

Equity Valuation Using Multiples

An Empirical Investigation

DISSERTATION

of the University of St.Gallen

Graduate School of Business Administration,
Economics, Law and Social Sciences (HSG)

to obtain the title of

Doctor of Business Administration

submitted by

Andreas Schreiner

from

Austria

Approved on the application of

Prof. Dr. Klaus Spremann

and

Prof. Dr. Thomas Berndt

Dissertation no. 3313

Deutscher Universitäts-Verlag, Wiesbaden 2007

Contents

Foreword.....	VII
Preface.....	IX
Executive summary.....	XI
Brief contents.....	XIII
Contents.....	XV
List of figures.....	XIX
List of tables.....	XXI
Notations and abbreviations.....	XXIII
1 Introduction.....	1
1.1 Motivation.....	1
1.2 Research idea.....	5
1.2.1 Research questions for the theoretical part.....	5
1.2.2 Research questions for the empirical part.....	7
1.2.3 Research design of the empirical study.....	10
1.3 Outline of the book.....	11
2 Literature review.....	13
2.1 Coverage in standard literature.....	13
2.2 Empirical research.....	15
2.2.1 Valuation accuracy of the multiples valuation method.....	15
2.2.2 Selection of value relevant measures.....	16
2.2.3 Identification of comparable firms.....	17
2.2.4 Industry-preferred multiples.....	19
2.2.5 Combination of multiples.....	19
2.3 Contribution to prior research.....	20

3	Theoretical foundations.....	22
3.1	Theoretical concept of fundamental equity valuation models.....	22
3.1.1	Dividend discount model.....	23
3.1.2	Discounted cash flow model.....	24
3.1.3	Residual income valuation model.....	27
3.1.4	Abnormal earnings growth model.....	29
3.2	Derivation of intrinsic multiples.....	31
3.2.1	Intrinsic P/E multiple derived from the DDM.....	32
3.2.2	Intrinsic EV/EBIT multiple derived from the DCF model.....	33
3.2.3	Intrinsic P/B multiple derived from the RIV model.....	35
3.3	Market multiples.....	38
3.3.1	Definition and categorization of market multiples.....	38
3.3.2	Common equity value and entity value multiples.....	41
3.3.3	Alternative multiples.....	43
3.3.4	Trailing and forward-looking multiples.....	47
4	Comprehensive multiples valuation.....	48
4.1	The standard multiples valuation method and its criticism.....	48
4.1.1	Concept of the multiples valuation method.....	48
4.1.2	Four step valuation process.....	49
4.1.3	Strengths and weaknesses of the standard multiples method.....	53
4.2	Selection of value relevant measures.....	56
4.2.1	Equity value versus entity value multiples.....	57
4.2.2	Industry specific multiples.....	62
4.2.3	Time reference of value drivers.....	65
4.2.4	Criteria for the selection of value relevant measures.....	66
4.3	Identification of comparable firms.....	68
4.3.1	Industry classification systems.....	69
4.3.2	Assessment of comparability.....	70
4.3.3	Size of the peer group.....	72
4.3.4	Criteria for the identification of comparable firms.....	73
4.4	Estimation of synthetic peer group multiples.....	74

4.5	Actual valuation.....	76
4.5.1	Ratio analysis.....	76
4.5.2	Adjustment factor.....	78
4.6	Two-factor multiples valuation model.....	80
4.6.1	Decision relevant multiples and hedging multiples.....	80
4.6.2	Combination of two decision relevant multiples.....	81
5	Design of the empirical study.....	84
5.1	The concept of value relevance.....	84
5.1.1	Definition, interpretation, implementation.....	84
5.1.2	The link between value relevance and market efficiency.....	86
5.2	Research hypotheses.....	88
5.3	Research methodology.....	89
5.3.1	Methodology using single multiples.....	90
5.3.2	Methodology using combined multiples.....	92
5.4	Data and sample.....	93
6	Empirical results.....	98
6.1	Cross-sectional analysis..... [^]	98
6.1.1	Absolute valuation accuracy.....	98
6.1.2	Equity value versus entity value multiples.....	101
6.1.3	Knowledge-related versus traditional multiples.....	104
6.1.4	Forward-looking versus trailing multiples.....	106
6.1.5	The effect of industry fineness.....	110
6.2	Industry analysis.....	113
6.2.1	Industry-preferred multiples.....	114
6.2.2	Single versus combined multiples.....	117
6.3	Evaluation of empirical results.....	121
6.3.1	Validation using U.S. data.....	121
6.3.2	Limitations.....	124

- 7 Conclusion.....127**
 - 7.1 Summary of findings.....127
 - 7.2 Implications for practice.....129
 - 7.3 Research outlook.....130

- Appendix A: ICB industry classification structure.....131**

- Appendix B: U.S. evidence.....135**

- Appendix C: Definition of variables.....151**

- References.....155**