahbodi/Espahbodi (2003), p. 560, fn. 10.
525 This study analyzes differences between foreign and US-acquisitions. the first two coefficients refer to foreign acquisitions, 1 and 2 years prior to the announcement date; coefficients 3 and 4 refer to US-acquisitions, 1 and 2 years prior to the announcement date.

Industry Disturbance	Obs. Rel-ation	3-Level of acquisition activity in firm's industry	2-Level of acquisition activity in firm's industry	(Highest Price Per Share - lowest Price Per Share) / Earnings Per Share	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Cudd/ Duggal (2000)	+/+*		S		n/a	(L)[526]: +0.0384, +0.1269, +1.2505*

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 38: Industry Disturbance Metrics

5.11 Agency Conflict Measures

The agency conflict hypothesis states that mergers may be motivated by the avoidance of agency costs.[527] These mergers serve as control mechanism that sanctions self-interested management by replacing them when agency costs become too high. Firms with agency problems are attractive takeover targets if additional resources together with unused profitable investment opportunities result from the firm's acquisition. Therefore, it is hypothesized in several empirical takeover studies that firms with agency problems are likely to become acquisition targets.

As indicated in Section 4.2.5—Agency Conflicts, the level of agency problems is measured by three financial characteristics in takeover studies:[528] (1) The level of free cash flow, (2) the dividend payout level, and (3) the degree of leverage.[529]

[526] Coefficients are displayed for the unadjusted model, the model adjusted for industry distributional characteristics, and the model adjusted for both industry distributional characteristics and a twelve-month industry disturbance, Cudd/Duggal (2000), p. 113.

[527] Section 4.2.5—Agency Conflicts.

[528] Section 4.2.5—Agency Conflicts.

[529] The degree of leverage and takeover activity has been considered in section 5.6—Leverage, Long-term Solvency and Debt Capacity.

5.11.1 Free Cash Flow Measures

5.11.1.1 *Free Cash Flow Definitions in Research*

Jensen (1986) defines free cash flow in the following manner:

> "Free cash flow is cash flow in excess of that required to fund all projects that have positive net present values when discounted at the relevant cost of capital."[530]

This definition refers to the amount of net cash generated by operations (after cash investments), which is the amount of cash that a firm can pay out to investors after paying for all investments necessary for growth.

However, Jensen's free cash flow definition requires knowledge of the most profitable, positive net present value investment projects that have been forgone by the firm's management, as well as the investments in unprofitable or less profitable projects due to management's self-interest, and also the sum of excess free cash flow not distributed to shareholders. As this information is impossible to obtain, Jensen's free cash flow definition is criticized for not being operational.[531] Therefore, financial research usually applies less complex variables to approximate free cash flow.

A common proxy for free cash flow in empirical studies is based on the operating cash flow, as applied, for example, by Lehn/Poulson (1989), Lang/Stulz/Walkling (1991), Carroll/Griffith (2001), Brailsford/Yeoh (2004).[532] Its computation is as follows:

Figure 38
Free Cash Flow Measure in Empirical Studies

Free Cash Flow = Operating income + Depreciation
- (Interest Expense + Taxes + Preferred Dividends + Common Dividends)

Figure 38: Free Cash Flow Measure in Empirical Studies

However, the validity of this kind of free cash flow measurement is questionable, as it is remains unclear if agency conflicts are measured or not. It may approximate the

530 Jensen (1986), p. 323.
531 Similarly Espahbodi/Espahbodi (2003), pp. 558.
532 Lehn/Poulson (1988), pp. 771-787; Lang/Stulz/Walkling (1991), pp. 229-330; Carroll/Griffith (2001), p. 144; Brailsford/Yeoh (2004), p. 233.

amount of free cash flow that remains in the firm, but it does not necessarily reflect the investments in unprofitable projects and other cash-destroying actions due to management's self-interest. Additionally, it may proxy for performance rather than for free cash flow in Jensen's sense.[533] Nevertheless, this measure of free cash flow is frequently used in empirical studies. Lang/Stulz/Walkling (1991) stress: "Its advantage is that it can be easily calculated", objecting that "it makes few adjustments to operating income to offset the effects of accrual accounting."[534]

Several different measures of to approximate free cash flow have been proposed in the accounting literature:[535]

- operating income before depreciation minus interest expense, taxes, preferred dividends, and dividends,
- net income plus depreciation plus adjustments for "other" elements in income that do not affect working capital,
- cash flow from operations,
- cash flow from operations without adjustment for changes in "other" current assets and liabilities,
- two-year average of cash flow from operations,
- operating income,
- operating income plus change in inventory, and
- net income plus depreciation.

Lang/Stulz/Walkling (1991) develop a measure of free cash flow to distinguish between firms that have good investment opportunities and those that do not. They then analyze whether their study's results change with regard to the impact of the above-mentioned alternate cash flow measures. Their evidence suggests that the findings do not change when alternate free cash flow measures are considered. They "find that our results hold better for simple earnings and cash flow measures than for the more sophisticated but also more noisy measures proposed in the literature."[536] This contrasts with the results of Bowen/Burgstahler/Daley (1986) showing "that traditional measures of cash flow (i.e., net income plus depreciation and amortization, and working capital from operations) are highly correlated with earnings, while the

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533 Lang/Stulz/Walkling (1991), p. 330.

534 Both citations Lang/Stulz/Walkling (1991), p. 329.

535 Described in Lang/Stulz/Walkling (1991), p. 330, Table 5; the following studies present different calculations of free cash flow measure: Drtina/Largay (1985), pp. 314-326; Bowen/Burgstahler/Daley (1986), pp. 713-725; Lehn/Poulson (1988), pp. 771-787; Smith/Kim (1994), pp. 281-310; Carroll/Griffith (2001), pp. 141-153; Espahbodi/Espahbodi (2003), pp. 549-574; Brailsford/Yeoh (2004), pp. 223-256.

536 Lang/Stulz/Walkling (1991), p. 316.

correlations of alternative measures of cash flow with earnings are low. Thus, prior studies which have relied on traditional measures of cash flow have used a variable with substantially different properties than alternative measures of cash flow which incorporate additional adjustments."[537] Espahbodi/Espahbodi (2003) additionally consider cash flow from operations minus the cash flow for investing activities, assuming that "firms with high investment opportunities use considerably more cash than that provided through their operating activities."[538]

5.11.1.2 *Free Cash Flow Definitions in Textbooks*

Free cash flow in textbooks is measured from two perspectives:

- free cash flows for all debt and equity capital stakeholders (sometimes also referred to as free cash flow of the firm), and
- free cash flows for common equity shareholders.

Starting-points for free cash flow calculation can be twofold: [539] It can be based on either

- the statement of cash flows, or
- the components of the income statement: net income, EBITDA (earnings before interest, tax, depreciation, and amortization), and NOPAT (net operating profit adjusted for tax).

5.11.1.3 *Free Cash Flow based on the Statement of Cash Flows*

Although, firms report their decomposed cash flow under U.S. Gaap and IFRS, the required reporting categories of cash flow do not match the components needed to calculate the free cash flow for all debt and/or equity capital stakeholders.

The most direct calculation of free cash flows is to start with the cash flow from operations obtained from the statement of cash flow (Figure 39). As the cash flow from operating activities contains interest payments (and corresponding tax benefits) that are part of the financial capital structure of the firm (rather than part of the operating liquidity management of the firm), the cash flow from operations as obtained from the statement of cash flow must be adjusted. Specifically, cash flow referring to interest payments for financial rather than operational assets must be reclassified to

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537 Bowen/Burgstahler/Daley (1986), p. 724.
538 Espahbodi/Espahbodi (2003), p. 557.
539 Wahlen/Baginski/Bradshaw (2011), pp. 943-954; Penman (2010), pp. 341-354; Coenenberg/Haller/Schultze (2009), pp. 1080-1082.

cash flow from financing activities. Additionally, the cash flow from operating activities must be adjusted for all cash that is bond working capital process (e.g., cash on hand that is required in the retail stores of a retail store chain). [540] Finally, cash flows related to capital expenditure must be adjusted, as reported in the investing activities section of the statement of cash flows. In sum, these computations yield the cash flow available to service debt, pay dividends to preferred and common shareholders, buy back shares, or reinvest. Thus, this computation yields free cash flows for all debt and equity capital stakeholders. Adjusting for financing activities, which incorporate cash flows that are attributable to debt and preferred stock claims, the result is the free cash flows for common equity shareholders.

5.11.1.4 *Free Cash Flow based on the Income Statement*

An alternative calculation approach is to derive the free cash flow from the income statement (Figure 40).[541] Applying the income statement based approaches requires that, all non-cash components (depreciation, amortization, accruals and other deferrals) are removed and cash flows related to changes in working capital accounts (such as cash flows related to changes in receivables, inventory, and payables). The result after these adjustments is the free cash flow from operations for all debt and equity stakeholders. After that, the procedure is similar to the calculation procedure based on cash flow statement. Cash flows related to capital expenditure must be adjusted to get the free cash flows for all debt and equity capital stakeholders. Adjusting for financing activities finally yields the free cash flows for common equity shareholders (Figure 40).

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[540] Chen/Su (1997), p. 74.
[541] Wahlen/Baginski/Bradshaw (2011), pp. 951-952;

Figure 39
Measurement of Free Cash Flows from Cash Flow Statement

Free Cash Flows for All Debt and Equity Stakeholders:

Operating Activities:

Cash Flow from Operations
Begin with cash flow from operations on the projected statement of cash flows.

+/− Net Interest after Tax
Add back interest expense and subtract interest income, net of tax effects.

+/− Changes in Cash Requirements for Liquidity
Subtract an increase or add a decrease in cash required for purposes of liquidity for operations.

= Free Cash Flows from Operations for All Debt and Equity

Investing Activities:

+/− Net Capital Expenditures
Subtract cash outflows for capital expenditures and add cash inflows from sales of assets that comprise the productive capacity of the operations of the firm (including property, plant, and equipment; affiliated companies; and intangible assets).

= Free Cash Flows for All Debt and Equity Stakeholders

Free Cash Flows for Common Equity Shareholders:

Operating Activities:

Cash Flow from Operations
Begin with cash flow from operations on the projected statement of cash flows.

+/− Changes in Cash Requirements for Liquidity
Subtract an increase or add a decrease in cash required for purposes of liquidity for operations.

= Free Cash Flows from Operations for Equity

Investing Activities:

+/− Net Capital Expenditures
Subtract cash outflows for capital expenditures and add cash inflows from sales of assets that comprise the productive capacity of the operations of the firm (including property, plant, and equipment; affiliated companies; and intangible assets).

Financing Activities:

+/− Debt Cash Flows
Add cash inflows from new borrowings or subtract cash outflows from repayments of short-term and long-term interest-bearing debt.

+/− Financial Asset Cash Flows
Subtract cash outflows invested in cash, short-term, and long-term investment securities (or add cash inflows from these accounts) if these financial assets are deemed to be part of the financial capital structure of the firm and are not part of the operating activities of the firm.

+/− Preferred Stock Cash Flows
Add cash inflows from new issues of preferred stock or subtract cash outflows from preferred stock retirements and dividend payments.

= Free Cash Flows for Common Equity Stakeholders

Figure 39: Measurement of Free Cash Flows from Cash Flow Statement[542]

[542] Source: Adopted from Wahlen/Baginski/Bradshaw (2011), pp. 946-947

Figure 40
Measurement of Free Cash Flows from Income Statement

Measurement of Free Cash Flows for All Debt and Equity Stakeholders from Alternative Starting Points

Starting Point:		
Net Income:	**EBITDA:[a]**	**NOPAT:[b]**
Operating Activities:	***Operating Activities:***	***Operating Activities:***
Net income	EBITDA	NOPAT
+ Add back all non-cash expenses	+ Add back all non-cash expenses other than depreciation and amortization	+ Add back all non-cash expenses
− Subtract all non-cash income items	− Subtract all non-cash income items	− Subtract all non-cash income items
+/− Working capital cash flows	+/− Working capital cash flows	+/− Working capital cash flows
+/− Net interest after tax	− Subtract cash taxes paid, net of tax savings on interest expense	
+/− Changes in cash requirements for liquidity	+/− Changes in cash requirements for liquidity	+/− Changes in cash requirements for liquidity
= Free Cash Flows from Operations for All Debt and Equity Stakeholders	***= Free Cash Flows from Operations for All Debt and Equity Stakeholders***	***= Free Cash Flows from Operations for All Debt and Equity Stakeholders***
Investing Activities:	***Investing Activities:***	***Investing Activities:***
+/− Net capital expenditures	+/− Net capital expenditures	+/− Net capital expenditures
= Free Cash Flows for All Debt and Equity Stakeholders	***= Free Cash Flows for All Debt and Equity Stakeholders***	***= Free Cash Flows for All Debt and Equity Stakeholders***

[a] EBITDA denotes earnings before interest, tax, depreciation, and amortization.
[b] NOPAT denotes net operating profit after tax, which equals net income adjusted for net interest expense after tax.

Measurement of Free Cash Flows for Common Equity Shareholders from Alternative Starting Points

Starting Point:		
Net Income:	**EBITDA:[a]**	**NOPAT:[b]**
Operating Activities:	***Operating Activities:***	***Operating Activities:***
Net income	EBITDA	NOPAT
+ Add back all non-cash expenses	+ Add back all non-cash expenses other than depreciation and amortization	+ Add back all non-cash expenses
− Subtract all non-cash income items	− Subtract all non-cash income items	− Subtract all non-cash income items
+/− Working capital cash flows	+/− Working capital cash flows	+/− Working capital cash flows
	− Subtract net interest expense	− Subtract net interest expense after tax
	− Subtract taxes	
+/− Changes in cash requirements for liquidity	+/− Changes in cash requirements for liquidity	+/− Changes in cash requirements for liquidity
= Free Cash Flows from Operations for Equity	***= Free Cash Flows from Operations for Equity***	***= Free Cash Flows from Operations for Equity***
Investing Activities:	***Investing Activities:***	***Investing Activities:***
+/− Net capital expenditures	+/− Net capital expenditures	+/− Net capital expenditures
Financing Activities:	***Financing Activities:***	***Financing Activities:***
+/− Debt cash flows	+/− Debt cash flows	+/− Debt cash flows
+/− Financial asset cash flows	+/− Financial asset cash flows	+/− Financial asset cash flows
+/− Preferred stock cash flows	+/− Preferred stock cash flows	+/− Preferred stock cash flows
= Free Cash Flows for Common Equity Shareholders	***= Free Cash Flows for Common Equity Shareholders***	***= Free Cash Flows for Common Equity Shareholders***

[a] EBITDA denotes earnings before interest, tax, depreciation, and amortization.
[b] NOPAT denotes net operating profit after tax, which equals net income adjusted for net interest expense after tax.

Figure 40: Measurement of Free Cash Flows from Income Statement[543]

543 Source: Adopted from Wahlen/Baginski/Bradshaw (2011), pp. 951-952

5.11.1.5 *Free Cash Flow not distributed to Owners*

In order to obtain a free cash flow metric that reflects the free cash flow that is remaining in the firm after paying dividends to the owner, which is a potential indicator for agency conflicts, the following modification to the free cash flow calculations described before may be considered. It reflects the amount of free cash flow that an acquirer would potentially "free up" in the target firm for new operations.[544] This measure can be calculated as free cash flow for common equity shareholders less dividend payments (and stock repurchases):[545]

Figure 41
Free Cash Flow not Distributed to Owners (1)

Free Cash Flow not distributed to Owners =
+ Free Cash Flow for Common Equity Shareholders
- Cash Dividends

Figure 41: Free Cash Flow not Distributed to Owners (1)

In short, this would be the amount of cash available from operations after paying for planned investment in long-term assets and after paying cash dividends to shareholders. In practice, a basic formula for free cash flow not distributed to owners is as follows: [546]

Figure 42
Free Cash Flow not Distributed to Owners (2)

Free Cash Flow not distributed to Owners =
+ Net Cash provided by Operating Activities
- Cash payments planned for Investments in Long-term Assets
- Cash Dividends

Figure 42: Free Cash Flow not Distributed to Owners (2)

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544 Amit/Livnat/Zarowin (1989), p. 144; sometimes also referred to as free cash flow for "new operations", Horngren/Harrison/Oliver (2012), p. 676.
545 Penman (2010), pp. 94-96.
546 Horngren/Harrison/Oliver (2012), p. 676.

Since this measure of free cash flow indicates the amount of cash that stays within the firm, the free cash flow not distributed to owners appears to be a potential indicator for agency problems.[547] However, similar to the previously described free cash flow measures in research, it is not reflecting the investments in unprofitable projects and other cash-destroying actions due to management's self-interest.

5.11.1.6 *Free Cash Flow Related Variables in Takeover Studies*

Several acquisition likelihood studies, among them Davis/Stout (1992), Powell (1997), (2004), Sorensen (2000) and Bhabra (2008) use free cash flow metrics for agency problems (Table 39). Their results suggest that Operating Cash Flow has a significant effect on takeover likelihood when is used.[548] Applying FCF-measures that divide EBITDA by size indicators, Davis/Stout (1992), Powell (1997), and Kumar/Rajib (2007) find a statistically significant positive relationship using logit analysis (Table 39). This strongly supports the free cash flow hypothesis and suggests that this variable should be included when analyzing the characteristics of the acquirer and target in business combinations.

Table 39
Free Cash Flow Metrics

Free Cash Flow Metrics	**Obs. Rel-ation**	**FCF (not defined)**	**Operating Cash Flow or EBITDA scaled by Size[Total Assets]**	**Operating Cash Flow or EBITDA scaled by Size[Sales]**	**Operating Cash Flow or EBITDA scaled by Size[Market Value]**	**EBITDA**	**Cash Flow or Net Income plus DA scaled by Size[Net Income]**	**Cash Flow or Net Income plus DA scaled by Size[Total Assets]**	**Univariate Comparison**	**MDA-/ Logit-(L)/ Probit-(P) Coefficients** (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Belkaoui (1978)	+/+**/ +***/ -/-**/ -***						S	S	n/a	MDA for Year 1, 2***, 3**, 4**, 5**, before takeover with the following values for Cash Flow/Net Worth: -0.05699, -0.04873, -0.07209, -0.12516, -0.10842; for Cash Flow/Total Assets: +0.06193, +0.00819, +0.15693, +0.33359, +0.2339

547 For example, Amit/Livnat/Zarowin (1989), p. 144.

548 Davis/Stout (1992), pp. 605-633; Powell (1997), pp. 1009-1030; Zanakis/Zopounidis (1997), pp. 678-687; Sorensen (2000), pp. 423-433; Powell (2004), pp. 35-72; Kumar/Rajib (2007), pp. 27-44; Bhabra (2008), pp. 158-175.

Free Cash Flow Metrics	Obs. Rel-ation	FCF (not defined)	Operating Cash Flow or EBITDA scaled by Size[Total Assets]	Operating Cash Flow or EBITDA scaled by Size[Sales]	Operating Cash Flow or EBITDA scaled by Size[Market Value]	EBITDA	Cash Flow or Net Income plus DA scaled by Size[Net Income]	Cash Flow or Net Income plus DA scaled by Size[Total Assets]	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Davis/ Stout (1992)	+/+***				S				n/a	1980-1990:[549] +0.292, +0.253, +0.208, +0.107, +0.285, +0.253, +0.225, +0.189 ; 1983-1990: +0.331***, +0.247, +0.401, +0.334
Powell (1997)	+/ +**/-		S						n/a	(L);[550] ; 1984-1991: +3.423, +1.951, +2.154; Ind.adj: +2.591, +1.206, +1.479; Ind.&Econ.adj: +5.207, +1.989, +2.625; 1984-1987: +1.598; +1.475, +1.468; Ind.adj: +1.844, +1.790, +1.906; Ind.&Econ.adj: +3.472, +5.917, +5.977; 1988-1991:+5.643**, +2.791, +3.185**; Ind.adj: +2.007, -0.455, +0.024; Ind.&Econ.adj: +1.748, -1.999, -1.369
Zanakis/ Zopouni-dis (1997)	+/-		X						Non-Acquired, Acquired: [551] Year -1: 0.08, 0.08; Year -2: 0.08 < 0.09; Year -3: 0.11 > 0.08	Factor Analysis, DA, n/a[552]
Sorensen (2000)	-		S						Nonmerging, Acquiring, Target-Groups: 0.0237, 0.0959, -0.0204,*	n/a
Powell (2004)	+/-		X						n/a	(L);[553] ; +0.1141, -0.1966, -0.1700; Ind.adj:-0.0587, +0.0075, +0.0009; Ind.&Econ.adj:+0.4747, -0.2756, -0.1110
Kumar/ Rajib (2007)	+/+*/ +**/ -*/-***		S	S	X	S			Acquirer, Target: CF/MV: 0.555 < 1.07; CF/SA: 0.23 > 0.19,*** ; CF/TA: 0.145, 0.099,* ; EBITDA: 349.95 > 90.09,*	Non-Acquired Firms vs. Target: CF/MV: +0.15***; CF/SA: +0.72, +0.759; CF/TA: +0.145, +0.099,* ; EBITDA: not measured.
Bhabra (2008)	-/+*	S							FCF: Acquiring firms, Competitors: Mean: 0.086 > 0.083; Median: 0.080 > 0.076; Competitors, Targets: Mean: 0.034 < 0.073, *; Median: 0.043 < 0.071, *; n/a	FCF: (L); +0.91*

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 39: Free Cash Flow Metrics

549 For each period, the coefficients refer to: All bids, all successful bids, hostile bids, successful hostile.

550 This study uses three samples: Hostile takeovers, friendly takeovers, and a sample of both.

551 Data refers to 1 to 3 years prior to takeover.

552 A logit analysis was performed but the significance level of coefficients was not indicated; therefore, the coefficients are not listed in this table, Zanakis/Zopounidis (1997), p. 685.

553 This study uses three samples: Hostile takeovers, friendly takeovers, and a sample of both.

5.11.2 Further Free Cash Flow Measures

Investment research often uses further ratios to analyze free cash flow, such as the free cash flow per share and free cash flow yield.

5.11.2.1 *Free Cash Flow per Share*

The free cash flow per share ratio is very similar to the earnings per share ratio,[554] but it is less easy to manipulate as it is based on cash and not on earnings. However, its reliability may be questionable as the free cash flow is also dependent on investing activities, and investing activities can have a strong impact in high-growth, and, therefore, capital intensive periods of a firm's life.

The ratio is calculated by dividing free cash flow by the number of shares outstanding:

Figure 43
Free Cash Flow per Share

$$\text{Free Cash Flow per Share (of Common Stock)} = \frac{\text{Free Cash Flow}}{\text{Weighted-Average Number of Common Shares Outstanding during the Period}}$$

Figure 43: Free Cash Flow per Share

Depending on the free cash flow used,[555] this measure signals a company's ability to pay debt, pay dividends, and/or buy back stock. It can also be indicative of the firm's growth opportunities (e.g., when compared to earnings per share development).[556] However, there is no takeover study applying this ratio so far.

5.11.2.2 *Free Cash Flow Yield*

The free cash flow yield metric indicates the percentage of free cash flow that can be earned divided by the market value of equity:

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554 See section 5.2.2—Earnings per Share Ratio.
555 See section 5.11.1- Free Cash Flow.
556 Groppelli/Nikbakht/Nikbakht (2006), p. 130.

Figure 44
Free Cash Flow Yield

$$\text{Free Cash Flow Yield} = \frac{\text{Free Cash Flow per Common Share}}{\text{Market Price per Common Share}}$$

Figure 44: Free Cash Flow Yield

The value of this ratio heavily depends on the free cash flow measure used. If the basis for calculation is either the free cash flows for all debt and equity capital stakeholders or the free cash flows for common equity shareholders. However, if free cash flow is calculated as the free cash flow not distributed to the owners, this ratio may indicate agency problems. However, no takeover study has used this ratio.

5.11.3 Ratios indicating the Dividend Policy of a Firm

If a company has plenty of free cash flow but few profitable investment opportunities, shareholders may fear that management will prioritize their own wealth maximization over firm profitability. In such cases, shareholders may seek to encourage a more careful, value-oriented investment policy by demanding a higher level of dividends or stock repurchases.[557]

Therefore, and consistent with the free cash flow hypothesis, finance theory has assumed that firms that have a higher payout of earnings, or more precisely a higher payout of cash flow, might be considered to suffer fewer agency conflicts. Since higher dividends reduce the amount of cash at the managers' disposal, it is assumed that managers will concentrate on the most profitable investments. By focusing on profitable investments rather than inefficient self-interest, agency costs are thought to be reduced. Thus, the firm's dividends payout policy, measured by dividend yield, dividend payout ratio, or the percentage of earnings retained, might be a indicative of agency costs.

Despite extensive literature regarding dividend payout policy, there is no consensus as to whether it affects acquisition likelihood. Thus, several explanations exist in the takeover likelihood literature: For example, Trahan (1988) suggests that a large payout of earnings could indicate that the firm has high efficiencies and is growing; therefore,

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[557] Brealey/Myers/Franklin (2008), p. 457; La Porta/Lopez-de-Silanes/Shleifer/Vishny (2000), pp. 1-34.

it is more likely to be an acquiring firm.[558] In contrast, Gaver/Gaver (1993) and Smith/Watts (1992) report that growth firms pay significantly higher levels of cash compensation to their executives and have significant lower dividend yields compared with non-growth firms.[559] Similarly, Dietrich/Sorensen (1984) find that "[a] high payout signals a lack of investment opportunities and thus lower future cash flows".[560] However, Walter (1994) assumes that: "A low dividend payout may indicate that management has internal investment opportunities yielding high rates of return, electing to invest excess cash rather than pay large dividends. Companies having such investment opportunities are attractive to certain potential acquirers who may not have such high-yielding opportunities themselves. Accordingly, a low dividend payout rate should be associated with high acquisition likelihood."[561] Hence, it is unclear whether dividend policy is a proxy for agency conflict or a determinant for acquisition likelihood. However, several empirical takeover studies, which are described in the following subsections (Table 40, Table 41, and Table 42), use dividend policy as a determinant of takeover likelihood.[562]

5.11.3.1 ***Dividend Yield***

The dividend yield indicates the current dividend return earned by shareholders.[563] It is defined as dividends as a percentage of the current stock price. The calculation is as follows:[564]

Figure 45
Dividend Yield

$$\text{Dividend Yield} = \frac{\text{Dividends per Common Share}}{\text{Market Price per Common Share}}$$

Figure 45: Dividend Yield

558 Trahan (1993), p. 28.
559 Gaver/Gaver (1993), pp. 125-160; Smith/Watts (1992), pp. 263-292.
560 Dietrich/Sorensen (1984), p. 396.
561 Walter (1994), p. 359.
562 Palepu/Healy/Bernard (2000), p. 661; Coenenberg/Haller/Schultze (2009), p. 1141.
563 Palepu/Healy/Bernard (2000), p. 661.
564 Gibson (2011), pp. 351-352; Coenenberg/Haller/Schultze (2009), p. 1141; Brealey/Myers/Franklin (2008), p. 798; Palepu/Healy/Bernard (2000), p. 661.

Dividends, together with capital gains, are the shareholders' return. Following modern finance theory, higher dividends do not affect the total return of securities, as the capital gains are reduced by the amount of the dividend (MM dividend irrelevance theorem).[565] In other words, if a firm pays a dividend of 1 MU, the value of the firms drops by 1 MU. Or, if no dividends are paid out, the firm reinvests cash flow to earn the investors' required rate of return.[566] From the investors' perspective, the dividend payments are equivalent to selling a portion of their shareholdings (also called homemade dividends).[567] If investors prefer to not receive dividend payments, they can achieve this result by buying stock with the cash from dividends.[568] Furthermore, a firm can pay dividends without backing them up with current earnings, simply by reducing its cash positions or by increasing its debt positions.[569]

Despite, the announcement of dividend increases or decreases is thought to impact stock prices to some extent (as with share issues and share repurchases). A dividend increase is sometimes considered a signal that managers have favorable private information about expectations for future sustainable earnings and cash flows, whereas dividend cuts signal negative future earnings expectations.[570,571]

Also, shares with a high dividend yield may indicate that investors are demanding a relatively high rate of return or that they are not expecting rapid dividend growth with consequent capital gains.[572] In addition, the dividend yield depends on the dividend and the market price. If the dividend increases, the market price decreases and vice versa.

In sum, its use as a proxy for agency problems is questionable. Accordingly, this measure has not been successfully used as a determinant of takeover likelihood (Table 40). The dividend payout ratio may be a better indicator. It is discussed in the subsequent section.

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565 Miller and Modigliani (1961), pp. 411-433; Allen/Michaely (2003), p. 339; for an numeric example of the irrelevance theorem, Wahlen/Baginski/Bradshaw (2011), pp. 903-904; before Modigliani and Miller 1961 formulated their irrelevance theorem, finance literature had advocated high payout ratios, for example Graham/Dodd (1951), p. 432; for a discussion of dividend payouts and its clientele, Brealey/Myers/Franklin (2008), p. 456.

566 Penman/Sougiannis (1997), pp. 1–21.

567 Penman (2010), p. 95.

568 Penman (2010), p. 94-96.

569 Transaction cost may occur but are considered to be relatively small and neglectible, Penman (2010), p. 95.

570 Wahlen/Baginski/Bradshaw (2011), p. 831.

571 This is in contrast to the dividend irrelevance theorem that says that dividends themselves will not affect stockholders' returns (or the cum-dividend shareholder value when the stock goes ex-dividend), Penman (2010), p. 95; for a recent discussion of the MM dividend irrelevance theorem, DeAngelo/DeAngelo (2006), p. 293-315.

572 Brealey/Myers/Franklin (2008), p. 798.

Table 40
Dividend Yield

Dividend Yield	Obs. Relation	Common Dividends to Book Value of Stockholders' Equity (1 Year)	Common Dividends to Book Value of Stockholders' Equity (3 Year Average)	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Bartley/ Boardman (1990)	n/a	S		n/a	Stepwise MDA*, coefficients n/a.
Barnes (1998), (1999), (2000)	-		X	n/a	(L), -0.9317, -0.9462
Kumar/ Rajib (2007)	-	X		Acquirer, Target: 2.67 > 2.09	n/a

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 40: Dividend Yield

5.11.3.2 ***Dividend Payout Ratio***

The dividend payout ratio (DPO ratio) compares dividends to earnings and measures the ratio of dividends to earnings. It is calculated as the proportion of earnings paid out as dividends:[573]

Figure 46
Dividend Payout Ratio

$$\text{Dividend Payout Ratio} = \frac{\text{Dividends per Common Share}}{\text{Earnings per Share}}$$

Figure 46: Dividend Payout Ratio

The DPO ratio is a measure of the extent to which dividends reflect paid out earnings. However, its use as indicator for agency conflicts may depend on its strategic use by managers as indicator for future earnings and growth: For example, managers may

573 Coenenberg/Haller/Schultze (2009), p. 1141; Brealey/Myers/Franklin (2008), p. 798; a more conservative variation is using the diluted earnings per share in the denominator, Gibson (2011), p. 350-352; Penman (2010), pp. 264-265.

seek to avoid cutting dividends if there is a shortfall in the current period earnings. Thus, a strategy for a management exposed to the risk of a sudden decrease in current earnings may be to generate a low DPO ratio by paying low dividends. Likewise, if future earnings are expected, management will signal this by paying higher dividends, which increases the DPO ratio.[574] New firms, growing firms, and firms perceived as growth firms usually have a relatively low DPO ratio. Indeed, no correct DPO ratio or rule of thumb exists; some investors may prefer high DPO ratios while other investors prefer low DPO ratios. [575]

In addition, this ratio can be somewhat misleading because it suggests that earnings per share are representative of the firm's cash holdings. Accounting is accrual based; thus, earnings do not necessarily represent cash and cash equivalents.[576]

However, this measure has been used in a number of takeover studies (Table 41). In particular, Dietrich/Sorensen (1984) successfully applied this measure and found a negative relationship between a firm's DPO ratio and its acquisition activity. A negative relationship suggests that targets are more likely to have low dividend payouts, and, hence, are suspected of bearing agency conflicts.

Table 41
Dividend Payout Ratio

Dividend Payout Ratio	**Obs. Relation**	**Dividends / Net Income (1 Year)**	**Dividends / Net Income (2 Year Average)**	**Dividends / Cash Flow From Operations (1 Year)**	**Inverse of DPO: Net Income / Dividends**	**Univariate Comparison**	**MDA-/ Logit-(L)/ Probit-(P) Coefficients** (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Stevens (1973)	n/a	X				n/a	Factor Analysis
Harris/ Stewart/ Guilkey/ Carleton (1982)	+/ -/ -**	S				Non-acquired, Acquired Firms in 1974-1975: 0.259 > 0.243; 1975-1976: 0.310 > 0.191, **	(P) ; 1974-1975: -0.015, +0.022, -0.017, +0.020; 1976-1977: -0.484, -0.236, -0.446, -0.238;
Wansley/ Lane (1983), Wansley (1984)	n/a	X				n/a	LDA, n/a
Dietrich/ Sorensen (1984)	-**	S				n/a	-0.81**

574 Brealey/Myers/Franklin (2008), p. 798.
575 Gibson (2011), p. 351.
576 Gibson (2011), p. 351; Papanastasopoulos/Thomakos/Wang (2010), pp. 395-423

Dividend Payout Ratio	Obs. Relation	Dividends / Net Income (1 Year)	Dividends / Net Income (2 Year Average)	Dividends / Cash Flow From Operations (1 Year)	Inverse of DPO: Net Income / Dividends	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Bartley/ Boardman (1986)	-	X				Non-Target, Target:[577] 0.36 > 0.34	Stepwise MDA, variable failed to enter
Bartley/ Boardman (1990)	n/a	S		S		n/a	Stepwise MDA*, coefficients n/a.
Trahan/ Shawky (1992), Trahan (1993)	+/ -/ -**/ -***		S			n/a	Here:[578] Acquirer (0) vs. Non acquiring firms (1) in Food, Chem, Petro, ElectrMach, Trans, All: -3.94, -1.28, +4.00, -0.93***, -3.53***, -0.15**
Walter (1994)	-				X	n/a	Hist.-Cost, Curr.-Cost-Model: -0.616, -0.393
Meador/ Church/ Rayburn (1996)	+/-	S				n/a	All, Horizontal, Vertical Mergers: -0.150, -0.634, +1.784
Kumar/ Rajib (2007)	-/-*	S				Acquirer, Target: 0.265 > 0.133,*	(L); Non-Acquired Firms vs. Target: -0.15, -0.32

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 41: Dividend Payout Ratio

5.11.3.3 *Percentage of Earnings Retained*

The percentage of earnings retained ratio (PER ratio) measures the proportion of current net income retained related to current net income. This internal growth measure is calculated by dividing net income after dividends by net income as follows:[579]

577 HC: Historical cost measure, RC: Replacement cost measure.

578 The original study analyzed acquirer = 1 and non-acquiring firm = 0. For purpose of comparison in this meta-analysis, the signs of the coefficients have been transformed to acquirer = 0 and non-acquiring firm = 1.

579 Gibson (2011), p. 350; Penman (2010), pp. 265.

Figure 47
Percentage of Earnings Retained

$$\text{Percentage of Earnings Retained} = \frac{\text{Net Income - Dividends}}{\text{Net Income}}$$

Figure 47: Percentage of Earnings Retained

The PER ratio in so far refers to the earnings retained in a single year and not to retained earnings from the balance sheet, which usually consists of accumulated retained earnings.

Similar to the DPO ratio, the PER ratio may be criticized for implying that earnings represent a cash pool for paying dividends.[580] However, under accrual accounting, earnings do not necessarily represent cash. In order to analyze the percentage of cash from operation being retained, the ratio of operating cash flow compared with cash dividends would provide a better indication.[581] As was also true of the DPO ratio, there is no general rule of thumb indicating a desired value of this ratio. However, new firms, growing firms, and firms perceived as growth firms usually have relatively low PER ratios, as those firms seldom pay dividends.[582]

The takeover studies using this ratio are presented in Table 42. The results of Thompson (1997) are consistent with the agency conflict hypothesis and suggest that firms that do not pay out earnings are more likely to be takeover targets.

Table 42
Percentage of Earnings Retained

Percentage of Earnings Retained	**Obs. Relation**	**EBIT Retention / EBIT (1 Year)**	**EBIT Retention / EBIT (2 Year Average)**	**EBIT Retention / EBIT (3 Year Average)**	**(Actual Reserves - Required Reserves) / Total Assets**	**Univariate Comparison**	**MDA-/ Logit-(L)/ Probit-(P) Coefficients** (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Singh (1975)	-/+*	X	S	X		Acquiring, Acquired: 44.17 > 37.83; 2-Year Avg. Retention Ratio.	MDA*, +0.5

580 Gibson (2011), p. 350; recent research finds that investors act as if the accrual and cash flow component of earnings have similar implications for future profitability, leading to an overvaluation of their differential persistence, Papanastasopoulos/Thomakos/Wang (2010), pp. 395-423.

581 Gibson (2011), p. 350.

582 Gibson (2011), p. 350.

Percentage of Earnings Retained	Obs. Relation	EBIT Retention / EBIT (1 Year)	EBIT Retention / EBIT (2 Year Average)	EBIT Retention / EBIT (3 Year Average)	(Actual Reserves - Required Reserves) / Total Assets	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Thompson (1997)	-/ -*/-**				S	n/a	-13.882**, -16.154*, -14.789*, -13.986

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 42: Percentage of Earnings Retained

5.11.4 Agency Dummies

Davis/Stout (1992) and Bhabra (2008) use dummy variables to analyze the agency conflicts, relating the amount of free cash flow to the firm's growth opportunities or capital structure. For example, Bhabra (2008) applies an indicator variable which equals 1 if either the acquirer has low (high) free cash flow and above (below) average growth opportunities and target has high (low) free cash flow and low (high) growth opportunities, and 0 otherwise; as well as a dummy variable which equals 1 if the target has high free cash flow and low growth opportunities, and 0 otherwise. Davis/Stout (1992) use an indicator variable representing free cash flow that was coded as 1 if the firm was above the median on the cash flow measure and below the median on the capital structure measure, and 0 otherwise However, as presented in Table 43, these agency dummies did not yield significant results.

5.11.5 Interim Summary—Agency Conflict Measures

In sum, agency conflict has been measured mainly by accounting based metrics of free cash flow and indicators of dividend policy, such as dividend yield, dividend payout ratio, and the percentage of earnings retained. In these studies, agency conflict is thought to be indicated by a high proportion of free cash flow that remains undistributed to shareholders and not invested in profitable projects by the firm's management. On the whole, there is evidence that firms with greater agency problems are more likely to become acquisition targets. All the studies reporting significant results have found that agency conflict is an important indicator of acquisition likelihood, thus supporting the agency conflict hypothesis.

Table 43

Agency Conflict Dummy Variables

Agency Dummy	Obs. Relation	Agency Match is dummy variable which equals 1 if either the acquirer has low (high) free cash flow and above (below) average growth opportunities and target has high (low) free cash flow and low (high) growth opportunities, and 0 otherwise.	Agency is dummy variable which equals 1 if the target has high free cash flow and low growth opportunities, and 0 otherwise.	Agency is a dummy variable representing free cash flow that was coded as unity if the firm was above the median on the cash flow measure and below the median on the capital structure measure, and zero otherwise.	(F)CF measure	Growth measure	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Davis/Stout (1992)	+/-			X	X (Income Before Extraordinary Items / Market Value of Equity)	S (Employment Growth)	n/a	1980-1990:[583] -0.095, -0.161, -0.011, +0.012, -0.376, -0.455, -0.352, -0.267; 1983-1990: -0.29, -0.020, -0.400, -0.577.
Bhabra (2008)	+/-	X	X		X (not defined)	S (Sales Growth)	n/a	Matching Agency: (L); +0.95, +1.76; Agency: (L); −0.91, +1.33, +1.26;

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 43: Agency Conflict Dummy Variables

[583] For each period, the coefficients refer to: All bids, all successful bids, hostile bids, successful hostile.

5.12 Further Variables used in Takeover Studies

5.12.1 Taxes

The effect of taxes on mergers has been inconsistent. Earlier studies using data from the 1970s found that taxes have a statistically significant impact on merger activity. More recent studies, however, have not found evidence for tax motivated mergers. Possible explanations for the discrepancy include (1) tax benefits from mergers have changed over time as a function of new tax laws;[584] (2) the earlier studies use mean comparison and discriminant analysis, but the later studies apply improved statistical techniques like logit regression that more properly identify multivariate influences;[585] (3) tax benefits may be limited by borders: The later studies use cross-border merger data, but tax savings may apply only to local mergers.[586] This explanation is supported by Harris/Ravenscraft (1991), which finds that the cross-border effect of mergers on wealth gains is not well explained by tax variables.

The results on acquisition likelihood and tax ratios are presented in Table 44.

Table 44

Tax-related Measures

Tax-related Measures	**Obs. Relation**	**Operating Loss Carryforward / Market Value of Equity**	**Operating Loss Carryforward / Total Assets**	**Inflationary Tax Loss = Current Cost Total Assets / Historical Cost Total Assets**	**Inflationary Tax Saving = Yes No Dummy**	**Tax Provisions / Operating Profits**	**Univariate Comparison**	**MDA-/ Logit-(L)/ Probit-(P) Coefficients** (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Harris/ Stewart/ Guilkey/ Carleton (1982)	+/ -/ -***		S				Non-acquired, Acquired Firms in 1974-1975: 0.0157 < 0.018; 1975-1976: 0.0164 < 0.0094	(P); 1976-1977: -0.659, -1.525; Fixed & Random Coef. Probit, 1976-1977: -1.398, -1.853***
Bartley/ Boardman (1990)	n/a	S					n/a	Stepwise MDA*, coefficients n/a.

584 For example, US Tax Reform Act of 1986, which eliminated a lot of tax benefits through mergers, Gaughan (2011), p. 314.

585 Harris/Stewart/Guilkey/Carleton (1982), pp. 164-184; Bartley/Boardman (1990), pp. 53-72; and more recent studies, Walter (1994), pp. 349-377; Chen/Su (1997), pp. 71-82.

586 The study of Chen/Su (1997) uses cross-border data and cannot find evidence that cross-border acquisitions of U.S. targets differ from U.S. takeover targets with regard to tax loss-carryforwards. Chen/Su (1997), pp. 71-82; Harris/Ravenscraft (1991), pp. 825-844.

Tax-related Measures	Obs. Relation	Operating Loss Carryforward / Market Value of Equity	Operating Loss Carryforward / Total Assets	Inflationary Tax Loss = Current Cost Total Assets / Historical Cost Total Assets	Inflationary Tax Saving = Yes No Dummy	Tax Provisions / Operating Profits	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Walter (1994)	+/ -/-***			X	S		n/a	Hist.-Cost, Curr.-Cost-Model: Inflationary Tax Loss: n/a, +0.374 Tax Savings Dummy: -1.276, -2.045***
Chen/Su (1997)	-/+		X				n/a	(L)[587] ; -0.726, +0.401, -0.628, +1.780
Kumar/Rajib (2007)	-/-*					S	Acquirer, Target: 0.165 > 0.077,*	(L); Non-Acquired Firms vs. Target: -0.60, -0.514

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 44: Tax-related Measures

5.12.2 Miscellaneous

Other determinants of merger activity may include cultural aspects, institutional details, or the regulatory setting. These items have been analysed in the takeover studies presented in Table 45, Table 46, Table 47, and Table 48. These studies include a number of potential determinants of merger activity, such as ownership and equity structure, regionality, workforce, firm age, level of deregulation, merger type, and defense tactics. However, the analysis of these variables on takeover activity considers a different set of firm characteristics, which are not in the focus of this study. For the sake of completeness, however, their finding are displayed in the following tables.

[587] This study analyzes differences between foreign and US-acquisitions. The first two coefficients refer to foreign acquisitions, 1 and 2 years prior to the announcement date; coefficients 3 and 4 refer to US-acquisitions, 1 and 2 years prior to the announcement date.

Table 45
Ownership

Ownership	Obs. Relation	Institutional & Bank Control	Change in Institutional Control	Family Control	Miscellaneous Control	Officer & Director, Managers' Shareholdings	Board Interlock / CFO Finance Background	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Ambrose/ Megginson (1992)	+/ -/ -**/ -***	X	S			X, X		Non-Target, Target: I&B-Contr: 55.981 > 45.410; Mgrs-Shareh: 27.883 > 25.760; Chg.i.Contr: 0.771 > 0.025, *** O&D-Shareh.: 16.393 > 15.051	I&B-Contr: not measured; Mgrs-Shareh: +0.0030, +0.034, +0.466; Chg.i.Contr: -6.7488**, -3.815**, -6.103*** O&D-Shareh.: +0.3273, +0.330, +0.195
Davis/ Stout (1992)	+/ +**/ +***/ -/ -*/ -**/ -***	X (bank)/ S (institutional)		S	S		X (Board Interlock)/ S (Finance Background of CEO, Banker on Board)	n/a	Bank Control: 1980-1990:[588] +0.267, +0.364, +0.375, +0.473, +0.259, +0.308, +0.422, +0.477; 1983-1990: +0.454, +0.533, +0.513, -0.657; Institutitutional Ownership: 1980-1990: -0.012**, -0.016**, -0.016**, -0.021*, -0.013, -0.014, -0.021**, -0.021; 1983-1990: -0.011***, -0.016**, -0.012, -0.021**; Miscellaneous Control: 1980-1990: +0.398**, .+0.219, +0.420***, -0.180, -0.037, -0.191, -0.152, -0.443; 1983-1990: +0.458**, +0.477***, -0.021, -0.146; Banker on Board: 1980-1990: not measured; 1983-1990: -0.241, -0.191, -0.185, -0.038; Finance CEO: 1980-1990: +0.592**, +0.343; +0.699, +0.216; 1983-1990: not measured.

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 45: Ownership

[588] For each period, the coefficients refer to: All bids, all successful bids, hostile bids, successful hostile.

Table 46

Equity Structure

Equity Structure	Obs. Relation	Trading Volume of Common Shares Outstanding	Proportion of Common Shares per Shareholder	Book Value per Share	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Wansley/ Lane (1983), Wansley (1984)	n/a	X			n/a	Factor Analysis; LDA: n/a
Dietrich/ Sorensen (1984)	+***	S			n/a	+4.15***
Bartley/ Boardman (1990)	n/a		S		n/a	Stepwise MDA*, coefficients n/a.
Meador/ Church/ Rayburn (1996)	+	X			n/a	All, Horizontal, Vertical Mergers: +0.462, +1.547,+0.454
Kumar/ Rajib (2007)	-*			S	Acquirer, Target: 116.49 > 39.82,*	n/a

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 46: Equity Structure

Table 47

Takeover Defense

Takeover Defense	Anti-Takeover Charta Amendments, ATCA	Blank-Check Preferred-Stock, BCP	Classified Boards, CB	Dual-Class Recapitalizations, DC	Fair-Price Requirements, FP	Poison Pill, PP	Restricted Voting Rights, VR	Supermajority Requirements, SM	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Ambrose/ Megginson (1992)	S	X	X	X	X	X	S	X	All variables use 0, 1 dummies: Non-Target, Target: ATCA: 0.516, 0.465; BCP: 0.322, 0.194, ** CB: 0.242, 0.300; DC: 0.037, 0.018; FP: 0.106, 0.065; PP: 0.011, 0.006; VR: 0.015, 0.035; SM: 0.081, 0.112	(L), All variables use 0, 1 dummies: ATCA: -0.120; BCP: -1.053** CB: +0.238; DC: -0.068; FP: -0.695; PP: -0.226; -0.268; VR: +2.246**; SM: +0.515

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 47: Takeover Defense

Table 48

Further Miscellaneous Variables

Further Miscellaneous Variables	Obs. Rel-ation	Firm Age	Workforce tenure	Industry[589]	Rationality	Dereg-ulation	Mer-ger Type	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Harris/ Stewart/ Guilkey/ Carleton (1982)	+/-			X (4 firms industry concentration ratio)				Non-acquired, Acquired Firms in 1974-1975: 36.17 > 32.09; 1975-1976: 36.31 < 36.33	(P) ; 1974-1975: -0.007, -0.006; Fixed & Random Coef. Probit, 1976-1977: -0.003, 0.0045
Hannan/ Rhoades (1987)	+/ +*/ -/ -*			S (3 firms industry concentration ratio) / S (firm's market share)	S (local and nonlocal banking market's counties)			n/a	(L)[590]; Concentration: -88.15*, +12.19, -88.14*, +12.22, -83.41*, +5.80, -83.23*, +5.76; Market Share: +0.24E – 2, +0.02*, -0.24E – 2, +0.02*, -0.17E – 2, 0.03*, 0.12E – 2, 0.03* Regionality: +0.46, +2.00*, +0.46, +2.00*, +0.73, +2.09*, +0.73, +2.09*

589 This is a dummy variable, which is coded high-tenure / low-growth as 1 if the firm operated in an industry that was above the median in tenure and the firm was at or below the median in employment growth, and 0 otherwise, Davis/Stout (1992), p. 3.

590 Each first coefficient refers to acquisitions from inside of the target firm's market and, each second coefficient refers to acquisitions from outside of the target firm's market, Hannan/Rhoades (1987), p. 68.

Further Miscellaneous Variables	Obs. Rel-ation	Firm Age	Workforce tenure	Industry[589]	Rationality	Dereg-ulation	Mer-ger Type	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
Davis/ Stout (1992)	+/ +*/+**/ +***/ -/ -**/ -***	S	S (employee's number of years with employer)	X (dummy based on high firm tenure in an industry and low employment growth				n/a	Age: 1980-1990:[591] +0.258***, +0.252, +0.225, +0.222, +0.665*, +0.658*, +0.745**, +0.767**; 1983-1990: +0.160, +0.095, +0.606**, +0.590**. Workforce Tenure: 1980-1990: -0.116**, -0.083, -0.089, -0.060, -0.088, -0.019, -0.034, +0.037; 1983-1990: -0.134**, -0.097***, -0.134***, -0.066; High-Tenure/Low Growth Dummy: 1980-1990: +0.282, +0.212, +0.213, +0.148, +0.343, +0.338, +0.240, +0.300; 1983-1990: +0.222, +0.139, +0.422, +0.314.
Meador/ Church/ Rayburn (1996)	+						X	n/a	+0.060
Thompson (1997)	+/-				X, LONDON = 1 if society's headquarters in London postal area, = 0 if otherwise; X, LOCAL = 1 if society is provincial and local market has > 2 society headquarters, = 0 otherwise	S		n/a	LONDON: -0.548, -0.601, -0.605; -0.677; LOCAL +0.362, +0.335, +0.337, +0.263
Doumpos/ Kosmidou/ Pasiouras (2004)	n/a		X (Remune-rations per Employee)					T-Test[592]; Remunerations/ Employee: Year1 not signif., Year2 not signif.,	DA, n/a[593]

591 For each period, the coefficients refer to: All bids, all successful bids, hostile bids, successful hostile.

592 This study does not present the tested means.

593 This study displays only the classification results, and not the findings of the regression models such as coefficients and related statistics.

Further Miscellaneous Variables	Obs. Rel-ation	Firm Age	Workforce tenure	Industry[589]	Rationality	Dereg-ulation	Mer-ger Type	Univariate Comparison	MDA-/ Logit-(L)/ Probit-(P) Coefficients (assuming 1=Target or Non-Acquirers; 0=Non-Targets or Acquirers)
								Year3 not signif.;	
Tsagkanos/ Georgopoulos/ Siriopoulos (2006)	+/+**	S		S (productivity of branch)				n/a	(L): Binary Logit, Conditional Logit; Age; + 0.00213222, +0.00485525; Industry: +11.677**, +000213222
Tsagkanos/ Georgopoulos/ Siriopoulos/ Koumanakos (2008)	+/+**/ +***/ -	S		S (productivity of branch); X(type of branch: traditional and non-traditional)				n/a	(L): Classical MLE, Bootstrap MLE of Logit; Age: +0.03054**, +0.039*** Industry: +7.818**, +22.33 Trad.vs. Non-Trad. Industry: -0.5782, -1.02

An "S" marks if firm characteristic have been statistically significant at the 0.01 to 0.10 level of a study, an "X" marks otherwise. In addition, the significance level of the studies' findings is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 48: Further Miscellaneous Variables

5.13 Interim Summary of Chapter 5

The meta-analysis presented in this section analyzed the findings of thirty-six studies spanning forty years of empirical research. These studies describe firms that have been involved in mergers, and contribute to our understanding of takeover activity and the determinants of merger targets.

Based on the theoretical framework of section 4—Theoretical Framework,[594] the meta-analysis in this section presents the discussion and the findings of measures used in empirical studies of acquisition likelihood. The measures are reorganized as they are not uniformly applied in empirical research.

The findings on firm characteristics and takeover activity are as follows:

The most important feature that determines acquisition likelihood is firm **size**. Consistent with international accounting standards on consolidation suggesting that the larger firm is usually the acquirer, the studies presented here suggest that smaller firms are more likely to be acquired. This is reasonable because smaller firms are limited in their resources, larger firms are more likely to realize operating synergies, and the number of firms that are larger than the target decreases as its size increases. Concerning the size metric, there is no indication whether the firm's total assets, sales or equity is a better discriminator; all of these metrics performed similarly. However, total assets was the most frequently used measure in the analyzed studies.

The **performance measures**, particularly return on assets and return on equity ratios, provide evidence consistent with the hypothesis that firms with lower profitability are likely to be acquisition targets. Several studies using logit regressions report a statistically significant relationship between these ratios and takeover likelihood. This supports the inefficient management / performance hypothesis, which suggests that mergers occur to replace poor managers with more efficient ones. However, the components of the return on assets (asset turnover and profit margin), if considered separately, do not consistently indicate the expected negative association towards takeover likelihood. The asset turnover ratio captures the ability of assets to generate sales; the profit margin calculates the proportion of profits that is generated by sales. Apparently, the information that is provided by these ratios individually is already contained in the return on assets, which somewhat explains their low relevance for takeover activity.

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[594] Section 4—Theoretical Framework.

With regard to **liquidity** measures, there is only weak evidence that liquidity—mostly understood as short-term solvency—determines acquisition likelihood. Often cash and other current asset positions are used. These positions, however, refer to the firm's liquidity position at the balance sheet date and do not necessarily reflect present or future levels of liquidity. These ratios change frequently, and, therefore, are not reliable indicators of future liquidity.

The **leverage** or debt capacity of the firms seems to be more relevant. The strongest implication for the importance of leverage as discriminator comes from studies using the debt-to-equity ratio. Several takeover studies report a statistically significant negative relationship between this ratio and takeover likelihood, which supports the hypothesis that firms with higher debt-capacity are likely takeover targets. However, no fewer than five studies report contrasting results. An explanation could be that the importance of leverage depends on other firm characteristics such as growth, and that these variables should be considered jointly. This is done using the growth-resource mismatch variable.

Growth is primarily measured by sales growth, assets growth, and equity growth. Studies using individual growth ratios did not support the expected positive association between growth and acquisition likelihood. This can partly be explained by the findings of several studies reporting that financial resources and growth need to be considered jointly by employing the growth-resource mismatch variable. Another explanation is that the metrics used are not sufficiently reliable because they use past growth rates to estimate future growth rates, and past growth rates do not necessarily reflect future growth potential.

A firm's **growth-resource mismatch** has served as an important and statistically significant indicator for takeover targets. The relationship between the growth-resource mismatch variable and acquisition likelihood is positive, suggesting that firms with a mismatch of growth opportunities and financial resources, are likely to become acquisition targets.

With regard to **valuation** ratios, financial theory suggests that firms are attractive takeover targets if their net assets are undervalued, or are acquirers if their market values are overvalued. Hence, firms with relatively low valuation ratios are likely acquisition targets. This is supported by several studies using price-to-book ratios and, to lesser extent, price-to-earnings ratios and Q-measures.

The **agency** measures employ free cash flow and dividend payout ratios to measure the amount of free cash flow not distributed to owners. If free cash flow is considered to

reflect of agency conflict, the literature supports the hypothesis that agency conflicted firms are likely to become acquisition targets. The studies using the dividend payout ratio and the percentage of earnings retained ratio report findings consistent with the agency conflict hypothesis that firms that have lower payouts are more likely to be acquisition targets.

With regard to **asset structure,** it is hypothesized that a high proportion of tangible to total assets is positively related to acquisition likelihood. The findings of the studies mentioned in this chapter support this assumption by reporting a statistically significant association between a firm's acquisition likelihood and its proportion of fixed assets.

There are limited studies examining the relationship between acquisition likelihood and **tax** benefits. This may be due to the fact that the financial impact from taxes is not straight-forward. Tax laws are complex, and if mergers are cross-border, for example, the deduction of tax loss carry-forwards is certainly very limited.

Industry shocks are significant indicators for mergers. However, the use of this variable seems limited given the frequency of within-industry takeovers in recent years.

In sum, acquisition targets have been described as smaller and less profitable, but with excess free cash flow, a growth-resource mismatch or excess debt capacity, and a relatively high proportion of tangible fixed assets. Further variables such as short-term solvency, taxes, and industry disturbance have also been significant, but are less important indicators in empirical takeover studies because their impact on acquisition likelihood is inconsistent.

A general limitation on the research presented in this chapter is that metrics, which have been used in takeover prediction studies, are far from standardized. The components as well as the time periods behind them are unique in almost every study and are seldom applied in response to previous findings. Furthermore, the most takeover studies do not derive their measures theoretically. Moreover, there seem to be multicollinearity issues since there are many covariates that are qualitatively redundant in the analyzed studies. Specifically, several studies use similar variables (e.g., working capital, current ratio, quick ratio) that are intended to measure the impact of one dimension of takeover activity (e.g., liquidity) simultaneously.

6 Empirical Study

Prior empirical studies suggest that relative firm characteristics are important indicators of target firms. However, instead of focusing on firm characteristics of target firms, this section empirically evaluates the firm characteristics of acquiring firms relative to their targets, the acquirees.

6.1 Statement of Hypothesis

There is no study, so far, that considers firm characteristics of acquiring firms directly, or in relation to their targets.[595] However, the findings of the previous meta-analysis report that acquisition targets compared to non-targets are smaller, less profitable, and/or have greater free cash flow.[596] Furthermore, target firms are often characterized by a growth-resource mismatch, excess debt capacity, and/or a relatively high proportion of fixed assets. Short-term solvency, taxes, and industry disturbance have been found to be less important indicators for the prediction of takeover targets. Their impact on acquisition likelihood is complex, inconsistent, or changes over time. Therefore, recent studies no longer consider taxes and industry disturbance variables.

The empirical analysis presented assumes that the discriminating properties used to distinguish targets from non-targets in takeover prediction studies can be used to characterize acquiring firms and their targets, the acquirees. This is conceivable because financial theory generally considers the motivations for business combinations from the standpoint of the acquiring firm rather than the potential target firm.[597]

Section 4—Theoretical Framework outlined the theoretical aspects and rationales behind the motives of takeover activity, and Section 5—Meta-Analysis provided an analysis of takeover studies.[598] Based on the findings in theses sections, the following associations between acquirer and acquiree are analyzed empirically.

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595 However, the studies of Trahan/Shawky (1992) and Trahan (1993) use the characteristics of acquiring firms compared to non-acquiring firms and examine the relation of firm characteristics to the shareholder wealth effects experienced by acquiring firms at the announcement of an acquisition; they use a US-sample of 212 acquiring and 1,008 non-acquiring firms between 1984 and 1986, Trahan/Shawky (1992), pp. 81-94; Trahan (1993), pp. 21-35; also, Sorensen (2000) compares merger targets to non-merging firms as well as acquiring firms to non-merging ones, using a 1996 sample of 350 acquirers, 286 targets and 217 non-merging firms, Sorensen (2000), pp. 423-433; furthermore, Kumar/Rajib (2007), pp. 27-44; Ooghe/De Langhe/Camerlynck (2006), pp. 725-733; Pasiouras/Gaganis/Zopounidis (2010), pp. 328-335 include some descriptives on acquiring and target firms.

596 See section 5.13—Interim Summary of Chapter 5.

597 See section 4—Theoretical Framework.

598 See section 4—Theoretical Framework, starting on pp. 23; section 5—Meta-Analysis.

6.1.1 Performance

Section 4.2.3—Managerial Inefficiencies and Performance stressed that acquisitions are motivated by the desire to remove self-interested managers.[599] Therefore, mergers are considered a control mechanism to discipline the management of underperforming firms, and are mainly motivated by potential merger gains that should accrue when the inefficient managers of the firm are replaced. Building upon this idea and the findings of the meta-analysis in section 5.2—Performance a positive relationship between acquirer and acquiree is hypothesized (Figure 48).[600]

> *Performance Hypothesis: Firms that are more profitable are more likely to be the acquirer than the acquiree in business combinations.*

Figure 48
Performance Hypothesis

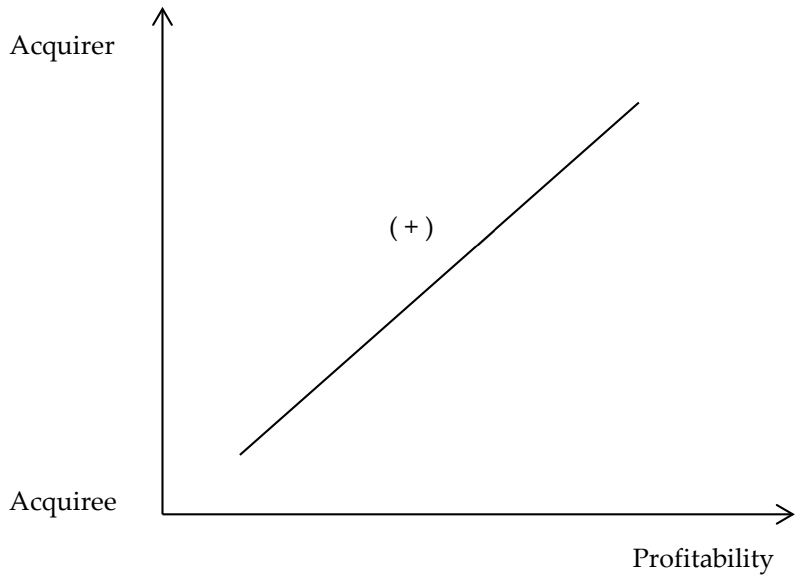

Figure 48: Performance Hypothesis

The regression analysis uses return on assets to measure profitability (PR). Measures used in the descriptive analysis as proxies for profitability are the return on equity, return on assets, EBIT, net income, and the sales-to-total assets activity.

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599 See section 4.2.3—Managerial Inefficiencies and Performance; Fama/Miller (1972), p. 75; Palepu (1982), pp. 28-31; Palepu (1986), p. 16.

600 See section 5.2—Performance.

6.1.2 Liquidity, Leverage, Growth and the Growth-Resource Mismatch

The overall impact of liquidity, leverage, and growth on acquisition likelihood in prior literature is ambiguous.[601] One explanation is that liquidity and leverage must be jointly related to firm growth in order to capture a potential mismatch of growth and resources.[602] That is why this study does not assume a directional impact of financial resources and growth on the likelihood of being the acquirer in a business combination. The analysis is rather exploratory and separately includes liquidity (LIQ), leverage (LEV), and growth (GR) as well as the joint variable for a growth-resource mismatch (GRMM).

Liquidity is measured using the current ratio in the logit regression analysis and, in addition to it, the quick ratio for the descriptive and the univariate analysis.

Leverage is analyzed using the debt-to-equity ratio, the (long-term) debt-to-assets ratio, and the interest coverage ratio in the descriptive and the univariate analysis. The logit regression then applies the (long-term) debt-to-assets ratio, which appeared to be a good discriminator in other empirical studies.[603]

Growth is measured by the 5-year average total asset growth in the logit analysis and, additionally, with 1- and 3-year average sales growth in the univariate statistics.

With regard to a growth-resource mismatch (GRMM),[604] it can be assumed that a high- (low-) growth firm with a lack (surplus) of financial resources is an attractive acquisition target, suggesting the following negative relationship between acquirer and acquiree in a business combination (Figure 49):

> *GRMM Hypothesis: Firms with a mismatch of growth and resources are more likely the acquiree than the acquirer in business combinations.*

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601 See section 5.5.8—Interim Summary—Liquidity Measures, starting p. 116.

602 See section 4.2.2.2.2—Growth-Resource Mismatch; 5.5.8- Interim Summary—Liquidity Measures, p. 116; Lehn/Netter/Poulson (1990), pp. 557-580.

603 See section 5.6—Leverage, Long-term Solvency and Debt Capacity.

604 See section 4.2.2.2.2—Growth-Resource Mismatch.

Figure 49
GRMM Hypothesis

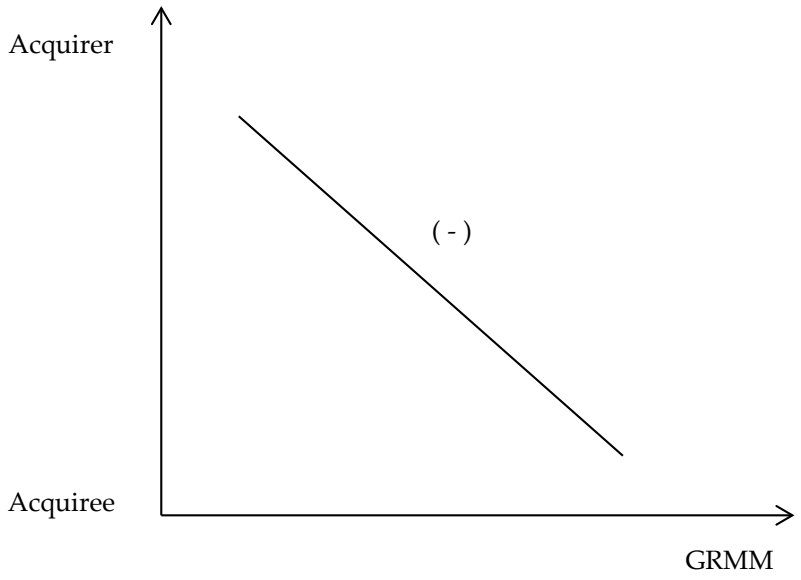

Figure 49: GRMM Hypothesis

The growth-resource mismatch variable is based on the 1-year average sales growth (GR), the current ratio (LIQ), and the debt-equity ratio (DE). A growth-resource mismatch is indicated by an indicator variable of 1 when the firm's

- GR is high, LIQ is low, and LEV is high; or
- GR is low, LIQ is high, and LEV is low.

It is otherwise 0.

The levels of GR, LIQ, and LEV are considered high or low if the firm's respective ratio was above or below the 10 percent 2-sided trimmed average of all firms in the complete sample.

6.1.3 Size

Consistent with both the use of size as an indicator in international accounting standards on consolidation, and the empirical findings on acquisition targets, the following positive relationship between acquirer and acquiree is hypothesized (Figure 50).

Size Hypothesis: Larger Firms are more likely to be the acquirer than the acquiree in business combinations.

Figure 50
Size Hypothesis

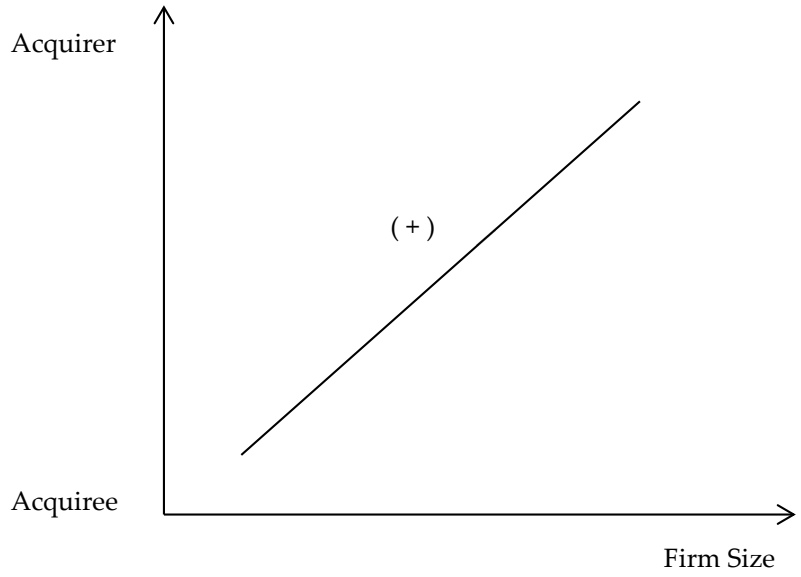

Figure 50: Size Hypothesis

The following measures are used as descriptive measures of firm size (SIZE): the firm's total assets (in million USD and as natural logarithm), total sales (in million USD and as natural logarithm), and the market capitalization (in million USD and as natural logarithm). The logit regression analysis uses the natural logarithm of total assets.

6.1.4 Agency

According to the hypothesis outlined in section 4.2.5—Agency Conflicts and section 5.11—Agency of the meta analysis,[605] agency costs can be avoided by an acquisition induced replacement of the current management. Furthermore, the availability of additional resources together with potentially unused profitable investment opportunities make an agency conflicted firm an attractive takeover target. Therefore, the free cash flow not distributed to the owners and remaining in the firm is assumed

[605] See section 4.2.5—Agency Conflicts; section 5.11—Agency Conflict Measures.

to be larger for acquisition targets than for their acquirers, resulting in the following hypothesis (Figure 51).

> *Agency Conflict Hypothesis: In a business combination, the firm with the larger amount of undistributed free cash flow is more likely to be the acquiree than the acquirer.*

Figure 51
Agency Conflict Hypothesis

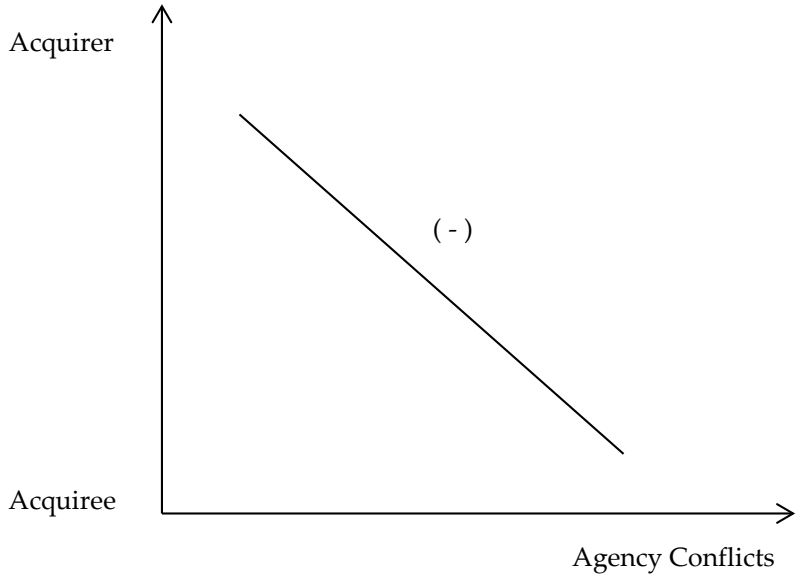

Figure 51: Agency Conflict Hypothesis

Agency conflicts in the multivariate analysis are approximated by the variable AGENCY, which is the firm's cash flow. The cash flow metric is scaled by the market capitalization.

In addition, the descriptive statistics and univariate tests display the percentage of dividend payout, which is expected to be the inverse of the previously discussed measure of agency conflict. This suggests that the acquirer has higher payouts than the acquiree does.

6.1.5 Valuation

Valuation discrepancies of the target firm, whether due to overvaluation of the acquirer or undervaluation of the target, are a well-described motive for takeover.[606] This is supported by several empirical takeover prediction studies that find lower valuation ratios for target than for non-targets using price-to-book ratios, Q-measures, and price-earnings ratios as proxies.[607] The following empirical analysis uses this approach and assumes that acquiring firms have higher valuation ratios than target firms. The resulting hypothesis is stated below (Figure 52).

> *Valuation Discrepancy Hypothesis: In a business combination, the higher-valued firm is more likely to be the acquirer; the lower-valued firm is more likely to be the acquiree.*

Figure 52
Valuation Discrepancy Hypothesis

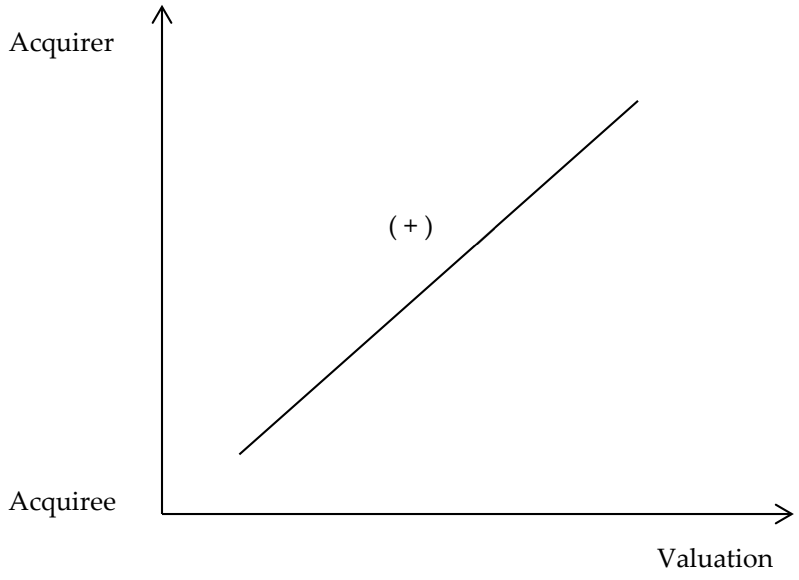

Figure 52: Valuation Discrepancy Hypothesis

The logit regression is based on the price-to-book ratio (VAL). The descriptive statistics and univariate analysis presents additional data on the price-earnings-ratio and the Q-measure.

606 See section 4.2.4—Valuation Discrepancies and Merger Activity.
607 See section 5.4—Valuation.

6.1.6 Asset Structure

Empirical takeover studies consistently reported that acquisition targets are firms with a relatively high proportion of tangible assets compared to non-targets.[608] Hence, in business combinations acquirers may consider the amount of the target's tangible assets as a co-insurance for the consideration transferred.[609,610] This study assumes that target firms compared to their acquirers have a higher proportion of tangible to total assets, resulting in the hypothesis stated below (Figure 53).

> *Asset Structure Hypothesis: Firms that have a relatively higher proportion of tangible assets are more likely to be the acquiree than the acquirer in business combinations.*

Figure 53
Asset Structure Hypothesis

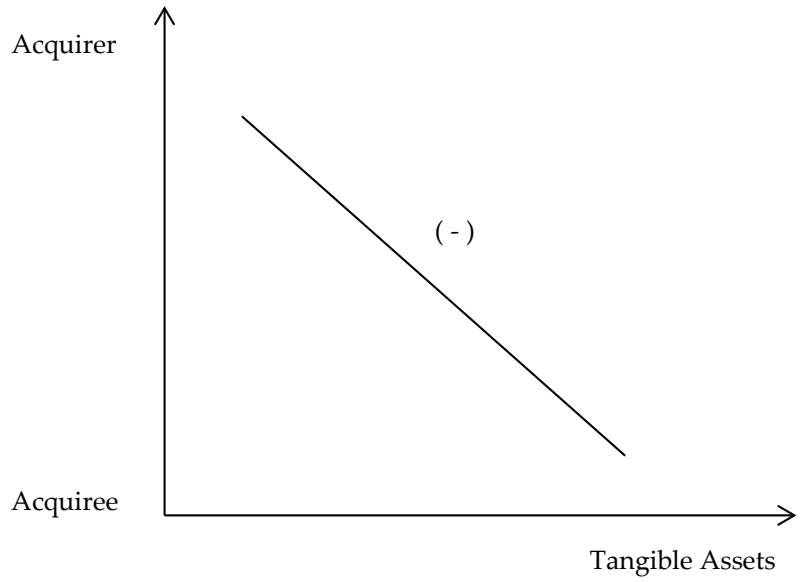

Figure 53: Asset Structure Hypothesis

608 See section 5.9—Asset Structure.

609 See section 4.3.2—Asset structure and Debt-Capacity.

610 Another explanation refers to growth opportunities, suggesting that asset-rich firms, particularly in declining industries, attract substantial takeover interest as a method of restructuring the firm to gain a competitive advantage relative to other firms in the industry, Ambrose/Megginson (1992), p. 583; Powell (1997), p. 1015; similarly, Trahan (1993), p. 29; see also section 4.3.2—Asset structure and Debt-Capacity.

6.2 Methodology

The empirical study is descriptive. It includes comparative statistics, univariate tests, and multivariate analysis. The Stata11 package was used for data analysis. Potential outliers were winsorized at 10 percent by Stata's Winsor Package.[611]

6.2.1 Univariate Analysis

First, the univariate analysis consists of comparative statistics that display the percentage of business combinations with relative acquirer-acquiree firm characteristics in the hypothesized direction (Table 53). For example, it is hypothesized that the larger firm in a business combination is the acquirer. Hence, it is expected that the acquirer will be larger than the acquiree in the majority of mergers. Accordingly, Table 53 displays the percentage of business combinations in which the acquirer was larger than its acquiree.

In addition, three univariate tests to compare the firm characteristics of the acquirer and acquiree are performed (Table 54, Table 55, and Table 56):

- The paired T-Test tests if the acquirer and the acquiree have the same mean, assuming paired data.[612] However, this test assumes that the difference between the two variables is normally distributed.
- Wilcoxon matched-pairs signed-ranks test that tests the equality of matched pairs of observations.[613] The null hypothesis is that both distributions are the same.
- The Signtest in Stata11 also tests the equality of matched pairs of observations.[614] The null hypothesis is that the median of the differences is zero (or the true proportion of positive (negative) signs is one-half); no further assumptions are made about the distributions. The analysis uses a two-sided test.

---

611 Potential outliers where treated by winsorizing the sample in Stata. The command 'winsor' in Stata takes the highest and the lowest values of the non-missing values and generates a new variable identical to the next value counting inwards from the extremes, Cox (2006). Winsor was applied to 10% of the extreme values of the variables of the total sample.

612 Satterthwaite (1946), pp. 110-114; Welch (1947), pp. 28-35.

613 Wilcoxon (1945), pp. 80-83.

614 Arbuthnott (1710), pp. 186-190; Snedecor/Cochran (1989), p. 135.

6.2.2 Multivariate Analysis

Besides comparative statistics and univariate tests, this study uses logit regression to describe the distinguishing characteristics of acquiring firms and their acquirees. Logit regression is the primary method used in empirical takeover or bankruptcy studies.[615] In logit regressions, the dependent variable is binary (here: acquirer = 1, acquiree = 0). Logit analysis employs maximum likelihood functions to estimate parameters and is expected to prove more powerful than multiple discriminant analysis because logit assumptions are not as restrictive as those required by discriminant analysis.[616]

The general model is as follows

$$Acquirer(Control)_i = f(PR_i, LIQ_i, LEV_i, GR_i, GRMM_i, SIZE_i, VAL_i, AGENCY_i, ASSETS_i),$$

Where:

Acquirer(Control)	=	Indicator variable equal to 1 if the firm is the controlling firm in a business combination; otherwise 0 for the acquiree;

and

PR	=	Profitability(ROA);
LIQ	=	Liquidity(Current Ratio);
LEV	=	Leverage(Lt.Debt-to-Assets);
GR	=	Growth(5-Yr-Total Assets-Growth);
GRMM	=	Growth-Resource Mismatch(LEV-high, LIQ-low, GR-high; or LEV-low, LIQ-high, GR-low)
SIZE	=	Size(Natural Logarithm of Total Assets);
VAL	=	Valuation(Price-to-Book);
AGENCY	=	Agency(Cash Flow / Total Assets);
ASSETS	=	Asset Structure(Tangible Assets / Total Assets);

Except *Acquirer(Control),* each variable in the regression model is calculated as the difference between the ratio of the acquirer and the ratio of the acquiree, in the year prior to the business combination.

---

615 See section 5.1—Overview: Previous Empirical Studies on Acquisition Likelihood.

616 Discriminant analysis requires the data to have multivariate normal distribution and the dispersion matrices of the groups to be equal. In logit analysis, no assumptions need to be made about the prior probability that the firm belongs to a specific group, and the assumptions of normal distribution and the equality of variances and covariances across groups are less critical, Meador/Church/Rayburn (1996), p. 17.

The logit probability (with p_i as the probability for firm i) of being the acquirer in business combinations is expressed below:

Figure 54
Logit Regression

$$\text{Ln}\,[p_i / (1 - p_i)] = \alpha_0 + \alpha_1 \overset{+}{PR}_i + \alpha_2 \overset{+/-}{LIQ} + \alpha_3 \overset{+/-}{LEV} + \alpha_4 \overset{+/-}{GR}_i + \alpha_5 \overset{-}{GRMM}_i + \alpha_6 \overset{+}{Size}_i + \alpha_7 \overset{+}{VAL}_i + \alpha_8 \overset{-}{AGENCY}_i + \alpha_9 \overset{-}{ASSETS}_i + \varepsilon_i$$

Figure 54: Logit Regression

In other words, this equation (Figure 54) compares the accounting determination of control (left-hand side) with the economic firm characteristics that potentially are expected to captures the motivation of a firm to enter a business combination as acquirer (right-hand side).

6.3 Sample

6.3.1 Databases

The data on business combinations was obtained from the Thomson One Banker Deals Analysis (TOBDA) database as of October 2010. Financial information on the firms involved in business combinations comes from the Worldscope (WS) database as of October 2010. With the exception of growth metrics, which use data from the 1- 5 years preceding the acquisition, financial information refers to the fiscal year immediately prior to the acquisition's effective date.[617]

The TOBDA data includes all business combinations in which one firm obtained majority control of a target firm during years 2000 to 2010 (year-to-date October 2010). There were 319,551 observations of business combinations. However, the number of business combinations was reduced to 7,903 after dropping business combinations with no data on financials (mostly private firms). Moreover, observations were removed from the sample in which indirect control was obtained or the acquisition was due to internal restructuring of the firm. In addition, reverse

[617] This procedure is in line with the target prediction studies, for example Bhabra (2008), pp. 158-175; Powell (2004), pp. 35-72; Barnes (2000), pp. 147-162; Cudd/Duggal (2000), pp. 105-120.

acquisitions involving private firms were dropped. This was done in order to avoid business combinations that were motivated by the desire to go public without undergoing a formal IPO.

6.3.2 Subsamples

For a detailed analysis, the total sample is divided into three subsamples to differentiate between:

- Cash acquisitions in which cash was transferred in exchange for control; in this case, the control assessment can be considered to be of low complexity (**Low Complexity Sample, Cash Acquisitions**); and
- Acquisitions that are executed by an exchange of stock (stock-for-stock acquisitions). As the control assessment may be discretionary, especially in cases when business combinations are effected primarily by exchanging equity interests, this sample includes all stock-for-stock acquisitions, that are not reverse acquisitions (**Moderate Complexity Sample, Stock-for-Stock, excl. Reverse Acquisitions**); and
- Since reverse acquisition are business combinations in which the economic substance (in terms of owners-control) deviates from the legal structure and overrides control on the firm level (in terms of voting rights);[618] these acquisition are considered to involve highly-complex control assessments (**High Complexity Sample, Reverse Acquisitions**).[619]

6.3.3 Sample Characteristics

A summary of firms, broken down by the industry, country, accounting standards, and year, is shown in the subsequent tables.

Table 49 displays the **industry distribution**. However, the following analysis omits real estate and financial firms (as well as holding firms). Their inclusion would have introduced a tremendous heterogeneity to the sample; furthermore, accounting methods and reporting practices potentially distort the analysis of firm characteristics in these industries. The multivariate analysis controls for industry-specific effects.

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618 See section 3.2.1—Firm-Level vs. Owner-Level Control.

619 TOBDA defines Reverse Acquisitions as acquisitions in which the acquiring firm offered more than 50% of its equity as consideration to the target firm, resulting in the target firm becoming the majority owner of the new company.

Table 50 displays the distribution of **business combinations per year**. Mergers appear in waves, which can explain the decline in merger activity with its low in 2002 and the decrease of mergers starting in 2009.[620] The consequences of the Dotcom Bubble and the financial crisis can be observed by the decrease in merger activity in 2002 and 2009. As such, the multivariate analysis controls for year-specific effects.

Table 52 captures the **cross-country distribution**. Since mergers and acquisitions are usually not limited to a certain country or nation, the sample is international and includes business combination involving cross-country firms. As countries may have an impact on which firm is the acquirer, (e.g., this may result from different regulatory and legal settings, including antitrust, competition, taxes, and corporate governance rules,), the multivariate analysis controls for country-specific effects.

With regard to **accounting standards**, Table 51 gives an overview of the proportion of international (IFRS, US-GAAP) and local standards. The multivariate analysis controls for accounting standards by using an indicator variable for international accounting standards. The variable is set equal to 1 for IFRS and US-GAAP standards, otherwise 0 for local standards. Controls are also included in the regression analysis for each individual set of accounting standards.

620 For an overview of merger waves of the last century and related literature, Bruner (2004), p. 69-75.

Table 49
Industry Distribution

	Low Complexity Sample (Cash Acquisitions)				*Moderate Complexity Sample (Stock-for-Stock, excl. Reverse Acquisitions)*				*High Complexity Sample (Reverse Acquisitions)*			
	Acquirer		*Acquiree*		*Acquirer*		*Acquiree*		*Acquirer*		*Acquiree*	
Classification ThomsonOne Macro Industries	*N= 6,027*	*% of Total*	*N= 6,027*	*% of Total*	*N= 1,764*	*% of Total*	*N= 1,764*	*% of Total*	*N= 112*	*% of Total*	*N= 112*	*% of Total*
Real Estate	251	4.2%	263	4.4%	71	4.0%	75	4.3%	8	7.1%	6	5.4%
Industrials	719	11.9%	804	13.3%	197	11.2%	172	9.8%	8	7.1%	10	8.9%
High Technology	731	12.1%	895	14.8%	281	15.9%	277	15.7%	14	12.5%	16	14.3%
Materials	792	13.1%	938	15.6%	248	14.1%	251	14.2%	18	16.1%	20	17.9%
Consumer Staples	338	5.6%	394	6.5%	70	4.0%	77	4.4%	5	4.5%	3	2.7%
Financials	1461	24.2%	780	12.9%	381	21.6%	356	20.2%	14	12.5%	22	19.6%
Energy and Power	407	6.8%	404	6.7%	159	9.0%	153	8.7%	16	14.3%	9	8.0%
Retail	239	4.0%	288	4.8%	72	4.1%	77	4.4%	5	4.5%	4	3.6%
Healthcare	277	4.6%	347	5.8%	98	5.6%	98	5.6%	8	7.1%	8	7.1%
Telecommunications	259	4.3%	242	4.0%	61	3.5%	64	3.6%	5	4.5%	5	4.5%
Media and Entertainment	272	4.5%	327	5.4%	67	3.8%	64	3.6%	4	3.6%	6	5.4%
Consumer Products and Services	281	4.7%	342	5.7%	59	3.3%	100	5.7%	7	6.3%	3	2.7%

Table 49: Industry Distribution

Table 50

Distribution of Business Combinations per Year

Year Business Combination Effective	*Low Complexity Sample (Cash Acquisitions)*		*Moderate Complexity Sample (Stock-for-Stock, excl. Reverse Acquisitions)*		*High Complexity Sample (Reverse Acquisitions)*	
	N=6,027	*% of Total*	*N=1,764*	*% of Total*	*N=112*	*% of Total*
2000	*623*	*10.3%*	*220*	*12.5%*	*18*	*16.1%*
2001	*453*	*7.5%*	*167*	*9.5%*	*4*	*3.6%*
2002	*449*	*7.4%*	*127*	*7.2%*	*7*	*6.3%*
2003	*478*	*7.9%*	*150*	*8.5%*	*1*	*0.9%*
2004	*456*	*7.6%*	*175*	*9.9%*	*3*	*2.7%*
2005	*561*	*9.3%*	*178*	*10.1%*	*10*	*8.9%*
2006	*647*	*10.7%*	*167*	*9.5%*	*12*	*10.7%*
2007	*715*	*11.9%*	*167*	*9.5%*	*13*	*11.6%*
2008	*686*	*11.4%*	*135*	*7.7%*	*21*	*18.8%*
2009	*555*	*9.2%*	*154*	*8.7%*	*11*	*9.8%*
2010 (YTD Oct)	*404*	*6.7%*	*124*	*7.0%*	*12*	*10.7%*

Table 50: Distribution of Business Combinations per Year

Table 51

Distribution of Accounting Standards

	Low Complexity Sample (Cash Acquisitions)				*Moderate Complexity Sample (Stock-for-Stock, excl. Reverse Acquisitions)*				*High Complexity Sample (Reverse Acquisitions)*			
	Acquirer		*Acquiree*		*Acquirer*		*Acquiree*		*Acquirer*		*Acquiree*	
Accounting Standards	*N= 6,027*	*% of Total*	*N= 6,027*	*% of Total*	*N= 1,764*	*% of Total*	*N= 1,764*	*% of Total*	*N= 112*	*% of Total*	*N= 112*	*% of Total*
International (IFRS, US-GAAP)	*2786*	*46.2%*	*2342*	*38.9%*	*834*	*47.3%*	*795*	*45.1%*	*52*	*46.4%*	*51*	*45.5%*
Local	*3187*	*52.9%*	*3685*	*61.1%*	*921*	*52.2%*	*969*	*54.9%*	*60*	*53.6%*	*60*	*53.6%*
Not Indicated	*54*	*0.9%*	*0*	*0.0%*	*9*	*0.5%*	*0*	*0.0%*	*0*	*0.0%*	*1*	*0.9%*

Table 51: Distribution of Accounting Standards

Table 52
Country Distribution

	Low Complexity Sample (Cash Acquisitions)				*Moderate Complexity Sample (Stock-for-Stock, excl. Reverse Acquisitions)*				*High Complexity Sample (Reverse Acquisitions)*			
	Acquirer		*Acquiree*		*Acquirer*		*Acquiree*		*Acquirer*		*Acquiree*	
Accounting Standards	*N= 6,027*	*% of Total*	*N= 6,027*	*% of Total*	*N= 1,764*	*% of Total*	*N= 1,764*	*% of Total*	*N= 112*	*% of Total*	*N= 112*	*% of Total*
Argentina	*7*	*0.1%*	*18*	*0.3%*			*4*	*0.2%*				
Australia	*459*	*7.6%*	*593*	*9.8%*	*122*	*6.9%*	*135*	*7.7%*	*19*	*17.0%*	*19*	*17.0%*
Austria	*41*	*0.7%*	*35*	*0.6%*			*2*	*0.1%*	*1*	*0.9%*	*1*	*0.9%*
Bahamas							*1*	*0.1%*				
Bahrain	*2*	*0.0%*	*5*	*0.1%*								
Belgium	*52*	*0.9%*	*29*	*0.5%*					*1*	*0.9%*	*1*	*0.9%*
Bermuda	*7*	*0.1%*	*5*	*0.1%*	*7*	*0.4%*	*4*	*0.2%*				
Brazil	*50*	*0.8%*	*73*	*1.2%*	*14*	*0.8%*	*17*	*1.0%*	*1*	*0.9%*	*1*	*0.9%*
Canada	*283*	*4.7%*	*319*	*5.3%*	*155*	*8.8%*	*144*	*8.2%*	*10*	*8.9%*	*10*	*8.9%*
Cayman Islands	*4*	*0.1%*	*2*	*0.0%*								
Chile	*16*	*0.3%*	*29*	*0.5%*	*1*	*0.1%*	*2*	*0.1%*				
China	*77*	*1.3%*	*74*	*1.2%*	*4*	*0.2%*	*5*	*0.3%*			*1*	*0.9%*
Colombia	*11*	*0.2%*	*13*	*0.2%*	*4*	*0.2%*	*4*	*0.2%*				

Table 52 continues on next page.

Table 52, continued
Country Distribution

	Low Complexity Sample (Cash Acquisitions)				*Moderate Complexity Sample (Stock-for-Stock, excl. Reverse Acquisitions)*				*High Complexity Sample (Reverse Acquisitions)*			
	Acquirer		*Acquiree*		*Acquirer*		*Acquiree*		*Acquirer*		*Acquiree*	
Accounting Standards	*N= 6,027*	*% of Total*	*N= 6,027*	*% of Total*	*N= 1,764*	*% of Total*	*N= 1,764*	*% of Total*	*N= 112*	*% of Total*	*N= 112*	*% of Total*
Croatia			*1*	*0.0%*								
Cyprus	*1*	*0.0%*	*1*	*0.0%*								
Czech Republic	*5*	*0.1%*	*24*	*0.4%*								
Denmark	*28*	*0.5%*	*30*	*0.5%*	*3*	*0.2%*	*2*	*0.1%*	*2*	*1.8%*	*1*	*0.9%*
Egypt	*8*	*0.1%*	*8*	*0.1%*								
Finland	*41*	*0.7%*	*35*	*0.6%*	*7*	*0.4%*	*8*	*0.5%*				
France	*263*	*4.4%*	*182*	*3.0%*	*29*	*1.6%*	*22*	*1.2%*	*4*	*3.6%*	*4*	*3.6%*
Germany	*305*	*5.1%*	*256*	*4.2%*	*12*	*0.7%*	*14*	*0.8%*			*1*	*0.9%*
Greece	*31*	*0.5%*	*39*	*0.6%*	*9*	*0.5%*	*8*	*0.5%*				
Guernsey	*1*	*0.0%*	*1*	*0.0%*	*1*	*0.1%*	*1*	*0.1%*				
Hong Kong	*101*	*1.7%*	*111*	*1.8%*	*14*	*0.8%*	*11*	*0.6%*	*2*	*1.8%*	*2*	*1.8%*
Hungary	*10*	*0.2%*	*19*	*0.3%*								
Iceland	*18*	*0.3%*	*7*	*0.1%*	*2*	*0.1%*						

Table 52 continues on next page.

Table 52, continued
Country Distribution

	Low Complexity Sample (Cash Acquisitions)				*Moderate Complexity Sample (Stock-for-Stock, excl. Reverse Acquisitions)*				*High Complexity Sample (Reverse Acquisitions)*			
	Acquirer		*Acquiree*		*Acquirer*		*Acquiree*		*Acquirer*		*Acquiree*	
Accounting Standards	*N= 6,027*	*% of Total*	*N= 6,027*	*% of Total*	*N= 1,764*	*% of Total*	*N= 1,764*	*% of Total*	*N= 112*	*% of Total*	*N= 112*	*% of Total*
India	*106*	*1.8%*	*152*	*2.5%*	*20*	*1.1%*	*19*	*1.1%*	*2*	*1.8%*	*2*	*1.8%*
Indonesia	*24*	*0.4%*	*53*	*0.9%*								
Ireland-Rep	*7*	*0.1%*	*7*	*0.1%*	*4*	*0.2%*	*5*	*0.3%*				
Isle of Man	*1*	*0.0%*	*1*	*0.0%*			*1*	*0.1%*				
Israel	*26*	*0.4%*	*22*	*0.4%*	*4*	*0.2%*	*2*	*0.1%*				
Italy	*109*	*1.8%*	*96*	*1.6%*	*23*	*1.3%*	*16*	*0.9%*	*1*	*0.9%*	*1*	*0.9%*
Japan	*1283*	*21.3%*	*1205*	*20.0%*	*466*	*26.4%*	*466*	*26.4%*	*15*	*13.4%*	*15*	*13.4%*
Jersey	*1*	*0.0%*	*3*	*0.0%*	*2*	*0.1%*	*2*	*0.1%*				
Jordan	*1*	*0.0%*	*4*	*0.1%*								
Kuwait	*24*	*0.4%*	*16*	*0.3%*								
Lebanon			*1*	*0.0%*								
Liechtenstein	*1*	*0.0%*										
Lithuania			*3*	*0.0%*								

Table 52 continues on next page.

Table 52, continued
Country Distribution

Accounting Standards	*Low Complexity Sample (Cash Acquisitions)*				*Moderate Complexity Sample (Stock-for-Stock, excl. Reverse Acquisitions)*				*High Complexity Sample (Reverse Acquisitions)*			
	Acquirer		*Acquiree*		*Acquirer*		*Acquiree*		*Acquirer*		*Acquiree*	
	N= 6,027	*% of Total*	*N= 6,027*	*% of Total*	*N= 1,764*	*% of Total*	*N= 1,764*	*% of Total*	*N= 112*	*% of Total*	*N= 112*	*% of Total*
Luxembourg	*12*	*0.2%*	*3*	*0.0%*	*2*	*0.1%*	*2*	*0.1%*				
Malaysia	*116*	*1.9%*	*109*	*1.8%*	*13*	*0.7%*	*14*	*0.8%*	*1*	*0.9%*		
Mexico	*20*	*0.3%*	*24*	*0.4%*	*3*	*0.2%*	*3*	*0.2%*				
Monaco	*1*	*0.0%*										
Morocco	*4*	*0.1%*	*6*	*0.1%*								
Neth Antilles			*2*	*0.0%*								
Netherlands	*70*	*1.2%*	*51*	*0.8%*	*11*	*0.6%*	*8*	*0.5%*	*2*	*1.8%*		
New Zealand	*19*	*0.3%*	*26*	*0.4%*	*1*	*0.1%*	*1*	*0.1%*	*3*	*2.7%*	*3*	*2.7%*
Nigeria			*1*	*0.0%*								
Norway	*51*	*0.8%*	*63*	*1.0%*	*5*	*0.3%*	*5*	*0.3%*				
Oman	*2*	*0.0%*										
Pakistan	*3*	*0.0%*	*9*	*0.1%*								
Papua N Guinea					*2*	*0.1%*	*1*	*0.1%*				

Table 52 continues on next page.

Table 52, continued
Country Distribution

	Low Complexity Sample (Cash Acquisitions)				*Moderate Complexity Sample (Stock-for-Stock, excl. Reverse Acquisitions)*				*High Complexity Sample (Reverse Acquisitions)*			
	Acquirer		*Acquiree*		*Acquirer*		*Acquiree*		*Acquirer*		*Acquiree*	
Accounting Standards	*N= 6,027*	*% of Total*	*N= 6,027*	*% of Total*	*N= 1,764*	*% of Total*	*N= 1,764*	*% of Total*	*N= 112*	*% of Total*	*N= 112*	*% of Total*
Peru	*4*	*0.1%*	*13*	*0.2%*	*1*	*0.1%*	*2*	*0.1%*				
Philippines	*28*	*0.5%*	*37*	*0.6%*	*2*	*0.1%*	*2*	*0.1%*				
Poland	*29*	*0.5%*	*56*	*0.9%*	*3*	*0.2%*	*3*	*0.2%*				
Portugal	*26*	*0.4%*	*39*	*0.6%*	*1*	*0.1%*	*3*	*0.2%*				
Puerto Rico	*2*	*0.0%*	*2*	*0.0%*								
Qatar	*3*	*0.0%*	*1*	*0.0%*	*1*	*0.1%*	*1*	*0.1%*	*1*	*0.9%*	*1*	*0.9%*
Reunion	*1*	*0.0%*	*1*	*0.0%*								
Russian Fed	*42*	*0.7%*	*45*	*0.7%*			*1*	*0.1%*				
Saudi Arabia	*2*	*0.0%*	*1*	*0.0%*	*1*	*0.1%*	*1*	*0.1%*				
Singapore	*106*	*1.8%*	*106*	*1.8%*	*15*	*0.9%*	*15*	*0.9%*				
Slovak Rep			*4*	*0.1%*								
Slovenia	*3*	*0.0%*	*3*	*0.0%*								
South Africa	*77*	*1.3%*	*57*	*0.9%*	*12*	*0.7%*	*13*	*0.7%*	*3*	*2.7%*		

Table 52 continues on next page.

Table 52, continued
Country Distribution

	Low Complexity Sample (Cash Acquisitions)				*Moderate Complexity Sample (Stock-for-Stock, excl. Reverse Acquisitions)*				*High Complexity Sample (Reverse Acquisitions)*			
	Acquirer		*Acquiree*		*Acquirer*		*Acquiree*		*Acquirer*		*Acquiree*	
Accounting Standards	*N= 6,027*	*% of Total*	*N= 6,027*	*% of Total*	*N= 1,764*	*% of Total*	*N= 1,764*	*% of Total*	*N= 112*	*% of Total*	*N= 112*	*% of Total*
South Korea	*170*	*2.8%*	*205*	*3.4%*	*13*	*0.7%*	*13*	*0.7%*	*3*	*2.7%*	*3*	*2.7%*
Spain	*100*	*1.7%*	*82*	*1.4%*	*29*	*1.6%*	*14*	*0.8%*				
Sri Lanka	*3*	*0.0%*	*4*	*0.1%*								
Sweden	*109*	*1.8%*	*98*	*1.6%*	*8*	*0.5%*	*12*	*0.7%*	*2*	*1.8%*	*2*	*1.8%*
Switzerland	*108*	*1.8%*	*58*	*1.0%*	*8*	*0.5%*	*12*	*0.7%*	*1*	*0.9%*	*2*	*1.8%*
Taiwan	*66*	*1.1%*	*73*	*1.2%*	*21*	*1.2%*	*21*	*1.2%*	*1*	*0.9%*	*1*	*0.9%*
Thailand	*68*	*1.1%*	*85*	*1.4%*	*8*	*0.5%*	*8*	*0.5%*	*1*	*0.9%*	*1*	*0.9%*
Turkey	*12*	*0.2%*	*33*	*0.5%*								
United Kingdom	*362*	*6.0%*	*306*	*5.1%*	*123*	*7.0%*	*127*	*7.2%*	*10*	*8.9%*	*12*	*10.7%*
United States	*1000*	*16.6%*	*948*	*15.7%*	*577*	*32.7%*	*586*	*33.2%*	*26*	*23.2%*	*28*	*25.0%*
United Arab Emirates	*3*	*0.0%*	*2*	*0.0%*	*1*	*0.1%*	*1*	*0.1%*				
Venezuela	*1*	*0.0%*	*2*	*0.0%*								

Table 52: Country Distribution

6.4 Results

6.4.1 Overview and Diagnostic

Table 53 displays the comparative statistics of the percentage of business combinations in the sample that show relative firm characteristics in the hypothesized direction. If there was no particular directional hypothesis, Table 53 shows the percentage indicated in parenthesis, which was based on the larger proportion in the low complexity sample case (cash acquisitions).

Table 54, Table 55, and Table 56 present the descriptive statistics and univariate tests of means and medians for each sample. The firm characteristics of the acquirer and acquiree are compared using three tests: the paired T-Test and the Wilcoxon matched-pairs signed-ranks test to test the equality of means, and the Signtest to test medians of the paired observations. The respective p-values are presented in the three columns on the left of the table. The 2-tailed significance level is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 57 presents the results of the logit regression. For each sample (low complexity, moderate complexity and high complexity), a regression analysis including the same independent variables was performed. Control variables are used to control for industry-specific, year-specific, and country-specific effects as well as the effect of international accounting standards using an indicator variable for international accounting standards. Additionally, a control variable is included for each individual set of accounting standards. R-squared refers to McFadden's pseudo R-squared. The robust standard errors are shown below the logit coefficient in parentheses. The 2-tailed significance level is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

To avoid incorrect statistical inferences, the logit regression model was analyzed with regard to specification errors, goodness-of-fit and multicollinearity.[621] Results on specification tests (using the program linktest in Stata11), goodness-of-fit statistics, correlation tables, and tolerance tests are displayed in Appendix B: Logit Regression Diagnostics. The model fit with regard to the three samples is revisited and discussed in detail at the end of the following section.

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621 See Peng/Lee/Ingersoll (2002), pp. 3-14 for a guidance on logit model diagnostics.

6.4.2 Relative Firm Characteristics

6.4.2.1 *Performance*

The **performance** hypothesis stresses that in business combinations the more profitable firms are more likely to be the acquirers than the acquirees. The comparative results in Table 53 suggest that this is the case for 61 to 64 percent of the business combinations in the low complexity sample (cash acquisitions) when ROA and ROE are used to measure profitability. However, the acquiring firm has a higher activity level, measured by the sales-to-assets ratio, in only 40 percent of the business combinations. In other words, the acquirees generate greater sales off their assets than do acquirers. The significant univariate findings (Table 54) and the positive and the highly significant sign in the logit regression (Table 55) further support the findings on the ROE, ROA, and sales-to-assets ratios. Similarly, statistically significant results are obtained for the moderate complexity sample (stock-for-stock acquisitions) in the univariate and multivariate analysis. However, the control assessment in the high complexity sample (reverse acquisition) is negative with no significance (Table 56, Table 57).

6.4.2.2 *Liquidity, Leverage and Growth*

With regard to **liquidity,** the univariate analysis—except for the high complexity sample (reverse acquisitions)—suggests that the acquiree is more liquid than the acquirer. This is in line with some target prediction studies that suggest that highly-liquid firms or firms in good financial shape are attractive targets as they provide additional financial resources. However, the multivariate analysis reveals with high statistical significance that the acquirer is more liquid when the low complexity sample (cash acquisitions) is considered; and the acquiree is more liquid when the moderate complexity sample (stock-for-stock acquisition) and the high complexity sample (stock-for-stock acquisition) are considered. This is conceivable since the means of payment (cash or stock) may be determined by the acquirer's liquidity.

Using the low and moderate complexity samples, Table 53 shows that the acquirer has more debt on the balance sheet than the acquiree in 54 to 59 percent of business combinations. This finding is supported by the univariate tests (Table 54, Table 55). However, the logit coefficient in the multivariate analysis with regard to the low and moderate complexity samples bears a statistically significant negative sign for the **leverage** ratio, indicating that the acquiree is more highly levered. The high

complexity sample (reverse acquisitions), again, does not show statistically significant results.

With regard to **growth**, both the univariate tests and multivariate analysis for the low and moderate complexity samples suggest that the high-growth firm is the acquirer (Table 53, Table 54, Table 55, and Table 57). The results using the high complexity (reverse acquisitions) sample again lacks statistical significance (Table 56, Table 57).

As far as the low complexity sample (cash acquisition) is concerned, acquirees are characterized by a growth-resource mismatch, **GRMM.** This is indicated by the logit regression results in Table 57 and is consistent with the hypothesis that firms that face a mismatch of growth and resources are more likely to be the acquirees than the acquirers in business combinations.

6.4.2.3 *Size*

Firm **size** seems to be the most important discriminator. Consistent with the size hypothesis that states that larger firms are more likely to be the acquirer than the acquiree, the descriptive statistics for all business combinations—except those using the high complexity sample (reverse acquisitions)—reveal that in 86 percent to 90 percent of the business combinations the acquirer is larger than the acquiree (Table 53). This is also strongly supported by univariate tests and multivariate analyses displayed in Table 54, Table 55, and Table 57.

6.4.2.4 *Agency Conflicts*

The variables related to possible **agency conflicts** are supposed to indicate the amount of free cash flow that has not been distributed to the owners. It is hypothesized that the firm with the larger amount of undistributed free cash flow is more likely to be the acquiree than the acquirer. The regression results in Table 57 support the hypothesis for all samples except the high complexity sample (reverse acquisitions), which does not show statistically significant results. However, the comparative statistics and the univariate tests suggest the opposite for all three samples (Table 53, Table 54, and Table 55).

6.4.2.5 *Valuation Discrepancies*

It is hypothesized that firms involved in business combination have **valuation discrepancies**, and that the acquirer is the firm, which is relatively higher-valued than

the target, the acquiree. As shown in Table 54, 53 to 60 percent of business combinations in low and moderate complexity samples have higher valuation ratios for the acquirer than the acquiree, which in—its tendency—supports the valuation discrepancy hypothesis. However, only 45 to 53 percent of the firms in the high complexity sample (reverse acquisitions) show this same trend. This is consistent with the findings of the univariate tests and the multivariate analysis. Table 54, Table 55, and Table 57 show that the acquirers in business combinations of the low complexity sample (cash acquisition) and the moderate complexity sample (stock-for-stock acquisition) are valued higher than their acquirees. However, the control assessment in the high complexity sample (reverse acquisition) seems unrelated to the assumptions of the valuation discrepancy hypothesis, as the logit regression coefficient is insignificant (Table 57).

6.4.2.6 *Asset Structure*

The **asset structure** related hypothesis predicts that firms that have a relatively higher proportion of tangible assets are more likely to be the acquiree than the acquirer in business combinations. This hypothesis is supported by the comparative statistics of Table 53, which show that this is the case—excluding the high complexity sample (reverse acquisitions)—for 62 to 64 percent of the business combinations. The univariate tests in Table 54 and Table 55 emphasize this finding of a negative relationship between asset structure and control assessment for the low and moderate complexity sample. However, the ASSETS variable in the multivariate analysis bears a significant positive sign for both samples and suggests just the opposite (Table 57). The high complexity sample (reverse acquisitions), again, does not show statistically significant results.

6.4.3 Sample Comparison

The total sample is divided into three subsamples to differentiate between three levels of control assessment complexity: low complexity, which has been indicated by cash acquisitions; moderate complexity, which has been indicated by stock-for-stock acquisitions; and high complexity, which has been indicated by reverse acquisitions.

The most striking difference between the samples when the results of the comparative statistics (Table 53), the univariate tests (Table 54, Table 55, and Table 56) and the multivariate analysis (Table 57) are taken together is the deviation of the results of the high complexity sample (reverse acquisitions) from the other two samples.

The reverse acquisitions in the low complexity sample are acquisitions in which the acquiring firm offers more than 50 percent of its equity as consideration to the target firm, resulting in the target firm becoming the majority owner of the new company. The owners' control overrides the firm-level control in this case. Proponents of reverse acquisitions argue that the consideration of the owners' control in acquisitions accounts for the economic substance of the transaction. However, owners usually have only an indirect effect on the firm management, and the relationship between management and owners is often effected by information asymmetries. Moreover, the firms—not their owners—engage in the negotiations necessary to carry out the combination, although the owners must eventually participate in and approve the transaction.[622] Hence, the construct of a reverse acquisition is discretional. Since the choice of a reverse acquisition influences the accounting,[623] it would be interesting for further research to analyze why the model (Table 57) that largely works on cash acquisition and stock-for-stock acquisitions (Pseudo R-Squared 0.7604 and 0.7809, respectively) does not work for the reverse acquisition sample (Pseudo R-Squared 0.2237).

[622] See also p. 13, fn.41.

[623] The acquiree's (not the acquirer's) assets have to be recognized and measured at their acquisition date fair values, section 3.2.1—Firm-Level vs. Owner-Level Control.

Table 53
Proportion of Mergers in Favor of Hypotheses

Dimensions / *Variables*	*Hypo-thesized Relation*	Samples: *Low Complexity (Cash Acquisitions) (N=3602)*	*Moderate Complexity (Stock-for-Stock, excl. Reverse Acquisitions) (N=1100)*	*High Complexity Reverse Acquisitions) (N=75)*
Profitability (PR)				
ROA	>	61%	55%	59%
ROE	>	64%	58%	62%
Activity Ratio (Sales / Total Assets)	>	40%	47%	49%
Liquidity (LIQ)				
Quick Ratio	n/a (<)	54%	58%	46%
Current Ratio	n/a (<)	53%	52%	46%
Leverage (LEV)				
Debt-to-Equity	n/a (>)	56%	54%	52%
Lt.Debt-to-Assets	n/a (>)	57%	55%	53%
Interest Coverage	n/a (>)	59%	55%	50%
Growth (GR)				
1-Yr-Sales-Growth	n/a (>)	53%	54%	51%
3-Yr-Sales-Growth	n/a (>)	53%	56%	48%
5-Yr-Total Assets-Growth	n/a (>)	55%	53%	49%
SIZE				
Total Assets	>	87%	86%	63%
Total Sales	>	86%	83%	68%
Market Capitalization	>	89%	90%	66%
AGENCY				
Cash Flow / Market Capitalization	<	40%	45%	37%
Dividend Payout	>	47%	46%	64%
Valuation (VAL)				
Price-to-Book	>	53%	57%	45%
Price-to-Earnings	>	58%	52%	49%
Q-Measure	>	55%	60%	53%
Asset Structure (ASSETS)				
Tangible Assets / Total Assets	<	62%	64%	35%

This table displays the comparative statistics of the percentage of business combinations in the sample that show relative firm characteristics in the hypothesized direction. If there was no particular hypothesis, the percentage indicated in parenthesis is shown.

Table 53: Proportion of Mergers in Favor of Hypotheses

Table 54

Descriptives—Low Complexity Sample (Cash Acquisitions)

Variables	*Hypo-thesized Relation*	*Acquirer*				*Ob-served Relation*	*Acquiree*				T-Test	Wil-coxon	Signtest
		N	*Mean*	*Relation*	*Std*		*N*	*Mean*	*Median*	*Std*	*p*	*p*	*p*
Profitability (PR)													
ROA	>	4,141	3.97%	4.23%	6.21%	>	4,139	0.06%	1.74%	8.15%	0.000*	0.000*	0.000*
ROE	>	4,141	10.08%	11.17%	14.09%	>	4,139	1.81%	4.92%	18.16%	0.000*	0.000*	0.000*
Activity Ratio (Sales / Total Assets)	>	3,999	6.15%	0.18%	25.20%	<	3,801	11.98%	1.20%	40.15%	0.000*	0.000*	0.000*
EBIT (in million USD)	>	4,075	516.3	144.2	652.1	>	4,006	75.6	5.2	243.8	0.000*	0.000*	0.000*
Net Income (in million USD)	>	4,141	240.7	62.7	310.1	>	4,139	36.0	2.0	125.0	0.000*	0.000*	0.000*
Liquidity (LIQ)													
Quick Ratio	>/<	4,094	1.32	0.99	0.94	<	4,006	1.47	1.05	1.09	0.000*	0.000*	0.036**
Current Ratio	>/<	4,097	2.47	1.39	7.43	<	4,040	3.27	1.51	13.72	0.001*	0.000*	0.001*
Leverage (LEV)													
Debt-to-Equity	>/<	4,142	5.57	1.39	61.84	>	4,136	5.13	0.98	49.54	0.715	0.000*	0.000*
Lt.Debt-to-Assets	>/<	3,642	0.18	0.17	0.13	>	3,151	0.17	0.12	0.18	0.002*	0.000*	0.000*
Interest Coverage	>/<	3,885	0.45	0.11	10.68	>	3,636	-0.06	0.05	4.81	0.008*	0.000*	0.000*
Growth (GR)													
1-Yr-Sales-Growth	>/<	4,000	15.38%	9.73%	21.96%	>	3,804	12.12%	6.94%	22.86%	0.000*	0.000*	0.000*
3-Yr-Sales-Growth	>/<	3,804	13.94%	10.29%	16.31%	>	3,403	11.88%	7.30%	17.09%	0.000*	0.000*	0.000*
5-Yr-Total Assets-Growth	>/<	3,451	13.16%	9.74%	13.67%	>	2,824	10.21%	5.94%	14.08%	0.000*	0.000*	0.000*
SIZE													
Total Assets (in million USD)	>	4,142	8,882	2,304	12,168	>	4,139	1,170	175	3,650	0.000*	0.000*	0.000*
Total Sales (in million USD)	>	4,056	5,309	1,917	6,247	>	3,903	929	162	2,392	0.000*	0.000*	0.000*
Market Capitalization (in million USD)	>	4,137	5,136	1,877	5,949	>	4,128	817	115	2,243	0.000*	0.000*	0.000*

Table 54 continues on next page.

Table 54, continued

Descriptives—Low Complexity Sample (Cash Acquisitions)

Variables	*Hypo-thesized Relation*	*Acquirer*				*Ob-served Relation*	*Acquiree*				T-Test	Wil-coxon	Signtest
		N	*Mean*	*Relation*	*Std*		*N*	*Mean*	*Median*	*Std*	*p*	*p*	*p*
AGENCY													
Cash Flow / Market Capitalization	<	*4,109*	*0.107*	*0.092*	*0.140*	>	*4,063*	*0.078*	*0.070*	*0.237*	0.000*	0.000*	0.000*
Dividend Payout	>	*2,539*	*31.17%*	*28.01%*	*18.10%*	<	*1,440*	*33.69%*	*29.97%*	*19.27%*	0.008*	0.008*	0.154
Valuation (VAL)													
Price-to-Book	>	*4,031*	*2.46*	*1.96*	*1.53*	>	*4,067*	*2.32*	*1.76*	*1.62*	0.000*	0.000*	0.000*
Price-to-Earnings	>	*4,095*	*17.2*	*15.7*	*15.5*	>	*4,043*	*10.7*	*9.2*	*16.8*	0.000*	0.000*	0.000*
Q-Measure	>	*4,137*	*1.77*	*1.28*	*2.82*	>	*4,126*	*1.65*	*1.29*	*1.77*	0.024**	0.000*	0.000*
Asset Structure (ASSETS)													
Tangible Assets / Total Assets	<	*3,990*	*0.871*	*0.919*	*0.155*	<	*3,931*	*0.894*	*0.957*	*0.145*	0.000*	0.000*	0.000*

This table present the descriptives and the univariate tests of means and medians for the low complexity sample. Three tests to compare the firm characteristics of the acquirer and acquiree are performed: the paired T-Test and the Wilcoxon matched-pairs signed-ranks test to test the equality of means, and the Signtest to test medians of the paired observations. The respective p-values are presented in the three columns on the left. The significance level is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 54: Comparison of Means and Median, Low Complexity Sample

Table 55

Descriptives—Moderate Complexity Sample (Stock-for-Stock, excl. Reverse Acquisitions)

Variables	Hypothesized Relation	Acquirer N	Acquirer Mean	Acquirer Relation	Acquirer Std	Observed Relation	Acquiree N	Acquiree Mean	Acquiree Median	Acquiree Std	T-Test p	Wilcoxon p	Signtest p
Profitability (PR)													
ROA	>	1,259	2.10%	3.01%	7.29%	>	1,255	-0.47%	1.20%	8.02%	0.000*	0.000*	0.000*
ROE	>	1,259	5.67%	7.63%	16.03%	>	1,255	0.27%	2.82%	17.75%	0.000*	0.000*	0.000*
Activity Ratio (Sales / Total Assets)	>	1,189	8.00%	0.31%	28.51%	<	1,152	9.93%	0.70%	36.54%	0.195	0.005*	0.048**
EBIT (in million USD)	>	1,227	291.0	45.5	506.5	>	1,192	87.0	4.3	281.2	0.000*	0.000*	0.000*
Net Income (in million USD)	>	1,259	133.6	19.7	239.7	>	1,255	40.0	1.8	138.1	0.000*	0.000*	0.000*
Liquidity (LIQ)													
Quick Ratio	>/<	1,250	1.43	1.02	1.05	<	1,217	1.53	1.08	1.14	0.002*	0.003*	0.028**
Current Ratio	>/<	1,252	2.73	1.47	6.46	<	1,230	3.18	1.50	7.46	0.096***	0.012**	0.161
Leverage (LEV)													
Debt-to-Equity	>/<	1,259	6.82	1.13	86.77	>	1,258	3.45	0.88	21.59	0.179	0.000*	0.001*
Lt.Debt-to-Assets	>/<	1,071	0.18	0.16	0.14	>	880	0.16	0.12	0.17	0.002*	0.000*	0.001*
Interest Coverage	>/<	1,143	0.12	0.07	2.19	<	1,051	0.16	0.04	3.20	0.748	0.033**	0.004*
Growth (GR)													
1-Yr-Sales-Growth	>/<	1,189	16.80%	9.97%	24.40%	>	1,153	11.81%	5.79%	23.60%	0.000*	0.000*	0.000*
3-Yr-Sales-Growth	>/<	1,105	14.83%	9.97%	17.72%	>	1,047	11.36%	6.19%	17.48%	0.000*	0.000*	0.000*
5-Yr-Total Assets-Growth	>/<	1,027	14.30%	9.78%	15.27%	>	899	10.27%	5.71%	14.57%	0.000*	0.000*	0.000*
SIZE													
Total Assets (in million USD)	>	1,259	5,501	1,088	9,526	>	1,258	1,382	181	4,371	0.000*	0.000*	0.000*
Total Sales (in million USD)	>	1,222	3,630	872	5,347	>	1,181	1,087	180	2,788	0.000*	0.000*	0.000*
Market Capitalization (in million USD)	>	1,259	3,422	974	4,955	>	1,255	978	117	2,645	0.000*	0.000*	0.000*

Table 55 continues on next page.

Table 55, continued

Descriptives—Moderate Complexity Sample (Stock-for-Stock, excl. Reverse Acquisitions)

Variables	*Hypo-thesized Relation*	*Acquirer*				*Ob-served Relation*	*Acquiree*				T-Test	Wil-coxon	Signtest
		N	*Mean*	*Relation*	*Std*		*N*	*Mean*	*Median*	*Std*	*p*	*p*	*p*
AGENCY													
Cash Flow / Market Capitalization	<	*1,254*	*0.091*	*0.088*	*0.140*	>	*1,230*	*0.077*	*0.069*	*0.241*	0.034**	0.000*	0.000*
Dividend Payout	>	*585*	*32.63%*	*27.18%*	*19.62%*	<	*387*	*32.87%*	*27.39%*	*20.31%*	0.401	0.751	0.952
Valuation (VAL)													
Price-to-Book	>	*1,220*	*2.54*	*2.03*	*1.57*	>	*1,237*	*2.32*	*1.72*	*1.66*	0.000*	0.000*	0.000*
Price-to-Earnings	>	*1,248*	*15.5*	*15.2*	*17.7*	>	*1,233*	*11.0*	*9.0*	*17.7*	0.000*	0.000*	0.000*
Q-Measure	>	*1,259*	*2.11*	*1.33*	*3.79*	>	*1,255*	*1.72*	*1.24*	*2.18*	0.000*	0.000*	0.000*
Asset Structure (ASSETS)													
Tangible Assets / Total Assets	<	*1,172*	*0.880*	*0.946*	*0.162*	<	*1,165*	*0.898*	*0.968*	*0.144*	0.001*	0.000*	0.000*

This table present the descriptives and the univariate tests of means and medians for the moderate complexity sample. Three tests to compare the firm characteristics of the acquirer and acquiree are performed: the paired T-Test and the Wilcoxon matched-pairs signed-ranks test to test the equality of means, and the Signtest to test medians of the paired observations. The respective p-values are presented in the three columns on the left. The significance level is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 55: Comparison of Means and Median, Moderate Complexity Sample

Table 56

Descriptives—High Complexity Sample (Reverse Acquisitions)

Variables	*Hypo-thesized Relation*	*Acquirer*				*Ob-served Relation*	*Acquiree*				T-Test	Wil-coxon	Signtest
		N	*Mean*	*Relation*	*Std*		*N*	*Mean*	*Median*	*Std*	p	*p*	*p*
Profitability (PR)													
ROA	>	*81*	*-0.11%*	*1.75%*	*8.90%*	>	*81*	*-1.03%*	*0.06%*	*8.59%*	0.401	0.313	0.635
ROE	>	*81*	*1.52%*	*6.06%*	*19.49%*	>	*81*	*-2.13%*	*1.96%*	*18.82%*	0.146	0.128	0.165
Activity Ratio (Sales / Total Assets)	>	*70*	*17.40%*	*0.31%*	*53.01%*	<	*71*	*21.15%*	*0.72%*	*55.75%*	0.479	0.461	1.000
EBIT (in million USD)	>	*79*	*130.4*	*3.7*	*332.0*	>	*79*	*102.0*	*2.0*	*294.4*	0.134	0.064***	0.081***
Net Income (in million USD)	>	*81*	*65.3*	*1.7*	*167.5*	>	*81*	*43.7*	*0.1*	*125.0*	0.045	0.082***	0.115
Liquidity (LIQ)													
Quick Ratio	>/<	*80*	*1.50*	*1.13*	*1.10*	>	*81*	*1.43*	*1.07*	*1.07*	0.512	0.666	1.000
Current Ratio	>/<	*81*	*3.58*	*1.53*	*8.39*	>	*81*	*2.79*	*1.31*	*5.03*	0.450	0.340	0.505
Leverage (LEV)													
Debt-to-Equity	>/<	*81*	*10.62*	*0.92*	*82.29*	>/<	*81*	*2.57*	*0.92*	*9.27*	0.385	0.665	0.909
Lt.Debt-to-Assets	>/<	*61*	*0.19*	*0.16*	*0.17*	>	*59*	*0.18*	*0.14*	*0.15*	0.944	0.899	0.888
Interest Coverage	>/<	*68*	*0.17*	*0.07*	*0.65*	>/<	*71*	*0.65*	*0.03*	*5.18*	0.362	0.544	1.000
Growth (GR)													
1-Yr-Sales-Growth	>/<	*70*	*12.25%*	*6.87%*	*24.73%*	>/<	*71*	*13.78%*	*6.00%*	*25.95%*	0.584	0.450	0.801
3-Yr-Sales-Growth	>/<	*60*	*13.45%*	*6.97%*	*18.12%*	>/<	*58*	*13.76%*	*8.49%*	*18.94%*	0.617	0.643	0.568
5-Yr-Total Assets-Growth	>/<	*58*	*12.16%*	*11.31%*	*13.68%*	>	*53*	*12.12%*	*9.69%*	*15.33%*	0.733	0.866	0.761
SIZE													
Total Assets (in million USD)	>	*81*	*1,828*	*184*	*5,569*	>	*81*	*1,689*	*125*	*5,145*	0.578	0.243	0.336
Total Sales (in million USD)	>	*74*	*1,206*	*159*	*2,572*	>/<	*74*	*1,221*	*148*	*2,826*	0.992	0.099***	0.043
Market Capitalization (in million USD)	>	*81*	*1,131*	*183*	*2,772*	>	*80*	*1,084*	*159*	*2,724*	0.670	0.093***	0.072

Table 56 continues on next page.

Table 56, continued

Descriptives—High Complexity Sample (Reverse Acquisitions)

Variables	*Hypo-thesized Relation*	*Acquirer*				*Ob-served Relation*	*Acquiree*				T-Test	Wil-coxon	Signtest
		N	*Mean*	*Relation*	*Std*		*N*	*Mean*	*Median*	*Std*	*P*	*p*	*p*
AGENCY													
Cash Flow / Market Capitalization	<	*77*	*0.052*	*0.054*	*0.143*	>	*80*	*0.031*	*0.046*	*0.164*	0.075***	0.073***	0.037**
Dividend Payout	>	*23*	*44.43%*	*48.35%*	*18.52%*	>	*23*	*33.60%*	*31.56%*	*15.31%*	0.187	0.300	0.424
Valuation (VAL)													
Price-to-Book	>	*81*	*2.53*	*2.18*	*1.50*	<	*78*	*2.60*	*2.26*	*1.47*	0.751	0.397	0.302
Price-to-Earnings	>	*79*	*9.6*	*9.5*	*15.8*	>	*79*	*8.0*	*4.9*	*16.5*	0.707	0.804	0.556
Q-Measure	>	*81*	*1.76*	*1.31*	*1.57*	>	*80*	*1.69*	*1.30*	*1.40*	0.709	0.814	0.724
Asset Structure (ASSETS)													
Tangible Assets / Total Assets	<	*75*	*0.853*	*0.884*	*0.179*	>	*79*	*0.845*	*0.855*	*0.170*	0.427	0.446	0.366

This table present the descriptives and the univariate tests of means and medians for the high complexity sample. Three tests to compare the firm characteristics of the acquirer and acquiree are performed: the paired T-Test and the Wilcoxon matched-pairs signed-ranks test to test the equality of means, and the Signtest to test medians of the paired observations. The respective p-values are presented in the three columns on the left. The significance level is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 56: Comparison of Means and Median, High Complexity Sample

Table 57
Logit Regression Analysis

Acquirer = 1, Acquiree = 0 *(Control)*	Hypo-thesized Relation	Samples: Low Complexity (Cash Acquisitions)	Moderate Complexity (Stock-for-Stock, excl. Reverse Acquisitions)	High Complexity (Reverse Acquisitions)
PR	+	+0.105*	+0.314*	-0.025
		(0.0141)	(0.0408)	(0.0489)
LIQ	+/-	+0.161*	-0.310*	-2.023*
		(0.0401)	(0.0669)	(0.7495)
LEV	+/-	-1.521**	-5.019*	+7.030
		(0.6564)	(1.8440)	(4.6694)
GR	+/-	+0.027*	+0.033**	+0.023
		(0.0063)	(0.0143)	(0.0220)
GRMM	-	-0.411**	-0.123	-2.672
		(0.2083)	(0.5298)	(1.7367)
SIZE	+	+2.103*	+4.375*	+0.241
		(0.0924)	(0.4267)	(0.6738)
VAL	+	+0.142**	+0.337**	-0.222
		(0.0557)	(0.1596)	(0.2550)
AGENCY	-	-0.205*	-6.862*	-1.122
		(0.0702)	(1.1662)	(4.2609)
ASSETS	-	+1.480**	+7.232*	+0.046
		(0.6306)	(1.9225)	(3.6354)
CONTROLS		YES	YES	YES
N		3207	874	56
Pseudo R-Squared		0.7604	0.7809	0.2237

This table presents the results of the logit regression, applying an indicator variable of 1 if the firm is the controlling firm in a business combination, the acquirer; otherwise 0 for the acquiree. For each samples (low complexity, moderate complexity and high complexity) a regression analysis including the same independent variables was performed. CONTROLS include control variables for industry-specific, year-specific, country-specific effects as well as the effect of international accounting standards using an indicator variable for international accounting standards 1, otherwise 0; additionally also a control variable is included for each individual set of accounting standards. R-squared refers to McFadden's pseudo R-squared. The robust standard errors are shown below the logit coefficient in parenthesis. The 2-tailed significance level is indicated as follows: *Significant at the 0.01 level; **Significant at the 0.05 level; ***Significant at the 0.10 level.

Table 57: Logit Regression Analysis

6.5 Interim Summary of Chapter 6

In sum, there are empirically observable relationships between the acquirer and the acquiree with regard to firm characteristics. Acquirers are larger, more profitable, higher valued, and less levered than target firms. Meanwhile, acquirees have an imbalance of financial resources and growth, larger free cash flows, and lower asset growth than their acquirers. Relative liquidity depends on the means of payment (cash or stock) that was used to acquire controlling ownership. The acquirer has greater liquidity than the acquiree in a cash acquisition, whereas the acquiree is more liquid than the acquirer in a stock-for-stock acquisition.

The general findings suggest that control is largely consistent with the economic motivation for mergers and acquisitions, and that firm characteristics of the acquirer and the acquiree reflect these motivations and, hence, are possible indicators for control in business combinations. However, economic indicators do not reflect accounting control for reverse acquisitions.

Professionals, stakeholders, and auditors as well as other users of consolidated financial statements might benefit if standard setters incorporated firm characteristics into their guidance. This leaves space for future research, particularly on the question of whether guidance in accounting standards that accounts for the motivations of business combinations improves the control assessment.

7 Discussion and Conclusion

The designation of which firm is the acquirer and which is the acquiree is important from an accounting perspective. Particularly, because the acquiree's (not the acquirer's) assets have to be recognized and measured at their fair values as of the acquisition date. This study analyzed the importance of firm characteristics in identifying the acquirer in business combinations.

7.1 Theoretical Implications

This study's empirical design is built on a theoretical framework that links merger theories to acquisition likelihood hypotheses and underlying measurement variables. This framework does not aim to be exhaustive. It is intended to simplify theory formation and, thus providing a conceptual framework for this and future studies on business combinations.

The theoretical framework presented here can be briefly described as follows. Merger activity is supposed to arise primarily from potential merger gains that accrue from synergies, growth opportunities, valuation discrepancies of the acquiring or the target firm, as well as the replacement of inefficient, agency-conflicted management. These incentives of merger activity refer to the dimension of performance (understood predominantly as accounting profitability), valuation, free cash flow and the firms' dividend policy (to capture potential agency conflicts), and the firms' leverage, liquidity and growth. There are also barriers that constrain merger activity to some extent. They refer to dimensions like firm size, asset structure or the consideration transferred in exchange for control.

The meta-analysis used this framework to analyze empirical studies on takeover activity and provided an investigation of premerger firm characteristics of acquisition targets. Thirty-six empirical studies spanning forty years of research were obtained by a broad literature search. In sum, acquisition targets have been described as smaller and less profitable, but with excess free cash flow, a growth-resource mismatch or excess debt capacity, and a relatively high proportion of tangible fixed assets. Further variables such as short-term solvency, taxes, and industry disturbance have also been significant, but are less important indicators in empirical takeover studies because their impact on acquisition likelihood is inconsistent.

The empirical study conducted here stresses that the acquisition hypotheses as originally developed to predict takeover targets can be used to identify acquirers in

business combinations. The general findings suggest that control is largely consistent with the economic motivation for mergers and acquisitions, and that firm characteristics of the acquirer and the acquiree reflect these motivations and, hence, are possible indicators for control in business combinations. However, economic indicators do not reflect accounting control for reverse acquisitions.

Acquiring firms are larger, more profitable, higher valued, and less levered than their acquires. Compared with their acquirers, acquirees have an imbalance of financial resources and growth, have larger free cash flows, and lower asset growth. Relative liquidity depends on the means of payment (cash or stock) that was used to acquire controlling ownership. The acquirer has greater liquidity than the acquiree in a cash acquisition, whereas the acquiree is more liquid than the acquirer in a stock-for-stock acquisition.

7.2 Implications for Standard Setters and Practitioners

For more than forty years, international standard setters have been developing proper guidance to identify the controlling firm, the acquirer, in business combinations. The current changes to the guidance on control assessment provided by IFRS 10 and the expanded description of reverse acquisitions indicate a need for improvement to identify control and the acquirer in business combinations.

The aim of international standard setters such as the IASB and the FASB is to ensure faithful representation in consolidated financial statements. From the understanding of this study, this aim is closely related to economic motives for mergers. As such, this study assumes that understanding and applying merger motives can help to identify the acquirer in business combinations. Business combinations are largely motivated by merger gains. Control—as a concept that is usually assumed in accounting standards for consolidation purposes—can be further interpreted as control over merger gains. Thus, a consideration of the motives for business combinations—which are observable with relative firm characteristics—as part of the control assessment seems reasonable. This is even more important with regard to the development of practical and reliable guidance, as the motives for a merger commonly originates from the benefits to the shareholders of the acquiring firm.

So far, the guidance of international accounting standards makes only limited use of relative firm characteristics as economic indicators. The size relation of the merging firms is the only criterion that needs to be considered when assessing which firm is the acquirer in a business combination.

However, this study documented that size is not the only relevant firm characteristic. In addition to being larger, acquirers are more profitable, higher valued, and less levered than their acquires. Compared with their acquirers, acquirees have an imbalance of financial resources and growth, larger free cash flows, and lower asset growth. Relative liquidity depends on the means of payment (cash or stock) that was used to acquire controlling ownership. The acquirer has greater liquidity than the acquiree in a cash acquisition, whereas the acquiree is more liquid than the acquirer in a stock-for-stock acquisition. Therefore, a consideration of additional indicator variables to complement the guidance of identifying the acquirer seems important and useful for stakeholders, in terms of reliability, and for preparers and auditors of consolidated financial statements.

Indeed, relative firm characteristics should support the ownership designation, but cannot be used exclusively to determine control. Therefore, when incorporating the findings of this study into accounting standards, it must be emphasized that these indicators are help to determine control in business combinations, but do not prescribe it. For example, standard setters could introduce case studies with illustrative examples describing typical motives and their manifestation in relative financial characteristics of acquiring and target firms.

7.3 Limitations and Further Research

This study identified relative firm characteristics of acquiring and target firms that can be used to determine the acquirer in business combinations. In so doing, this study builds upon typical merger motives that have been formulated as hypotheses in financial research and that have been measured in previous empirical takeover studies. This study focused on both business combinations where the legal acquirer is the accounting acquiree and reverse acquisitions. However, this study did not consider cases in which control was obtained indirectly, or situations in which control was not, or was only partially, indicated by an investment in another firm. Also, the economic indicators presented here have not been considered in the context of business combinations involving special purpose vehicles.

As already outlined above, the general findings suggest that control is largely consistent with the economic motivation for mergers and acquisitions and that firm characteristics of the acquirer and the acquiree reflect these motivations and, hence, are possible indicators for control in business combinations. However, economic indicators do not reflect accounting control for reverse acquisitions. This is striking,

since the major argument for the accounting of reverse acquisitions is to capture the economic substance rather than the merely the legal form. Further investigation on this finding could be the subject of future research.

8 Executive Summary

1. The research question focused on the role of firm characteristics in identifying the acquirer in business combinations. Such research is important as standard setters emphasize the need to consider the "economic substance" of a transaction when identifying a business combination. This study was guided by the idea that the acquirer can be identified by relative firm characteristics that capture the economic motivation for the merger.

2. The methodology of this study was manifold. First, it employed a normative consideration of international accounting standards on accounting for business combinations and consolidation. Second, a theoretical framework was presented and was discussed in the light of previous empirical findings. Third, a meta-analysis of empirical findings in takeover studies was executed. Fourth, an empirical study of acquiring firms and their targets, using comparative statistics and logit regression analysis, was performed. The findings are summarized as follows:

3. Size: Relative firm size is the only firm characteristic suggested by international standard setters to distinguish the acquirer. Prior literature supports this relationship, assuming that it arises because smaller firms are limited in their resources, larger firms are more likely to realize operating synergies, and the number of firms that are larger than the target decreases as its size increases. The empirical results of this paper are consistent with the guidance of international standards in suggesting that acquirers are larger than their acquirees. Therefore, size is a useful indicator of the acquirer in business combinations.

4. Performance: Mergers may be motivated by the removal of management that is failing to act in the best interest of its owners. This control mechanism disciplines the management of underperforming firms and is largely motivated by potential gains that are expected to accrue when the inefficient managers of the firm are replaced. Therefore, it is commonly assumed that target firms are less profitable than non-targets. This is supported by empirical takeover studies, where profitability is measured by the return on assets and the return on equity ratios. The study conducted here also suggests that accounting profitability is an important

determinant of the acquirer or the acquiree in a business combination. Acquirers are more profitable than their acquirees. Hence, relative accounting profitability should be considered when identifying the acquirer in business combinations.

5. Liquidity: Firm liquidity is commonly measured by short-term solvency ratios, such as the current ratio, the level of working capital, the quick ratio, and/or the cash position related to size metrics. The hypothesis in several takeover prediction studies was that liquid firms are attractive acquisition targets. However, this hypothesis has not been consistently supported by studies on acquisition likelihood. One explanation is that liquidity, leverage, and growth must be considered in terms of a growth-resource mismatch. Hence, the empirical study in this paper has not hypothesized a directional effect of relative liquidity. However, the empirical analysis suggests that liquidity is an important discriminator, but depends on the means of payment for the acquisition: If the consideration transferred was cash, the acquirer in a business combination had higher liquidity than the acquiree. However, if the consideration transferred was stock (stock-for-stock acquisition), the acquirer in a business combination had lower liquidity than the acquiree.

6. Leverage: Since low leverage signals unused debt capacity, which is attractive to acquiring firms, the financial literature hypothesizes that acquiring firms have higher leverage than target firms. Indeed, this literature provides some evidence that long-term solvency ratios, such as the debt-to-assets ratio and the debt-to-equity ratio, serve as good indicators for acquisition likelihood. However, there are also studies that report contrasting results. It may be more appropriate to consider liquidity, leverage and growth together with regard to a growth-resource mismatch. For that reason, the empirical study here has not hypothesized a directional effect of relative leverage. Univariate statistics show that in 54 to 59 percent of business combinations, the acquirer is more highly levered than the acquiree. This is contrasted by the results of the multivariate analysis, which suggest a statistically significant negative relationship between leverage and the likelihood of being the acquirer.

7. Growth: Financial literature hypothesizes that growing firms are likely to be takeover targets. However, this hypothesis has received only lackluster support from empirical takeover studies, which have found inconsistent results. That is why the empirical study presented here does not assume a particular directional impact

of growth on the likelihood of being the acquirer in business combination. However, univariate tests and multivariate analysis consistently suggest that the high-growth firm is usually the acquirer.

8. Growth and financial resources: Empirical target prediction studies have hypothesized that target firms have a growth-resource mismatch. It is assumed that firms with high-(low-) growth and a lack (surplus) of financial resources are attractive acquisition targets. Therefore, literature has hypothesized that firms with a mismatch of growth and resources are more likely the acquiree than the acquirer in business combinations. This negative relationship is supported by the multivariate results in this paper, but only for cash acquisitions.

9. Agency: Managers sometimes focus on maximizing their own private benefits instead of increasing the firm's net present value. The incentive to acquire firms with agency problems stems from the joint availability of additional resources and unused profitable investment opportunities. Consistent with the performance hypothesis, financial research suggests that takeovers alleviate agency problems and create wealth for stockholders. Agency problems are indicated by an increased level of free cash flow. Therefore, it is hypothesized that firms with agency problems are likely to become acquisition targets. Empirical findings of takeover studies and the empirical part of this study support the agency conflict hypothesis. This suggests that cash flow rich firms are more likely the acquirees and not the acquirers.

10. Valuation: Merger activity results from valuation discrepancies. Financial literature explains merger activity by the overvaluation of the acquiring firm and the undervaluation of target firms. Therefore, financial literature often hypothesizes that acquiring firms have higher valuation ratios than their targets. This hypothesis is supported by several empirical studies that use price-to-book ratios, Q-measures, and price-earnings ratios. Therefore, this study hypothesized that the higher-valued firm is more likely the acquirer, and the lower-valued firm is more likely the acquiree. This hypothesis was largely confirmed by the empirical results in this study.

11. Asset structure: Empirical studies proved the relevance of asset structure for takeover prediction. Financial literature theorized that acquiring firms consider the

proportion of tangible assets to total assets of their targets as a co-insurance for their consideration transferred. Therefore, it was hypothesized that firms that have a relatively higher proportion of tangible assets are more likely to be the acquiree than the acquirer. The univariate statistics support this hypothesis: Acquirees have a higher proportion of tangible assets in 62 to 64 percent the business combinations. However, the results of the multivariate analysis in this study contrasted with the univariate results, and found that acquirers have a higher proportion of tangible compared to their acquirees.

12. The general findings suggest that control is largely consistent with the economic motivation for mergers and acquisitions, and that firm characteristics of the acquirer and the acquiree reflect these motivations and, hence, are possible indicators for control in business combinations. However, economic indicators for control that are successful in "standard case" acquisitions (cash acquisitions, stock-for-stock acquisitions) do not reflect the accounting control for reverse acquisitions. This is striking, since the major argument for the accounting of reverse acquisitions is to capture the economic substance rather than the merely the legal form. Future research could further investigate this observation.

13. In sum, acquirers are larger, more profitable, higher valued, and less levered than their acquirees. Compared with their acquirers, acquirees have an imbalance of financial resources and growth, have larger free cash flows, and lower asset growth. Relative liquidity depends on the means of payment (cash or stock) that was used to acquire controlling ownership. The acquirer has greater liquidity than the acquiree in a cash acquisition, whereas the acquiree is more liquid than the acquirer in a stock-for-stock acquisition.

14. Based upon the findings of prior empirical studies and the empirical study conducted in this study, it is suggested that the guidance for the identification of the acquirer could be improved by providing relative firm characteristics like those that have been identified in this study.

Appendix A: Variable Definition and Data Source

Data Source: Thomson Analytics Calculated Item Using Worldscope, Database as of October 2010.

Variable	Description
PR	Profitability measure in regression analysis; calculated as the difference between the combining firms' ROA ratio.
ROA	Return on Assets = Net Income / Average Total Assets
ROE	Return on Equity = Net Income / Average Total Common Equity
Activity Ratio	Asset Turnover = Sales / Total Assets
EBIT	Earnings before Interest and Taxes in million USD
Net Income	Net Income in million USD that the company uses to calculate its Earnings per Share. It is before extraordinary items.
LIQ	Liquidity measure in regression analysis; calculated as the difference between the combining firms' current ratio.
QR	Quick Ratio = (Cash & Equivalents + Receivables (Net)) / Total Current Liabilities
CR	Current Ratio = Current Assets / Total Current Liabilities
LEV	Leverage measure in regression analysis; calculated as the difference between the combining firms' Lt.Debt-to-Assets ratio.
Debt-to-Equity	Total Liabilities book Value / Total Common Equity
Lt.Debt-to-Assets	Long-term debt / Total Assets
Interest Coverage	Earnings before Interest and Taxes / Total Interest Expense
GR	Growth measure in regression analysis; calculated as the difference between the combining firms' 5-Yr-Total Assets-Growth.
1-Yr-Sales-Growth	(Current Year's Net Sales or Revenues / Last Year's Total Net Sales or Revenues - 1) x 100

3-Yr-Sales-Growth	((Current Year's Net Sales or Revenues / Net Sales or Revenues four years ago, reduced to a compound annual rate) - 1) x 100
5-Yr-Total Assets-Growth	((Current Year's Total Assets / Total Assets six years ago, reduced to a compound annual rate) - 1) x 100
GRMM	Growth-resource mismatch; The GRMM is based on the 1-YYear Sales Growth (GR), the Current Ratio (LIQ), as well as the Debt-to-Equity ratio (DE). A Growth-Resource Mismatch (GRMM) is indicated by an indicator variable of 1 when the firm's -GR is high, LIQ is low and LEV is high; or -GR is low, LIQ is high and LEV is low ; otherwise 0. The decision of high or low was made if the firm's ratio was above or below the 2-sided 10% trimmed average of all firms in the complete sample.
LEV (high), LIQ (low), GR(high)	See GRMM.
LEV (low), LIQ (high), GR(low)	See GRMM
SIZE	The difference between the combining firms with regard to the natural logarithm of Total Assets.
Total Assets	Total Assets represents the total assets of the company converted to (million) USD using the fiscal year end exchange rate.
Total Sales	Gross Sales and Other Operating Revenue less Discounts, Returns and Allowances in million USD.
Market Capitalization (in million USD)	The Market Capitalization in million USD as obtained from Worldscope Database.
AGENCY	Agency measure in regression analysis; calculated as the difference between the combining firms' Cash Flow to Market Capitalization ratio.
Cash Flow / Market Capitalization	Cash Flow represents Income before Extraordinary Items and preferred and common Dividends, but after Operating and Non-Operating Income and Expense, Reserves, Income Taxes, Minority Interest and Equity in Earnings, plus Depreciation, Depletion and Amortization. The Cash Flow is scaled by the Market Capitalization as obtained from Worldscope Database.
Dividend Payout	Common Dividends (Cash) / (Net Income before Preferred Dividends - Preferred Dividend Requirement) x 100
VAL	Valuation measure in regression analysis; calculated as the difference between the combining firms' Price-to-Book ratio.
Price-to-Book	(Market Price-High + Market Price-Low / 2) / Book Value Per Share

Price-to-Earnings	(Market Price-High + Market Price-Low / 2) / Earnings Per Share
Q-Measure	(Total Assets + Market Capitalization - Total Common Equity) / Total Assets
ASSETS	Asset Structure measure in regression analysis; calculated as the difference between the combining firms' ratio of Tangible to Total Assets.
Tangible Assets / Total Assets	(Total Assets – Intangible Assets) / Total Assets

Appendix B: Logit Regression Diagnostics

The following model diagnostics are performed on the logit regression model with regard to each sample.[624] Their results are presented in Appendices: B1: Low Complexity Sample, B2: Moderate Complexity Sample, and B3: High Complexity Sample.

Specification Errors:

To assess whether the model is properly specified, an additional linear predictor variable was generated for each sample: a linear predicted value variable "_hat" and a linear predicted value squared variable "_hatsq", to rebuild the model. The linear predicted value variable was statistically significant, whereas the linear predicted value squared variable had no predictive power. This suggests that the model is correctly specified.

Goodness of Fit:

To analyze the goodness of fit of a model Stata11 calculates the log likelihood chi-squared, which is an omnibus test to see if the model as a whole is statistically significant, being two-times the difference between the log likelihood of the current model and the log likelihood of the intercept-only model. Besides this measure, the McFadden's pseudo R-squared is displayed. Similar to the proportion of change in terms of likelihood and similar to R-squared found in OLS regressions, a pseudo R-squared suggests the fit of the model. Additional goodness-of-fit tests, such as Cox/Snell R-squared, Nagelkerke R-squared, the Hosmer and Lemeshow's goodness-of-fit, and the Akaike Information Criterion and Bayesian Information Criterion were executed using Stata's fitstat command.

Collinearity:

Severe multicollinearity leads to inflated standard errors for the coefficients and unreliable estimates of logistic regression coefficients. However, the Spearman Pairwise Rank Correlation Matrix and tolerance tests presented below indicate that there is no collinearity issue.

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624 See the guidance of Stata11 Package.

B1: Low Complexity Sample

Regression Analysis (Controls Omitted):

Logistic regression

Number of obs	3207
Wald chi2(81)	646.10
Prob > chi2	0.0000
Log pseudolikelihood = −532.50754	Pseudo R2 = 0.7604

ACQUIRER	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
PR	.1050474	.0141115	7.44	0.000	.0773893	.1327054
LIQ	.1612118	.0401602	4.01	0.000	.0824992	.2399245
LEV	−1.521206	.6564772	−2.32	0.020	−2.807877	−.2345341
GR	.0271028	.0063045	4.30	0.000	.0147462	.0394595
GRMM	−.4111024	.2083715	−1.97	0.049	−.819503	−.0027018
SIZE	2.103106	.0924787	22.74	0.000	1.921851	2.284361
VAL	.142275	.055742	2.55	0.011	.0330226	.2515273
AGENCY	−.20597	.0702304	−2.93	0.003	−.343619	−.068321
ASSETS	1.480676	.6306767	2.35	0.019	.2445726	2.71678

Specification Test:

```
. linktest, nolog
```

Logistic regression

Number of obs	3207
LR chi2(2)	3380.25
Prob > chi2	0.0000
Log likelihood = −532.28992	Pseudo R2 = 0.7605

ACQUIRER	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_hat	1.00148	.0420004	23.84	0.000	.9191607	1.083799
_hatsq	−.0091004	.0137338	−0.66	0.508	−.0360181	.0178172
_cons	.0326923	.0933577	0.35	0.726	−.1502855	.2156701

Note: 5 failures and 0 successes completely determined.

Goodness-of-Fit Statistics:

```
. fitstat
```

Measures of Fit for **logit** of **ACQUIRER**

Log-Lik Intercept Only:	−2222.416	Log-Lik Full Model:	−532.508
D(3084):	1065.015	LR(81):	3379.818
		Prob > LR:	0.000
McFadden's R2:	0.760	McFadden's Adj R2:	0.705
Maximum Likelihood R2:	0.651	Cragg & Uhler's R2:	0.869
McKelvey and Zavoina's R2:	0.918	Efron's R2:	0.803
Variance of y*:	40.310	Variance of error:	3.290
Count R2:	0.933	Adj Count R2:	0.863
AIC:	0.409	AIC*n:	1311.015
BIC:	−23832.398	BIC':	−2725.897

Multicollinearity Diagnostics:

Collinearity Diagnostics

Variable	VIF	SQRT VIF	Tolerance	R-Squared
PR	1.29	1.13	0.7770	0.2230
LIQ	1.04	1.02	0.9625	0.0375
LEV	1.09	1.05	0.9136	0.0864
GR	1.06	1.03	0.9435	0.0565
GRMM	1.04	1.02	0.9651	0.0349
SIZE	1.27	1.13	0.7873	0.2127
VAL	1.07	1.03	0.9389	0.0611
AGENCY	1.07	1.03	0.9365	0.0635
ASSETS	1.15	1.07	0.8670	0.1330
Mean VIF	1.12			

	Eigenval	Cond Index
1	1.5485	1.0000
2	1.4663	1.0276
3	1.3004	1.0912
4	1.1018	1.1855
5	1.0789	1.1980
6	0.9721	1.2621
7	0.8584	1.3431
8	0.6570	1.5352
9	0.5445	1.6865
10	0.4720	1.8113
Condition Number		1.8113

Eigenvalues & Cond Index computed from scaled raw sscp (w/ intercept)
Det(correlation matrix) 0.6210

Spearman Pairwise Rank Correlation Matrix:

(* pairwise correlations significant at the 10 percent level):

	PR	LIQ	LEV	GR	GRMM	SIZE	VAL	AGENCY	ASSETS
PR	1.0000								
LIQ	0.0693*	1.0000							
LEV	-0.1138*	-0.0911*	1.0000						
GR	0.1081*	0.0591*	0.0485*	1.0000					
GRMM	-0.0038	0.0251*	0.1232*	-0.0430*	1.0000				
SIZE	0.3093*	-0.2094*	0.2051*	0.0881*	0.0758*	1.0000			
VAL	0.1292*	-0.0371*	0.0737*	0.0545*	0.0843*	0.0241*	1.0000		
AGENCY	0.5431*	-0.0687*	0.0453*	0.0075	0.0098	0.2585*	-0.1904*	1.0000	
ASSETS	0.0318*	0.1262*	-0.1212*	-0.1319*	0.0110	-0.2102*	-0.0196*	0.0048	1.0000

B2: Moderate Complexity Sample

Regression Analysis (Controls Omitted):

Logistic regression

Number of obs	= 874
Wald chi2(59)	= 160.60
Prob > chi2	= 0.0000
Log pseudolikelihood = −132.71331	Pseudo R2 = 0.7809

ACQUIRER	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
PR	.3145098	.0408555	7.70	0.000	.2344345	.3945851
LIQ	−.3107317	.0669924	−4.64	0.000	−.4420344	−.179429
LEV	−5.019341	1.84402	−2.72	0.006	−8.633553	−1.405129
GR	.033453	.0143318	2.33	0.020	.0053632	.0615428
GRMM	−.1239592	.5298989	−0.23	0.815	−1.162542	.9146235
SIZE	4.375832	.4267049	10.25	0.000	3.539506	5.212158
VAL	.3372928	.1596485	2.11	0.035	.0243876	.650198
AGENCY	−6.862505	1.16624	−5.88	0.000	−9.148294	−4.576716
ASSETS	7.232763	1.922573	3.76	0.000	3.46459	11.00094

Specification Test:

```
. linktest, nolog
```

Logistic regression

Number of obs	= 874
LR chi2(2)	= 946.19
Prob > chi2	= 0.0000
Log likelihood = −132.71293	Pseudo R2 = 0.7809

ACQUIRER	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_hat	1.000095	.0981033	10.19	0.000	.8078166	1.192374
_hatsq	−.0008576	.0314107	−0.03	0.978	−.0624213	.0607062
_cons	.002133	.173185	0.01	0.990	−.3373034	.3415694

Note: 31 failures and 24 successes completely determined.

Goodness-of-Fit Statistics:

```
. fitstat
```

Measures of Fit for **logit** of **ACQUIRER**

Log-Lik Intercept Only:	−605.808	Log-Lik Full Model:	−132.713
D(753):	265.427	LR(59):	946.190
		Prob > LR:	0.000
McFadden's R2:	0.781	McFadden's Adj R2: ||	0.581
Maximum Likelihood R2:	0.661	Cragg & Uhler's R2:	0.882
McKelvey and Zavoina's R2:	0.967	Efron's R2:	0.802
Variance of y*:	98.946	Variance of error:	3.290
Count R2:	0.928	Adj Count R2:	0.856
AIC:	0.581	AIC*n:	507.427
BIC:	−4834.703	BIC':	−546.578

Multicollinearity Diagnostics:

Collinearity Diagnostics

Variable	VIF	SQRT VIF	Tolerance	R-Squared
PR	1.29	1.13	0.7770	0.2230
LIQ	1.04	1.02	0.9625	0.0375
LEV	1.09	1.05	0.9136	0.0864
GR	1.06	1.03	0.9435	0.0565
GRMM	1.04	1.02	0.9651	0.0349
SIZE	1.27	1.13	0.7873	0.2127
VAL	1.07	1.03	0.9389	0.0611
AGENCY	1.07	1.03	0.9365	0.0635
ASSETS	1.15	1.07	0.8670	0.1330
Mean VIF	1.12			

	Eigenval	Cond Index
1	1.5485	1.0000
2	1.4663	1.0276
3	1.3004	1.0912
4	1.1018	1.1855
5	1.0789	1.1980
6	0.9721	1.2621
7	0.8584	1.3431
8	0.6570	1.5352
9	0.5445	1.6865
10	0.4720	1.8113
Condition Number		1.8113

Eigenvalues & Cond Index computed from scaled raw sscp (w/ intercept)
Det(correlation matrix) 0.6210

Spearman Pairwise Rank Correlation Matrix:

(* pairwise correlations significant at the 10 percent level):

	PR	LIQ	LEV	GR	GRMM	SIZE	VAL	AGENCY	ASSETS
PR	1.0000								
LIQ	0.0693*	1.0000							
LEV	-0.1138*	-0.0911*	1.0000						
GR	0.1081*	0.0591*	0.0485*	1.0000					
GRMM	-0.0038	0.0251*	0.1232*	-0.0430*	1.0000				
SIZE	0.3093*	-0.2094*	0.2051*	0.0881*	0.0758*	1.0000			
VAL	0.1292*	-0.0371*	0.0737*	0.0545*	0.0843*	0.0241*	1.0000		
AGENCY	0.5431*	-0.0687*	0.0453*	0.0075	0.0098	0.2585*	-0.1904*	1.0000	
ASSETS	0.0318*	0.1262*	-0.1212*	-0.1319*	0.0110	-0.2102*	-0.0196*	0.0048	1.0000

B3: High Complexity Sample

Regression Analysis (Controls Omitted):

Logistic regression

Number of obs	56
Wald chi2(35)	216.72
Prob > chi2	0.0000
Log pseudolikelihood = −30.105932	
Pseudo R2	0.2237

ACQUIRER	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf.	Interval]
PR	−.0253736	.0489324	−0.52	0.604	−.1212794	.0705321
LIQ	−2.023029	.7495422	−2.70	0.007	−3.492104	−.5539528
LEV	7.030381	4.669447	1.51	0.132	−2.121566	16.18233
GR	.0234586	.0220996	1.06	0.288	−.0198558	.0667731
GRMM	−2.672502	1.736769	−1.54	0.124	−6.076506	.7315021
SIZE	.2417677	.6738361	0.36	0.720	−1.078927	1.562462
VAL	−.2223349	.2550847	−0.87	0.383	−.7222918	.2776219
AGENCY	−1.122626	4.260971	−0.26	0.792	−9.473976	7.228724
ASSETS	.0466976	3.635497	0.01	0.990	−7.078745	7.17214

Specification Test:

```
. linktest, nolog
```

Logistic regression

Number of obs	56
LR chi2(2)	17.43
Prob > chi2	0.0002
Log likelihood = −30.066973	
Pseudo R2	0.2247

ACQUIRER	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_hat	1.011502	.3480673	2.91	0.004	.3293024	1.693701
_hatsq	.0494666	.1770961	0.28	0.780	−.2976354	.3965686
_cons	−.0411784	.3447256	−0.12	0.905	−.7168281	.6344714

Note: 0 failures and 1 success completely determined.

Goodness-of-Fit Statistics:

```
. fitstat
```

Measures of Fit for **logit** of **ACQUIRER**

Log-Lik Intercept Only:	−38.781	Log-Lik Full Model:	−30.106
D(-58):	60.212	LR(35):	17.349
		Prob > LR:	0.995
McFadden's R2:	0.224	McFadden's Adj R2:	−2.716
Maximum Likelihood R2:	0.266	Cragg & Uhler's R2:	0.355
McKelvey and Zavoina's R2:	0.672	Efron's R2:	0.248
Variance of y*:	10.029	Variance of error:	3.290
Count R2:	0.714	Adj Count R2:	0.407
AIC:	5.147	AIC*n:	288.212
BIC:	293.682	BIC':	123.538

Multicollinearity Diagnostics:

Collinearity Diagnostics

Variable	VIF	SQRT VIF	Tolerance	R-Squared
PR	1.29	1.13	0.7770	0.2230
LIQ	1.04	1.02	0.9625	0.0375
LEV	1.09	1.05	0.9136	0.0864
GR	1.06	1.03	0.9435	0.0565
GRMM	1.04	1.02	0.9651	0.0349
SIZE	1.27	1.13	0.7873	0.2127
VAL	1.07	1.03	0.9389	0.0611
AGENCY	1.07	1.03	0.9365	0.0635
ASSETS	1.15	1.07	0.8670	0.1330
Mean VIF	1.12			

	Eigenval	Cond Index
1	1.5485	1.0000
2	1.4663	1.0276
3	1.3004	1.0912
4	1.1018	1.1855
5	1.0789	1.1980
6	0.9721	1.2621
7	0.8584	1.3431
8	0.6570	1.5352
9	0.5445	1.6865
10	0.4720	1.8113

Condition Number 1.8113
Eigenvalues & Cond Index computed from scaled raw sscp (w/ intercept)
Det(correlation matrix) 0.6210

Spearman Pairwise Rank Correlation Matrix:

(* pairwise correlations significant at the 10 percent level):

	PR	LIQ	LEV	GR	GRMM	SIZE	VAL	AGENCY	ASSETS
PR	1.0000								
LIQ	0.0693*	1.0000							
LEV	-0.1138*	-0.0911*	1.0000						
GR	0.1081*	0.0591*	0.0485*	1.0000					
GRMM	-0.0038	0.0251*	0.1232*	-0.0430*	1.0000				
SIZE	0.3093*	-0.2094*	0.2051*	0.0881*	0.0758*	1.0000			
VAL	0.1292*	-0.0371*	0.0737*	0.0545*	0.0843*	0.0241*	1.0000		
AGENCY	0.5431*	-0.0687*	0.0453*	0.0075	0.0098	0.2585*	-0.1904*	1.0000	
ASSETS	0.0318*	0.1262*	-0.1212*	-0.1319*	0.0110	-0.2102*	-0.0196*	0.0048	1.0000

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Curriculum Vitae

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PERSONAL

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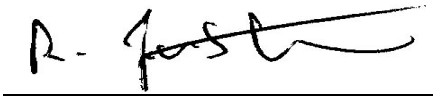
EDUCATION

08/12 – present	**CBS - Columbia University, New York, USA** *Visiting Scholar at the Graduate School of Business*
09/08 – 02/13	**HSG - University of St.Gallen, St.Gallen, Switzerland** *Ph.D.-Program at the School of Management*
04/03 – 08/08	**FUB - Freie Universität Berlin, Berlin, Germany** *Graduate Studies at the School of Business & Economics*
02/07 – 08/07	**UFV - University Francisco de Vitoria, Madrid, Spain** *Erasmus Exchange Semester*
09/99 – 07/01	**IHK - Gillette, Berlin, Germany** *Professional Training in Industrial Commerce*
09/95 – 06/98	**Bertha-von-Suttner-Gymnasium, Berlin, Germany** *High School*

EMPLOYMENT

09/08 – 12/12	**HSG - University of St.Gallen, St.Gallen, Switzerland** *Research and Teaching Assistant for Accounting*
09/06 – 03/07	**PwC - PricewaterhouseCoopers, Budapest, Hungary** *Audit and Assurance Assistant*
04/05 – 03/08	**FUB - Freie Universität Berlin, Berlin, Germany** *Student Lecturer for Accounting Courses*
09/99 – 10/05	**The Gillette Company, Berlin, Germany** *Trainee, later Financial Analyst*



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