Quantitatives Controlling

Hrsg.: Carsten Homburg

Julia Nasev

Conditional and Unconditional Conservatism

Implications for Accounting Based Valuation and Risky Projects

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Quantitatives Controlling

Herausgegeben von Professor Dr. Carsten Homburg,
Universität zu Köln

Die Schriftenreihe dient als Forum für hervorragende Forschungsergebnisse auf dem Gebiet des Controlling. Ihr liegt ein weites Controllingverständnis zugrunde, das über Problemstellungen der traditionellen internen Unternehmensrechnung hinaus geht und beispielsweise auch Aspekte der Verhaltenssteuerung einschließt.

Der Schwerpunkt der Reihe liegt auf quantitativen Analysen aktueller Controllingfragen. Hierbei werden formal-analytische ebenso wie empirisch ausgerichtete Arbeiten in Betracht gezogen.

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Preface

Im Zentrum der vorliegenden Dissertationsschrift von Frau Nasev steht das Phänomen des Konservatismus in der Rechnungslegung. In der deutschsprachigen Literatur wird dieser Aspekt schon seit langem unter dem sogenannten Vorsichtsprinzip subsumiert. Im angloamerikanischen Bereich hat der Konservatismus hingegen erst in jüngerer Zeit erhebliche Beachtung gefunden. Der Hauptgrund hierfür ist darin zu sehen, dass Konservatismusmaße entwickelt wurden, die empirische Analysen ermöglichen. So ist auch die vorliegende Dissertationsschrift empirisch ausgerichtet.

Im ersten Teil der Dissertationsschrift 'Linear Information Models: The Effect of Unconditional Conservatism' untersucht Frau Nasev, inwieweit es im Rahmen von Bewertungsverfahren gelingt, Konservatismus zu berücksichtigen. Dabei steht der sogenannte unbedingte Konservatismus im Vordergrund, worunter man eine informationsunabhängige Unterbewertung des Eigenkapitalbuchwertes versteht. Konkret untersucht die Verfasserin drei Residualgewinnmodelle mit linearer Informationsstruktur: das Ohlson Modell (1995), das Feltham/Ohlson Modell (1995) und das Modell von Choi/O´Hanlon/Pope (2006). Es zeigt sich, dass das Choi/O´Hanlon/Pope Modell unbedingten Konservatismus am besten erfasst, die Bewertungsungenauigkeit (inaccuracy) bleibt jedoch hoch. Die vorliegende Dissertation weist einen Weg auf, wie die Bewertungsgenauigkeit von linearen Informationsmodellen verbessert werden kann.

Im zweiten Teil der Arbeit 'Linear Information Models: The Effect of Conditional Conservatism' wird untersucht, inwieweit das Modell von Choi/O´Hanlon/Pope (2006) (COP-Modell) auch bedingten Konservatismus erfassen kann. Im Gegensatz zum unbedingten Konservatismus ist der bedingte Konservatismus abhängig von den Nachrichten in einer Periode. Die informationsbedingte Vorsicht kommt dadurch zustande, dass gute Nachrichten langsamer erfolgswirksam werden als schlechte Nachrichten. Die Autorin findet nun empirische Anzeichen dafür, dass es im COP-Modell prinzipiell auch möglich ist, bedingten Konservatismus zu erfassen. Hierzu ist allerdings eine adäquate Anpassung der Analystenprognosen vorzunehmen.

Im dritten Teil der Arbeit 'The Link between Conditional Conservatism and Cost Stickiness' wird die Verbindung geschaffen zwischen dem bereits im zweiten Teil behandelten bedingten Konservatismus und einem Phänomen aus dem Management Accounting, der sogenannten Cost Stickiness. Unter Cost Stickiness (Kostenremanenz) versteht man dabei ein asymmetrisches Verhalten der SG&A-Kosten zum Umsatz. Bei einem Umsatzrückgang nehmen die SG&A-Kosten nicht im gleichen Maße ab, wie sie bei einem Umsatzanstieg zunehmen. Dadurch ergibt sich häufig ein Anstieg des SG&A/Sales-Ratios bei Umsatzrückgängen. Dies wird im Allgemeinen als Ineffizienz-Signal gesehen. Nasev lässt hingegen auch eine andere Interpretation zu. Diese besteht darin, dass das Management die Kapazitäten absichtlich nicht herunterfährt, weil es mit einem baldigen Umsatzanstieg rechnet. Die Kosten einer kurzfristigen Anpassung wären dann deutlich höher als das 'strategische Aussitzen' der Umsatzdelle. Bei dieser Interpretation ist Cost Stickiness also ein positives Signal, mit dem das Management eine baldige Umsatzerholung signalisiert. Der Markt steht nun vor dem Problem zwischen effizienter und ineffizienter Cost Stickiness unterscheiden zu müssen. Insgesamt gelingt es Nasev durch diesen Teil der Arbeit zu zeigen, dass Konservatismus ein effizienter Mechanismus sein könnte, um im konkreten Fall der Cost Stickiness Informationsasymmetrie abzubauen.

Zusammenfassend kann die Verfasserin einen wichtigen und innovativen Beitrag zum Thema Konservatismus in der Rechnungslegung vorlegen. Daher wünsche ich der Arbeit eine gute Aufnahme in der Accounting-Community.

Univ.-Prof. Dr. Carsten Homburg

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Julia Nasev

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List of Tables and Figures

List of Abbreviations

c.p.	ceteris paribus
COPM	Choi/O'Hanlon/Pope (2006) model
e.g.	for example
EPS	earnings per share
et al.	et alii
FASB	Financial Accounting Standards Board
FOM	Feltham/Ohlson (1995) model
i.e.	id est
LIFO	last in, first out
LIM	linear information model
OM	Ohlson (1995) model
p.	page
pp.	pages
MTB	market-to-book-value-of-equity
R&D	research and development
ROE	return on equity
SIC	standard industrial classification
US	United States
US GAAP	United States Generally Accepted Accounting Principles
vs.	versus

List of Symbols

Latin Symbols

$AFLLW$	number of analysts following a firm
$AssetTurn$	change in asset turnover
$Bias$	signed percentage valuation error
b	book value of equity
$CapIn$	capital intensity
$CHNI$	change in net earnings
CS	cost stickiness
CV	coefficient of variation
d	net-dividends
D	dummy variable
$Delta^{COPM}$	delta variable for the COPM
$Delta^{FOM}$	delta variable for the FOM
$Delta^{OM}$	delta variable for the OM
$Depr$	depreciation proxy
$DISP$	forecast dispersion
ER	estimated reserve
$F0EPS$	adjusted earnings per share
$F1MD$	median EPS estimate
fa	net financial assets
FE	forecast error
G	growth parameter in the COPM
$GOOD$	good news dummy variable
$Growth$	growth parameter in the delta regression
i	index for an observation or firm
$IBNOSH$	number of shares outstanding
$INDORA$	industry adjusted return on assets
j	index for an observation or a firm
k	time index
$LaborEf$	labor efficiency
LEV	leverage using total assets

$LTMD$	expected EPS long-term growth
$MShare$	market share
$MNMD$	difference between mean and median earnings
MTB	market-to-book ratio
MV	market value of common equity
n	number of observations
oa	net operating assets
ox	operating income
ox^a	operating residual income
R	one plus the cost of equity capital
R^2	coefficient of determination
RDI	R & D intensity
RET	Return
s	time index
$SG\&A$	selling, general and administrative costs
$SIZE$	size variable
SpI	special items
t	time index
TV	total trading volume
v	other information variable
V	intrinsic equity value of the firm
$\hat{V}$	value estimate
$\hat{V}^{COPM}$	value estimate from the COPM
$\hat{V}^{adj}$	value estimate from the COPM adjusted for conditional conservatism
$\hat{V}^{FOM}$	value estimate from the FOM
$\hat{V}^{OM}$	value estimate from the OM
$\hat{V}^{OM-v}$	value estimate from the OM excluding other information
x^a	abnormal earnings

Greek Symbols

α	intercept of a regression
β	valuation multiple in a linear information model
γ	persistence of other information in the OM
γ_0	conservatism parameter in the COPM
γ_1	persistence of other information in the FOM and the COPM
γ_2	persistence of other information in the FOM
ε	error term, residual of a regression
ρ	valuation parameter for Liu/Ohlson (2000)
ω	persistence parameter of residual income in the OM
ω_0	conservatism parameter in the COPM
ω_1	persistence parameter of residual income in the COPM
ω_{11}	persistence parameter of residual income in the FOM
ω_{12}	conservatism parameter in the FOM
ω_{22}	growth parameter in the FOM

1 Introduction

One of the oldest and most debated principles in accounting is conservatism. Early literature on conservatism focused primarily on describing the phenomenon. More recent academic research broadly follows one of three directions: The first stream of research aims at assessing the impact of conservative reporting standards on real economic decisions, e.g., its role in contracting.[1] It addresses the basic question of whether more or less conservatism in accounting is economically desirable. The second stream is concerned with advancing the measurement of conservatism.[2] It addresses limitations of current conservatism measures to sufficiently reflect accounting conservatism. The third stream seeks to incorporate conservatism in accounting based valuation models.[3] It addresses the role of conservatism in valuation.

In three related studies, we examine issues revolving around the topic of accounting conservatism with particular focus on the first and third stream of conservatism research. The first two essays concentrate on conservatism in accounting based valuation models. Especially since the publication of the Ohlson (1995) model, this area has become an integral part of financial accounting. The third essay examines the variation of accounting conservatism with the riskiness of a project illustrated in the context of cost stickiness. This is a concept grounded in the management accounting literature that has recently attracted attention by empiricists.

The Financial Accounting Standards Board (FASB) describes conservatism as "a prudent reaction to uncertainty"[4]. The FASB emphasizes that financial information should be neutral instead of biased by prudence, i.e., conservatism. Accordingly, in recent years, U.S. accounting standard setters have started shifting standards away from historical cost accounting, characteristic for conservatism, towards fair value accounting. Critics from academia such as LaFond/Watts (2007) argue that compared to historical cost estimates fair value estimates lack verifiability and hence induce additional distortions. Despite this shift in standards suggesting a reduction in accounting conservatism levels, it is undisputable that accounting numbers are still subject to considerable conservative measurement implied by U.S. Generally Accepted Accounting Principles (US-GAAP).[5] Most obviously, accounting conservatism is reflected in the market-to-book ratio. The ratio is typically larger than one, which is consistent with accounting measurement understating book value relative to market value.

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1 See Qiang (2007), Garcia Lara/Osma/Penalva (2006), Watts (2003) and Ball/Kothari/Robin (2000).

2 See Callen/Hope/Segal (2006), Givoly/Hayn/Natarahan (2007), Dietrich/Muller/Riedl (2007) and Ball/ Kothari (2007).

3 See Choi/O'Hanlon/Pope (2006), Callen/Segal (2005), Monahan (2005), Price (2005), Ahmed/Morton/ Schaefer (2000), Feltham/Ohlson (1995 and 1996).

4 FASB (1980), SFAC 2.

5 See for example Givoly/Hayn/Natarahan (2007) and Basu (1997).

The accounting literature distinguishes between two types of conservatism. The first type, unconditional conservatism,[6] refers to the systematic downward bias in book value relative to market value as defined by Feltham/Ohlson (1995). Examples of unconditional conservatism include the immediate expensing of research and development or accelerated depreciation of long-lived assets. The second type, conditional conservatism, arises because accounting principles require a higher verification for the recognition of good compared to bad news. This news-dependent form of conservatism leads to a faster recognition of bad vs. good news in earnings, also known as the asymmetric timeliness of earnings.[7] Examples of conditional conservatism include the lower of cost or market accounting for inventory and impairment accounting for tangible and intangible assets.

The first two studies of this dissertation focus on conservatism in accounting based valuation models. Valuation models and more generally asset pricing models have their origin in finance. According to finance theory, the stock price of a firm is determined by the net present value of expected dividends that will be distributed to equity holders. While valuation in finance typically focuses on dividends, which requires assumptions about dividend payout policies, accounting research proposes valuation models that use accounting numbers to estimate market value, e.g., book value and earnings.

The most influential work in this area is the Ohlson (1995) model. The model has had a great impact on the theoretical development of accounting based valuation models as well as on empirical research testing valuation models. Some of the major contributions to valuation stemming from this area of financial accounting could be summarized as follows: First, the model links market value of equity to contemporaneous accounting numbers by extending the underlying valuation model with a forecast model (known as the linear information model) that predicts future payoffs. Second, the model shifts attention from the wealth distribution process, i.e., the distribution of future dividends to equity holders, towards the wealth creation process, i.e., forecasting residual income. Thus, it accentuates the information role of accounting with regard to providing information needed to forecast future payoffs. Third, the model is consistent with theoretical aspects of finance theory, e.g., no-arbitrage and dividend policy irrelevance, and at the same time it is consistent with practical aspects of valuation such as the focus of financial analysts on earnings. Fourth, by considering analysts' forecasts (other value relevant information) the model reflects the lack of timeliness of accounting numbers, i.e. conservatism. Fifth, the model highlights accounting properties important in valuation, e.g., persistence of earnings, aggregation of earnings components and accounting conservatism.

Subsequent research has quickly acknowledged that accounting based valuation inevitably raises conservatism issues. The Feltham/Ohlson (1995 and 1996) models belong to the first studies attempting to incorporate accounting conservatism in linear information models.

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6 See Beaver/Ryan (2005).

7 See Basu (1997). The negatively skewed earnings distribution could also be regarded as empirical evidence for conditional conservatism, at least to some extent, see Ryan (2006).

These models provide a valuable theoretical framework that explains the role of conservatism in valuation. For example, the models predict the effects of conservatism on the time series behavior of accounting numbers such as residual income. Yet, particularly with regard to the empirical implementation of the models a number of questions remain unanswered. Why is valuation accuracy of linear information models comparably low? To what extent do linear information models empirically capture conservatism? Can valuation errors be reduced by improving the incorporation of conservatism in linear information models? We address these questions in the first two studies of this dissertation.

Despite its conservatism correction the market value estimates of the Feltham/Ohlson (1995) model are systematically lower compared to actual market values. These findings indicate that the model fails to correct for conservatism when tested empirically. In a recent refinement of the Feltham/Ohlson (1995) model, Choi/O'Hanlon/Pope (2006) explicitly aim at mitigating the negative valuation bias[8] induced by accounting conservatism. The results are encouraging as valuation bias is substantially reduced. Yet, if conservatism is adequately modeled valuation inaccuracy[9] should be substantially reduced as well, which is not the case. This discrepancy is addressed in the first study of this dissertation. More specifically, we examine (1) to what extent different implementations of linear information models empirically capture unconditional conservatism and (2) why inaccuracy is not markedly reduced. We also suggest an empirical implementation that substantially reduces inaccuracy. As a result, valuation errors of linear information models become comparable to implementations using analysts' forecasts and implementations based on perfect foresight settings.[10]

While the first study focuses on correcting valuation bias induced by unconditional conservatism, in the second study, we examine the ability of linear information models to tackle the asymmetric recognition of good and bad news characteristic for conditional conservatism. The tests conducted in the first study indicate that the Choi/O'Hanlon/Pope (2006) implementation tends to overvalue high conservative firms. This could be related to the fact that the conservatism correction suggested by Choi/O'Hanlon/Pope (2006) largely relies on analysts' earnings forecasts, which are typically upward biased. A recent study by Louis/Lys/Sun (2007) documents that part of the forecast bias can be ascribed to the failure of analysts to fully incorporate the asymmetric timeliness of earnings. Hence, we conjecture that adjusting the analyst forecast for the asymmetric timeliness of earnings (1) should allow the model to better capture conditional conservatism and (2) should produce more accurate and less biased valuation estimates. Since adjusting the forecast requires information of the next period the

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8 Valuation bias is the signed percentage prediction error, i.e., the difference between the value estimate and the actual market value divided by the actual market value.

9 Valuation inaccuracy is the absolute percentage prediction error.

10 See Francis/Olsson/Oswald (2000), Courteau/Kao/Richardson (2001) and Penman/Sougiannis (1998). For an analysis about the deviation of the discounted cash flow model, the residual income valuation model and the dividend discount model from ideal conditions compare Hess et al. (2007). A recent study by Henschke/Homburg (2008) suggests improvements with regard to equity valuation using multiples.

adjusted model could be regarded as a benchmark to investigate conditional conservatism in linear information models. The results indicate that linear information models that largely rely on analysts' forecasts could better capture conditional conservatism if analysts adjusted their optimistic forecast for the asymmetric timeliness of earnings.

The third study of this thesis is related to the stream of literature that aims at assessing the impact of conservative reporting standards on real economic decisions in order to evaluate whether more or less conservatism in accounting is economically desirable. We examine the variation of conditional conservatism with the riskiness of a project illustrated in the context of cost stickiness. We expect that conditional conservatism will increase for more risky projects such as cost stickiness if conservatism serves the purpose of protecting equity holders from management's opportunistic behavior.

Cost stickiness refers to the fact that selling, general and administrative costs decrease less with a sales decrease than they increase with an equivalent sales increase. Traditionally, an increase in the SG&A costs to sales ratio when sales decline has been interpreted as a sign of inefficiency. In contrast, more recent studies argue that if managers expect that the decline in sales is temporary, they will decide to bear the costs of excess resources in order to avoid adjustment costs of cutting resources and building them up again when demand is restored. In this case, cost stickiness is an efficient signal.

We interpret cost stickiness as a risky project with uncertain payoffs and examine its impact on conditional conservatism. The manager, who faces a current drop in sales, has the choice to either cut resources or maintain unutilized resources. If he expects sales to rebound sufficiently fast, he will decide to bear the costs of unutilized resources. Since future sales are uncertain, the manager implicitly invests in a risky project. Even though he is better informed about the future prospects of his firm than outside investors, he cannot credibly convey his private information. This increases information asymmetry between the cost sticky firm and investors. Higher information asymmetry, however, increases the incentives for the manager to overstate financial performance. Conditional conservatism should counteract this incentive by restricting managers' discretion to overstate gains and to understate losses in order to reduce information asymmetry. We therefore conjecture that cost sticky firms should be subject to higher conditional conservatism measured as the asymmetric timeliness of earnings. Accordingly, we expect that earnings will be less timely when costs are sticky, i.e., more conditionally conservative. Consistent with this expectation, we find that for a risky project such as cost stickiness the asymmetric timeliness of earnings increases by weakening the timeliness of earnings for good news firms and, at the same time, intensifying the timeliness of earnings for bad news firms.

This dissertation provides several implications for future research. The first two studies demonstrate that linear information models should be implemented using the additional conservatism correction based on analysts' forecasts as suggested by Choi/O'Hanlon/Pope (2006). While the additional correction is crucial in mitigating the conservatism-related valuation bias, the results reveal that the model better corrects for unconditional than conditional conservatism. The analysis suggests that, at least in part, this is related to the failure of analysts to fully adjust their forecast for the asymmetric timeliness of earnings. Extending this analysis, future research could address the interaction between unconditional and conditional conservatism. A second insight emerging from the first two studies is that the implementation of the residual income valuation model on the basis of linear information models provides a promising alternative to conventional implementations based on analysts' forecasts, when the estimation accounts for different conservatism levels and for the asymmetric timeliness of earnings. The third study contributes to the literature by providing implications with regard to the variation of conditional conservatism with the riskiness of a project illustrated in the context of cost stickiness. The results demonstrate that conditional conservatism is reinforced in the presence of cost stickiness. This is consistent with the notion that conditional conservatism serves the purpose of protecting shareholders from management's opportunistic behavior. This result is also in line with findings by LaFond/Watts (2007) who show that by limiting the discretion of managers to overstate accounting numbers conditional conservatism reduces information asymmetry evoked by future positive net present value projects. An interesting question arising from this study is whether conditional conservatism helps mitigating information asymmetry induced by cost stickiness.

The dissertation is organized as follows. Chapter 2 examines unconditional conservatism in linear information models. In chapter 3, we investigate a linear information model correction for conditional conservatism. Chapter 4 deals with the impact of a risky project on conditional conservatism illustrated in the context of cost stickiness. Chapter 5 concludes.

2 Linear Information Models: The Effect of Unconditional Conservatism

2.1 Introduction

A large literature develops and tests valuation models that assume a link between equity values and the time series behavior of accounting numbers. With respect to predicting equity values, linear information models (LIMs), such as the Ohlson (1995) model, have been outshone by models implemented in perfect foresight settings or ex-ante approaches based on analyst forecasts.[11] The major challenge has been attempting to tackle the large negative bias[12] reported by empirical studies testing LIMs. These studies suggest that the violation of the assumption of unbiased accounting underlying the Ohlson (1995) model causes a systematic negative bias. Hence, we expect that if conservative accounting is adequately incorporated into the models, valuation errors should be reduced. Recent research refines the conservatism corrections of LIMs, e.g. Choi/O'Hanlon/Pope, 2006. The findings are encouraging as bias is substantially reduced. Yet, it is puzzling that inaccuracy remains high. These results raise two questions, which we address in this study: First, do the conservatism corrections of different LIM implementations capture conservative accounting, and to what extent? Second, if conservatism is captured, then why is accuracy not markedly improved?

To address these questions, we investigate the conservatism corrections of different Feltham/Ohlson (1995) model implementations. First, we contrast the original Feltham/Ohlson (1995) model, comprising one conservatism correction in the residual income process, with a modification of the model proposed by Choi/O'Hanlon/Pope (2006), which incorporates an additional correction in the process of the other information variable. Second, we assess the effect of disaggregating book value into operating and financial assets, leading to a conservatism correction based on operating assets instead of the book value of equity. Third, we examine and compare the effectiveness of the conservatism corrections for different estimation approaches. The first approach requires estimating the parameters of the LIM and then obtaining value estimates. The second approach requires estimating the coefficients of the valuation function directly.

We exploit the fact that the Feltham/Ohlson (1995) model and its different implementations are generalizations of the Ohlson (1995) model and nominate the Ohlson (1995) model to be the no conservatism benchmark. This ensures that other factors influencing the conservatism corrections are held constant. We do not consider the Feltham/Ohlson (1996) model because prior studies (e.g. Ahmed/Morton/Schafer, 2000) find that it underperforms compared to the Ohlson (1995) model. We also refrain from testing the Pope/Wang (2005) model

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[11] See Penman/Sougiannis (1998) and Francis/Olsson/Osswald (2000).

[12] Bias is defined as the difference between the value estimate and the actual market value divided by the actual market value, i.e. the signed valuation error.

since it focuses on relaxing the clean surplus assumption of the Ohlson (1995) model in addition to correcting for conservatism.

Our sample comprises firms from the intersection of COMPUSTAT/CRSP/IBES from 1987 to 2004. We follow Choi/O'Hanlon/Pope (2006) to estimate the models via the LIM, and we follow Callen/Segal (2005) to implement the models via the valuation function as suggested by Liu/Ohlson (2000).

Initially, we confirm that the Ohlson (1995) model does not capture conservatism. As expected, we find that bias for the Ohlson (1995) model increases with conservatism, indicating that the model is an appropriate no conservatism benchmark. To address our first research question concerning the extent to which different LIM implementations capture conservative accounting, we suggest two sets of tests, which both exploit the fact that the Ohlson (1995) model does not capture conservatism. In a first set of tests, we partition our sample according to conservatism and growth. We examine which LIM implementations reduce the valuation errors, particularly for high conservative/high-growth firms, compared to the Ohlson (1995) model. Our results indicate that the conservatism correction of the Feltham/Ohlson (1995) model does not discriminate between high and low conservative firms. For the modification suggested by Choi/O'Hanlon/Pope (2006), we find that the valuation errors are lower compared to the Ohlson (1995) model for all conservatism levels. Also, the correction is largest for the high conservatism/high-growth partition and smallest for the low conservatism/low-growth partition. Yet, we discover that the correction suggested by Choi/O'Hanlon/Pope (2006) is highly sensitive to the difference between the cost of capital and growth.

Subsequently, we develop a second set of tests, which we label delta regression, to examine whether the conservatism corrections empirically capture unconditional conservatism and growth in understated assets. The main idea is to regress the conservatism correction on proxies for unconditional conservatism. We measure the conservatism correction as the difference between the value estimate of a model that corrects for conservatism and the value estimate of the Ohlson (1995) model. Our tests indicate that the conservatism correction of the Feltham/Ohlson (1995) model fails to adequately adjust for conservatism. The most obvious result is a negative association between the conservatism correction and the main proxy for unconditional conservatism. In contrast, we provide evidence that the Choi/O'Hanlon/Pope (2006) modification captures unconditional conservatism to a major extent. On average, one dollar of unrecorded reserves, measured as the estimated reserve by Penman/Zhang (2002), results in a correction of market value forecasts of approximately one dollar.

With our second research question, we investigate why inaccuracy remains high for the whole sample, given that conservatism is captured. We argue that the failure of the Choi/O'Hanlon/Pope (2006) modification to markedly reduce inaccuracy for the whole sample is the consequence of forcing the model to value firms with different degrees of conservatism on the basis of the same conservatism coefficient. Consistent with this conjecture, Easton/Pae (2004) demonstrate that the magnitude of conservatism coefficients increases for higher conservatism levels. We implement two different approaches to form samples with more homogenous conservatism levels. First, we estimate industry-specific LIM parameters following the classification by Barth/Beaver/Hand/Landsman (2005). To additionally account for different conservatism levels within industries we consider a more direct conservatism measure and estimate the LIM parameters according to market to book deciles. We find that the median inaccuracy for the whole sample reduces from 36.8% to 21.1% when the parameters are estimated for market to book deciles. Our achieved accuracy level is comparable to implementations of the residual income model based on analyst forecasts without applying LIMs, e.g. Francis/Olsson/Oswald (2000) and Courteau/Kao/Richardson (2001). In contrast, we do not document a significant reduction in inaccuracy for by-industry estimations. Nonetheless, the industry-specific estimations are consistent with our partition results, as the correction for high conservative industries is higher than the correction for low conservative industries.

Finally, we document that differentiating between operating and financing activities does not aid in capturing conservatism more adequately compared to the specification without disaggregating book value. Our findings also suggest that ignoring the LIM and estimating the Feltham/Ohlson (1995) model directly via the valuation function, as suggested by Liu/Ohlson (2000), reduces valuation error considerably, but we do not find evidence that the model captures conservatism. More specifically, one of the conservatism coefficients is, contrary to its theoretical value, negative, and the leverage coefficient significantly exceeds its theoretical value of one, indicating misspecification problems.

To summarize, this study contributes to the literature on linear information models by providing an assessment of the conservatism corrections for different implementations of the Feltham/Ohlson (1995) model and by demonstrating how accuracy for LIMs can be significantly improved. Our results provide evidence that the modified LIM by Choi/O'Hanlon/Pope (2006) captures unconditional conservatism to a major extent. Furthermore, we demonstrate that inaccuracy is significantly reduced when the LIM suggested by Choi/O'Hanlon/Pope (2006) is estimated on the basis of conservatism specific coefficients. We also document that (1) the Feltham/Ohlson (1995) correction does not adequately capture conservatism, (2) a differentiation between operating and financing activities does not help to improve the conservatism correction and (3) estimating the Feltham/Ohlson (1995) model via the valuation function does not enhance the conservatism correction.

We provide two main implications for future research aiming to extend LIMs. First, the modification suggested by Choi/O'Hanlon/Pope (2006) should be preferred to the Feltham/Ohlson (1995) model, as it captures unconditional conservatism. For example, future research could use the Choi/O'Hanlon/Pope (2006) modification to incorporate conditional conservatism and, as suggested by Ryan (2006), to model the interaction between both types of conservatism. Second, our analyses provide preliminary evidence that the implementation of the residual income model on the basis of LIMs can be a promising alternative to the conventional implementation based on analyst forecasts.

The remainder of the paper is organized as follows: In section 2.2 we briefly outline the models. Section 2.3 describes our estimation and testing procedures. The empirical results are reported in section 2.4. We describe the findings of the sensitivity analyses in section 2.5. Section 2.6 summarizes and concludes.

2.2 Linear Information Models

In this section we provide an overview of the models examined in this study. We highlight the theoretical aspects of two linear information models, the Ohlson (1995) model and the Feltham/Ohlson (1995) model, henceforth OM and FOM, respectively that are central in deriving the hypothesis of our conservatism analyses. Additionally, we draw attention to a recent modification of the FOM proposed by Choi/O'Hanlon/Pope (2006), henceforth COPM.

2.2.1 The Case of No Conservatism

The OM rests on three major assumptions. First, it assumes that the equity value of a firm equals the present value of expected dividends in a non-arbitrage and risk-neutral market. Second, the clean surplus relation holds. Taken together, these two assumptions lead to the residual income valuation model. It states that the market value of equity equals the book value of equity plus the present value of expected residual income. Third, the time-series behavior of the next period's residual income $\tilde{x}^a_{t+1}$ and the next period's information other than residual income $\tilde{v}_{t+1}$ is autoregressive.[13] (1) and (2) are labeled linear information model (LIM):

$$\tilde{x}^a_{t+1} = \omega x^a_t + v_t + \tilde{\varepsilon}_{1,t+1}, \tag{1}$$

$$\tilde{v}_{t+1} = \gamma v_t + \tilde{\varepsilon}_{2,t+1}, \tag{2}$$

where $\tilde{\varepsilon}_{k,t+1}$ with $k = 1,\ 2$ are zero mean error terms. ω, γ $(0 \le \omega, \gamma < 1)$ are the persistence parameters of the residual income variable and the other information variable. This specification is consistent with the notion that economic rents cannot persist in the long run. Together, these three assumptions yield the following linear valuation function:

$$V_t = b_t + \beta_1 x^a_t + \beta_2 v_t, \tag{3}$$

where $\beta_1 = \dfrac{\omega}{(R-\omega)}$ and $\beta_2 = \dfrac{R}{(R-\omega)(R-\gamma)}$. V_t is the market value of equity at date t, b_t is the book value of equity at date t and R is a constant, risk free interest rate plus one.

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[13] Residual income for period (t-1,t) is defined as $x^a_t = x_t - (R-1)b_{t-1}$, with x_t being income for period (t-1,t).

2.2.2 The Case of Accounting Conservatism

2.2.2.1 The Feltham/Ohlson (1995) Model

The FOM distinguishes between financial and operating activities of the firm. In addition to the assumptions underlying the OM, the FOM further relies on the assumption that investments in net financial assets yield zero net present value. Moreover, the FOM relaxes the restriction of unbiased accounting and assumes the following, more general LIM:

$$\widetilde{ox}^{a}_{t+1} = \omega_{11} ox^{a}_{t} + \omega_{12} oa_{t} + v_{1,t} + \tilde{\varepsilon}_{1,t+1}, \quad (4)$$

$$\widetilde{oa}_{t+1} = \omega_{22} oa_{t} + v_{2,t} + \tilde{\varepsilon}_{2,t+1}, \quad (5)$$

$$\tilde{v}_{1,t+1} = \gamma_{1} v_{1,t} + \tilde{\varepsilon}_{3,t+1}, \quad (6)$$

$$\tilde{v}_{2,t+1} = \gamma_{2} v_{2,t} + \tilde{\varepsilon}_{4,t+1}, \quad (7)$$

where oa_t is net operating assets at date t and ox^a_t is residual operating income for period $(t-1,t)$. $\tilde{\varepsilon}_{k,t+1}$, with $k = 1,2,3,4$, are zero mean error terms. ω_{11} $(0 \le \omega_{11} < 1)$ is the persistence of operating residual earnings, ω_{12} $(\omega_{12} \ge 0)$ represents conservatism and ω_{22} $(1 \le \omega_{22} < R)$ reflects growth in net operating assets. $v_{i,t}$, with $i = 1,2$, denotes other information and γ_i $(0 \le \gamma_i < 1, i = 1,2)$ is the persistence of the other information variables. Taken together, the assumptions lead to the following closed form valuation equation:

$$V_t = b_t + \alpha_1 ox^a_t + \alpha_2 oa_t + \beta_1 v_{1,t} + \beta_2 v_{2,t}, \quad (8)$$

with $\alpha_1 = \dfrac{\omega_{11}}{R-\omega_{11}}$, $\alpha_2 = \dfrac{\omega_{12} R}{(R-\omega_{22})(R-\omega_{11})}$, $\beta_1 = \dfrac{R}{(R-\omega_{11})(R-\gamma_1)}$, $\beta_2 = \dfrac{\alpha_2}{R-\gamma_2}$.

Ohlson (1995) and Feltham/Ohlson (1995) define conservative and unbiased accounting in terms of how book value deviates asymptotically from market value. The definition of unbiased accounting, $\lim_{\tau\to\infty} E_t\left[V_{t+\tau} - b_{t+\tau}\right] = 0$, requires book value to equal market value in the long run. The LIM of the OM implies unbiased accounting since the parameter restriction $0 \le \omega, \gamma < 1$ ensures $\lim_{\tau\to\infty} E_t\left[\tilde{x}^a_{t+\tau}\right] = 0$ and $\lim_{\tau\to\infty} E_t\left[\tilde{v}_{t+\tau}\right] = 0$. In contrast, the definition of conservative accounting, $\lim_{\tau\to\infty} E_t\left[V_{t+\tau} - b_{t+\tau}\right] > 0$, implies on average understatement of book value relative to market value. The LIM of the FOM implies conservative accounting if $\omega_{12} > 0$. In the case of unbiased accounting, $\omega_{12} = 0$, and the FOM reduces to the OM. Contrary to the OM, the FOM incorporates growth. Note, that growth (ω_{22}) will be relevant for valuation only if operating assets are understated, i.e. $\omega_{12} > 0$. This implies that the conservatism correction is reinforced for growing conservative firms.[14]

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[14] A recent study by Rajan/Reichelstein/Soliman (2007) models the impact of growth and conservatism on the accounting rate of return.

The conservatism definition by Feltham/Ohlson (1995) implies two sources for a long-term deviation between book and market value: first, not recognizing expected positive net present value of future investments and second, not or not fully recognizing the present value of current investments. The conservatism correction of the Feltham/Ohlson (1995) model incorporates unconditional conservatism, e.g. immediate expensing of R&D or accelerated depreciation of fixed assets. Adjusting the LIM to incorporate conditional conservatism would require a correction of the residual income process for the asymmetric recognition of good and bad news.[15] Aside from this, recent studies suggest that the analysis of conservatism should not neglect possible interactions between both types of conservatism.[16]

In summary, contrary to the OM, the FOM aims at adjusting for understatement in operating assets resulting from (1) unconditional conservatism and (2) growth in understated operating assets.

2.2.2.2 The Choi/O'Hanlon/Pope (2006) Modification of the Feltham/Ohlson (1995) Model

Empirical tests of the OM and FOM find that the estimates of firm value are negatively biased.[17] A common explanation for the negative bias of the OM is the violation of the assumption of unbiased accounting. Most studies that test the FOM report a negative conservatism coefficient, ω_{22}, which is interpreted as a failure of the model to correct for conservative accounting. Choi/O'Hanlon/Pope (2006) propose the following modified LIM to mitigate this problem:

$$\tilde{x}^a_{t+1} = \omega_0 b_t + \omega_1 x^a_t + v_t + \tilde{\varepsilon}_{1,t+1}, \tag{9}$$

$$\tilde{v}_{t+1} = \gamma_0 b_t + \gamma_1 v_t + \tilde{\varepsilon}_{2,t+1}, \tag{10}$$

$$\tilde{b}_{t+1} = G b_t + \tilde{\varepsilon}_{3,t+1}, \tag{11}$$

where $\tilde{\varepsilon}_{k,t+1}$ with $k = 1,2,3$ are zero mean error terms. ω_0, γ_0 are conservatism parameters, ω_1, γ_1 ($0 \leq \omega_1, \gamma_1 < 1$) are persistence parameters and G ($1 \leq G < R$) represents growth. They derive the following linear valuation function:

$$V_t = b_t + \beta_1 x^a_t + \beta_2 v_t + (\beta_3 + \beta_4) b_t, \tag{12}$$

where

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15 See Beaver/Ryan (2005) for an overview of conservatism types. Lundholm (1995) sees in conditional conservatism "... a type of conservatism that cannot be captured in the Feltham/Ohlson (1995) model – recognizing bad news early but good news late …". Price (2005) implements conditional conservatism by distinguishing between good and bad other information. See also Ryan (2006) for a recent discussion of the literature on conditional conservatism. Recently, Callen/Hope/Segal (2006) and Callen (2006) construct a conditional conservatism metric at the firm-year level.

16 Several empirical studies, including Ball/Kothari (2007), Givoly/Hayn/Natarajan (2006), Beaver/Ryan (2005), Roychowdhury/Watts (2005), Pope/Walker (1999 and 2003) and Fuelbier/Gassen/Sellhorn (2006) examine the impact of unconditional conservatism on conditional conservatism.

17 See Dechow/Hutton/Sloan (1999), Myers (1999) and Callen/Segal (2005).

$$\beta_1 = \frac{\omega_1}{R-\omega_1},\ \beta_2 = \frac{R}{(R-\omega_1)(R-\gamma_1)},\ \beta_3 = \frac{R\omega_0}{(R-\omega_1)(R-G)},\ \beta_4 = \frac{R\gamma_0}{(R-\omega_1)(R-\gamma_1)(R-G)}.$$

In contrast to the original Feltham/Ohlson (1995) LIM this LIM does not distinguish between operating and financial assets. Choi/O'Hanlon/Pope (2006) demonstrate that the conservatism coefficient ω_{22} of the FOM is negative because mean residual income is negative during the estimation period. To address this problem, the authors include $\gamma_0 b_t$ in the second LIM equation, exploiting the fact that the mean of the other information variable (measured on the basis of analyst forecasts of residual income) can be positive over the estimation period. They argue that a positive mean for the other information variable is consistent with the expected unwinding of conservatism. As in the FOM, growth becomes value-relevant in the case of conservative accounting because the growth parameter enters the valuation equation if one of the conservatism parameters ω_0, γ_0 is different from zero. Taken together, the COPM aims at adjusting for (1) unconditional conservatism and (2) growth in understated assets.

2.3 Empirical Approach

We obtain financial statement data from COMPUSTAT, market price data from the Center for Research in Security Prices (CRSP) and analyst forecast data from IBES via Datastream, for the period from 1987 to 2004. The merging procedures and sample compositions are described in table 1. Table 2, panel A, gives an overview of variable definitions and measurements. To estimate the models, we use 12% as the constant cost of capital following Dechow/Hutton/Sloan (1999). We also report valuation errors for the time varying cost of capital following Choi/O'Hanlon/Pope (2006), by adding a 5% risk premium to the yield on U.S. treasury bonds with maturities greater than 10 years in the relevant calendar year. In addition, we examine the robustness of our results for different fixed cost of capital and industry-specific cost of capital following Fama/French (1997). We do not find evidence that a more sophisticated estimation of the cost of capital improves valuation errors.

2.3.1 Estimation Procedure

We follow Choi/O'Hanlon/Pope (2006) to estimate the OM, FOM and COPM.[18] First, we estimate year-specific parameters $\omega_{0,t}$ and $\omega_{1,t}$ for the first OM LIM equation scaling with lagged book value of equity, using all available data up to t:

$$\frac{x^a_{j,s}}{b_{j,s-1}} = \omega_{0,t} + \omega_{1,t}\frac{x^a_{j,s-1}}{b_{j,s-1}} + \varepsilon_{1,j,s} \quad (13)$$

j is a firm index and s is a time index running from the first year of our sample 1988, up to the current year t. To obtain $\omega_{0,1988}$ and $\omega_{1,1988}$ equation (13) is estimated for 1988. The para-

[18] There are two major differences between our data set and the data used by COP: (1) we cover a different time period (1987-2004 in contrast to 1950-1995) and (2) we obtain analyst forecast data from IBES via Datastream.

meters for 1989 are estimated using two years of pooled data (1988 and 1989), until the last regression, in which the data is pooled over all years available in the sample to estimate the parameters for 2004. In the same fashion we estimate year-specific parameters $\gamma_{0,t}$ and $\gamma_{1,t}$ for the second LIM equation scaling with lagged book value of equity, using all available data up to t:

$$\frac{v_{j,s}}{b_{j,s-1}} = \gamma_{0,t} + \gamma_{1,t}\frac{v_{j,s-1}}{b_{j,s-1}} + \varepsilon_{2,j,s}. \tag{14}$$

To obtain the other information variable, the first LIM equation (1) is solved for v_t:

$$v_{j,t} = E_t\left[\tilde{x}^a_{j,t+1}\right] - \omega_{1,t}x^a_{j,t}. \tag{15}$$

We employ the median analyst forecast of residual income as a proxy for next year's expected residual income $E_t\left[\tilde{x}^a_{j,t+1}\right]$. It is computed as the difference between the median analyst forecast of next year's earnings per share and the product of the cost of capital and book value of equity per share $(R_t - 1)b_{j,t}$. $\omega_{1,t}$ is the estimated slope parameter from equation (13).

Second, the parameters of the valuation equation (3), $\beta_{1,t}$ and $\beta_{2,t}$, are calculated using the estimated parameters of the LIM:

$$\beta_{1,t} = \frac{\omega_{1,t}}{(R_t - \omega_{1,t})}, \quad \beta_{2,t} = \frac{R_t}{(R_t - \omega_{1,t})(R_t - \gamma_{1,t})}.$$

Third, the estimated valuation parameters are applied together with firm-level data to obtain firm-level market value forecasts:

$$V_{j,t} = b_{j,t} + \beta_{1,t}x^a_{j,t} + \beta_{2,t}v_{j,t}. \tag{16}$$

For the COPM $\omega_{1,t}$ is estimated as for the OM from (13). The other information variable, however, is measured including the $\omega_{0,t}$ parameter from (13) by solving equation (9) for v_t:

$$v_{j,t} = E_t\left[\tilde{x}^a_{j,t+1}\right] - (\omega_{0,t}b_{j,t} + \omega_{1,t}x^a_{j,t}). \tag{17}$$

The parameters $\gamma_{0,t}$ and $\gamma_{1,t}$ of the second LIM equation of the COPM, are then estimated as in (14). The third LIM equation is implemented by estimating year specific growth in book value using all available book value data up to t:

$$G_t = \left(\sum_{s=k}^{t}\sum_{j=1}^{N_s} b_{j,s}\right) / \left(\sum_{s=k}^{t}\sum_{j=1}^{N_s} b_{j,s-1}\right). \tag{18}$$

N_s is the number of firms with book value data for year s, and k is the first year for which lagged book value is available. Next, the parameters of the valuation function (12) are calculated using the estimated parameters of the LIM. Finally, the parameters of the valuation function for year t are applied together with firm-level data for year t to obtain firm-level market value forecasts for the COPM:

$$V_{j,t} = b_{j,t} + \beta_{1,t} x^a_{j,t} + \beta_{2,t} v_{j,t} + (\beta_{3,t} + \beta_{4,t}) b_{j,t} . \quad (19)$$

To enhance comparability with the COPM, we estimate the FOM, refraining from distinguishing between operating and financial assets[19] and neglecting the second other information variable $v_{2,t}$ proposed in (5). In this specification, the FOM differs from the COPM as $\gamma_{0,t}$ equals zero in the second LIM equation. The estimation of the FOM equals the estimation of the COPM, with the only difference being that β_4 is zero in the valuation function.

To compare the models' abilities to estimate market value of equity, we employ two error metrics: bias and inaccuracy. $Bias = (\hat{V}_{j,t} - V_{j,t}) / V_{j,t}$ is the percentage prediction error and $Inaccuracy = \left| (\hat{V}_{j,t} - V_{j,t}) / V_{j,t} \right|$ is the absolute percentage prediction error, where $\hat{V}_{j,t}$ is the market value estimate and $V_{j,t}$ is the actual market value of equity. To assess the statistical significance of differences in valuation error for the FOM and the COPM, we compare median bias and inaccuracy against the OM using a nonparametric paired sign test that does not require symmetry of paired differences in the ranks.

2.3.2 Conservatism Analyses

Previous studies testing LIMs focus on the overall estimation performance of the models, i.e. valuation bias and inaccuracy. Yet, this approach is too general to assess whether, and to what extent, the models capture conservatism induced by understated assets and growth in understated assets. To address this question, we suggest two different approaches both exploiting the fact that the OM does not capture conservative accounting. First, we partition our sample and examine, whether the FOM and the COPM value particularly high conservative firms more accurately in terms of bias and inaccuracy, compared to the benchmark model (Ohlson, 1995). Second, we develop a regression approach to investigate to what extent the conservatism corrections – measured as the valuation difference between the FOM and OM, respectively COPM and OM – are empirically explained by proxies for unconditional conservatism.

2.3.2.1 Partition Approach

Theory suggests that the corrections of the FOM and COPM are driven by conservatism and the joint effect of conservatism and growth. Consequently, we divide our sample into four groups according to conservatism and growth.[20] To ensure that the order in which we split our sample does not affect the partition a company is assigned to, (1) we split the sample at the median of the conservatism proxy for each firm and (2) we split the sample at the median of the growth proxy for each firm and obtain four partitions: high conservatism/high-growth, high conservatism/low-growth, low conservatism/high-growth and low conservatism/low-growth. Rather than grouping individual observations, we assign individual firms to one of

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[19] As part of several sensitivity tests, in section 5 we examine the effect of a distinction between operating and financial assets in the COPM.

[20] Monahan (2005) applies a similar partition approach.

the four partitions. Thus, the number of observations in the different partitions may vary. We estimate the models' parameters for each partition separately and obtain firm-level out-of-sample value estimates.

As a growth proxy, we employ the median growth rate of the firm's book value of equity over all periods. To mitigate problems that arise in the high-growth partitions of the COPM when $R < G$, we eliminate firms with a median growth rate higher than the cost of capital.[21] As proxies for conservatism, we employ the firm's median market-to-book ratio (MTB) and alternatively the median of the estimated reserve according to Penman/Zhang (2002) scaled by current book value of equity.

If the OM is an appropriate no conservatism benchmark, we will expect that:

Hypothesis 1.1: Bias and inaccuracy for the benchmark model (Ohlson, 1995) are lowest in the low conservatism/low-growth partition and highest in the high conservatism/high-growth partition.

Subsequently, we benchmark the FOM and COPM within each partition against the OM on the basis of bias and inaccuracy and expect that:

Hypothesis 1.2: Bias and inaccuracy are significantly lower in each partition compared to the OM.

Hypothesis 1.3: The reduction in bias and inaccuracy is largest in the high conservatism/high-growth partition.

Hypothesis 1.4: The reduction in bias and inaccuracy is smallest in the low conservatism/low-growth partition.

2.3.2.2 Delta Regression

To assess whether the Feltham/Ohlson (1996) model captures conservatism induced by accelerated depreciation, Ahmed/Morton/Schaefer (2000) regress the estimated firm-specific conservatism coefficients on conservatism proxies. This approach, however, requires long time-series, which, in particular, are not available for analyst earnings forecasts. To meet the requirements of our sample, we develop a regression approach, which we label 'delta regression'. The main idea of our delta regression is to investigate to what extent the conservatism corrections – measured as the valuation difference between the FOM and OM, respectively COPM and OM – are empirically explained by proxies for unconditional conservatism. This approach allows us to assess what the FOM and the COPM explain in addition to what is already explained by the OM.

Yet, a correction for conservatism might as well slip into the OM, e.g. through the other information variable that is measured on the basis of analyst earnings forecasts. To clarify whether the OM is an appropriate no conservatism benchmark, we apply the delta regression. We estimate the OM according to Choi/O'Hanlon/Pope (2006) with (V_t^{OM}) and without the

[21] This leads to different numbers of observations for different discount rates.

other information variable (V_t^{OM-v}). The difference between the estimates determines the delta:

$$Delta_t^{OM} \equiv V_t^{OM} - V_t^{OM-v} = (b_t + \beta_1^{OM} x_t^a + \beta_2^{OM} v_t) - (b_t + \beta_1^{OM-v} x_t^a) = \beta_2^{OM} v_t \,. \qquad (20)$$

Then we regress the delta on conservatism proxies and control variables. If the OM is an appropriate no conservatism benchmark, we will expect that:

Hypothesis 2.1: The conservatism proxies are insignificant.

In the following, we illustrate the delta regression specification on the basis of the COPM. The specification is analogous for the FOM. The delta can be interpreted as our proxy for the COPM conservatism correction. We obtain it as the difference between the COPM value estimates and OM estimates:

$$\begin{aligned} Delta_t^{COPM} &\equiv V_t^{COPM} - V_t^{OM} \\ &= (\beta_1^{COPM} x_t^a + \beta_2^{COPM} v_t^{COPM} + (\beta_3^{COPM} + \beta_4^{COPM}) b_t) - (\beta_1^{OM} x_t^a + \beta_2^{OM} v_t^{OM}) \qquad (21) \\ &= (\beta_2^{COPM} v_t^{COPM} - \beta_2^{OM} v_t^{OM}) + (\beta_3^{COPM} + \beta_4^{COPM}) b_t. \end{aligned}$$

In addition to the conservatism correction term $(\beta_3^{COPM} + \beta_4^{COPM}) b_t$ that mainly depends on ω_0 and γ_0 the delta includes the difference between the contributions of the other information variables to goodwill in the respective models. To examine whether the conservatism correction of the COPM empirically captures conservatism as opposed to being an arbitrary correction, we regress the delta on the types of conservatism the model claims to capture. In section 2.2.2 we have identified unconditional conservatism and growth in understated assets as the two major determinants of the conservatism correction. Accordingly, we specify the delta regression as:

$$Delta_t = \alpha_0 + \alpha_1 ER_t + \alpha_2 ER_t \cdot Growth_t + \alpha_3 Depr_t + \sum Controls_t + \varepsilon_t \,. \qquad (22)$$

An overview of the measurement of the variables used in the delta regressions is given in table 2, panel B. In the following, we elaborate on our most important conservatism proxy – the estimated reserve (ER). The estimated reserve is supposed to detect the amount of existing assets that are not fully recognized on the balance sheet because of conservative accounting principles. A model that accounts for conservative accounting is expected to correct for the amount of hidden reserves reflected in our estimated reserve proxy.

We measure the estimated reserve according to Penman/Zhang (2002), with the only difference being a simplified amortization speed of R&D. Penman/Zhang (2002) remark that reserves from inventories, advertising and R&D, though not representing the total unrecorded reserves, have the advantage of being less exposed to managerial discretion. The inventory reserve is measured by the LIFO reserve reported in the financial statement footnotes (COMPUSTAT item #240 (LIFR)). The advertising reserve is measured by capitalizing advertising expenses (COMPUSTAT item #45 (XAD)) and amortizing them using a sum-of-the-year's digits method over two years because advertising is assumed to have a relatively short useful life. R&D expenditures (COMPUSTAT item #46 (XRD)) are capitalized and amortized uniformly according to Lev/Sarath/Sougiannis (2005) over five years. The estimated reserve variable is calculated as the sum of the three reserves, requiring at least one of the components to be non-missing in COMPUSTAT. Assuming that our proxy appropriately measures unrecorded reserves or a portion of unrecorded reserves, we expect a one-to-one correction for reserves, i.e. on average one dollar of hidden reserves should result in a one dollar correction of market value.

Hypothesis 2.2: The regression coefficient of the estimated reserve is roughly one.

In section 2.2.1 we have pointed out that growth is not modeled by the OM. Although it is included as a separate process in the information dynamics of the COPM (and FOM), growth is not value relevant per se. Rather, the joint effect of growth and conservatism, i.e. growth in understated assets, should be captured by the conservatism correction. We measure growth in understated assets with the interaction term $ER_t \cdot Growth_t$, where ER_t is the estimated reserve and $Growth_t$ is the firm's median annual percentage change in book value of equity over the sample period:[22]

Hypothesis 2.3: The coefficient of the interaction term is significantly positive.

$Depr$ (accelerated depreciation measured following Beaver/Ryan, 2000) should capture conservatism from accelerated depreciation of fixed assets. Assuming that we have an appropriate proxy for accelerated depreciation, we hypothesize that:

Hypothesis 2.4: The regression coefficient of the depreciation parameter is significant and positive.

To isolate the effect of unconditional conservatism, we include a set of control variables. First, we control for scale/size effects by deflating with the current share price. Second, we control for growth ($Growth$) and leverage (Lev). The models should capture growth only in conjunction with conservatism implying that the growth proxy should not be significantly different from zero. Leverage is a less clear control variable as it has been used to proxy for different effects, including risk, outside financing needs, and investment prospects. Additionally, leverage might also reflect debt financing benefits, i.e. it may capture tax shield reserves. Third, we include a set of analyst information items suggested by Cheng (2005) since the COPM is estimated so that compared to the OM, analyst forecasts have a higher impact.[23] We employ proxies for economic rents (market share ($MShare$) and capital intensity ($CapIn$)), earnings quality (labor efficiency ($LaborEf$) and change in assets turnover ($AssetTurn$)),

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[22] We choose the proxy for growth in understated asset such that it is consistent with the proxy for growth in the LIM estimation of the COPM.

[23] The idea is to control for information that analysts apply when valuing companies that might influence the conservatism correction.

and transitory earnings (special items (SpI)). We expect that the analyst information controls will be insignificant because they should be captured by the OM.

2.4 Results

2.4.1 Model Estimations and Out-of-Sample Forecasts

Panel A of table 3 lists summary statistics for the variables used to estimate the LIMs of the OM, FOM and COPM. Consistent with prior studies the residual income variable is negative on average and the mean of the other information variable is positive.

Table 3, panel B reports the estimated median LIM parameters and valuation multiples. These parameters are similar to previous research. The conservatism parameter in the first LIM equation of the FOM and COPM, ω_0, is negative due to the negative mean residual income in the sample. Hence, the conservatism correction β_3 is negative as well. The conservatism correction coefficient in the second LIM equation of the COPM γ_0 is significantly positive. For the COPM the total correction in the valuation function $(\beta_3 + \beta_4)$ is positive. Yet, it varies considerably since β_4 reacts strongly to changes in the difference between R and G, especially if G approaches R.

Table 3, panel C reports the valuation errors. The median bias (inaccuracy) of the OM value estimates is about -44% (48%) and stable for different discount rates. Similar to prior studies, we find that instead of reducing bias, the FOM exhibits an even higher bias compared to the OM. This can be attributed to the negative intercept in the first LIM equation. In contrast, the COPM substantially reduces valuation bias. A discount rate of 12% yields almost zero bias. However, the magnitude of the bias depends on the cost of capital. Whereas, for fixed cost of capital (12%) we obtain a reduction of inaccuracy from 48% to 37%, for time varying cost of capital, inaccuracy is not markedly reduced, resembling the findings of Choi/O'Hanlon/Pope (2006).

2.4.2 Partition Analyses

To assess whether the models discriminate between firms with different levels of understated assets, we estimate them separately for different partitions.

Table 4 presents portfolio-specific median bias and inaccuracy for the OM, FOM and COPM. We partially confirm Hypothesis 1.1. As expected, the bias of the OM is higher for the high conservatism than for the low conservatism group. However, the bias is highest in the high conservatism/low-growth partition instead of in the high conservatism/high-growth partition. Subsequent analysis reveals that mean ROE is negative only in this partition. Ahmed/Morton/Schaefer (2000) find that loss firms are particularly difficult to value on the basis of LIMs.[24]

While we generally confirm Hypothesis 1.2, 1.3 and 1.4 for the COPM, we cannot confirm them for the FOM. Median bias and inaccuracy are significantly lower for the COPM in

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[24] Joos/Plesko (2005) analyze problems specific to the valuation of loss firms.

all portfolios compared to the OM. The FOM reduces bias merely in the high conservatism/high-growth partition. For the COPM, the reduction in bias is as expected highest in the high conservatism/high-growth partition and lowest in the low conservatism/low-growth partition. Depending on the cost of capital, the COPM correction tends to over or under adjust. Inaccuracy is not as markedly reduced as bias for the COPM, and when using the estimated reserve instead of the MTB ratio to partition the sample, the results (not reported) are less pronounced.[25] Besides, the model's estimates are considerably driven by the difference between the cost of capital and growth.

In summary, the results of the partition analyses indicate that in contrast to the conservatism correction of the FOM the correction of the COPM discriminates between different levels of conservatism. Yet, the results are sensitive to the difference between the cost of capital and growth.[26]

2.4.3 Delta Regressions

In the following section we extend the partition analyses to control for other value relevant factors that might influence the results obtained in the partition analyses. For instance, the correction of the COPM need not result from conservatism but could partially stem from analyst forecast bias or the ability of analysts to capture other value relevant characteristics. To examine the empirical content of the models' corrections and to isolate the extent to which the models correct for understated assets, we apply the delta regression approach introduced in section 2.3.2.2.

Summary statistics (not reported) show that the proxy for the conservatism correction – the delta variable – is positive for the COPM. It is negative in about 75% of the observations of the FOM. The distribution of the independent variables is comparable to prior studies, e.g. Cheng (2005). The correlations and the VIF indicate that we do not encounter problems of multicollinearity.

The results of the delta regressions are presented in table 5. Since the conservatism proxies are small in magnitude and mostly insignificant, we conclude that the OM is an appropriate no conservatism benchmark.[27]

With respect to the COPM, we support Hypothesis 2.2, which predicts that the coefficient of the estimated reserve is approximately one. In the regression without controls for analyst items the coefficient of the estimated reserve is 1.05 (t=16.31) and after including the control variables it decreases to 0.62 (t=9.69). We conclude that on average, one dollar of unrecorded reserves results in a correction of the market value forecast of between 0.62 to 1.05 dollars. According to Hypothesis 2.3, we expect that the coefficient of the interaction between con-

[25] Note that the estimated reserve is probably an incomplete proxy for unconditional conservatism.

[26] Note that the sample size is reduced by about 50% when we eliminate firms with a growth rate higher than the cost of capital in order to meet the LIM restriction.

[27] Among the analyst information proxies we want to highlight that the special items variable is highly significant, which is consistent with findings by Cheng (2005) that analysts capture effects of transitory earnings.

servatism and growth is significantly positive, independent of the controls. Yet, we find that the coefficient becomes significant only after including analyst items. With respect to Hypothesis 2.4, we find that the proxy for accelerated depreciation is positively significant at the 5% level.

For the FOM we cannot confirm any of the hypotheses. The coefficient of the estimated reserve – our main proxy for unconditional conservatism – is contrary to the expectation of it being significantly negative, implying that c. p. hidden reserves reduce market value instead of increasing it.

To examine whether the results for the estimated reserve also hold for its three components, we disaggregate it into reserves from inventories, advertising and R&D. The results (not reported here) confirm the analysis based on the aggregated estimated reserve. For the COPM, the coefficients of the three components vary about one, whereas for the FOM they are negative.

In summary, our delta regressions provide three major results. First, we corroborate the findings of our partition analyses that the OM is a suitable no conservatism benchmark model. Second, we find that the conservatism correction of the FOM fails to adequately adjust for conservatism. Third, we provide evidence that the COPM captures unconditional conservatism. On average, one dollar of unrecorded reserves, measured as the estimated reserve by Penman/Zhang (2002), results in a correction of market value forecasts of approximately 0.62 to 1.05 dollars.

2.4.4 Conservatism Specific Model Estimation

In this section, we examine why inaccuracy for the COPM remains high, even though the negative bias of the OM is eliminated on average. Furthermore, we propose a new approach to estimate LIMs that significantly reduces bias and inaccuracy.

Previous research implementing LIMs typically estimates the persistence parameters for the entire sample and then applies these parameters to obtain market value forecasts. However, this approach does not account for different conservatism levels across the sample. The discontinuous lines in figure 1 indicate the behavior of bias for models that are estimated on such a pooled basis. Bias increases for the OM with higher levels of conservatism (measured by MTB deciles) indicating its inability to capture conservatism. For the FOM, bias is even higher than for the OM. The COPM reduces the large negative bias for all conservatism levels, so that the average bias is almost zero. However, the figure reveals that the COPM does not eliminate the systematic component in bias. The conservatism correction of the COPM over adjusts (under adjusts) for low (high) conservatism levels. This is reflected in inaccuracy that does not markedly decline.

Prior research documents that valuation parameters, such as persistence, growth and conservatism may vary considerably across different firms and industries. Consistent with this conjecture, Easton/Pae (2004) demonstrate that the magnitude of conservatism coefficients increases for higher conservatism levels. We argue that the high inaccuracy levels are related to forcing the model to value all firms on the basis of one conservatism coefficient, irrespective of their degree of conservatism. We implement two different approaches to form samples with more homogenous conservatism levels. On the one hand, previous research has documented that conservatism varies systematically across industries. We therefore estimate industry-specific LIM parameters following the classification by Barth/Beaver/Hand/Landsman (2005). To additionally account for different conservatism levels within industries we consider a more direct conservatism measure and estimate the LIM parameters according to MTB deciles.

We find that inaccuracy for the whole sample is significantly reduced when the COPM parameters are estimated separately for MTB deciles. When the parameters for the COPM are estimated jointly, inaccuracy, compared to OM, is reduced from 48% to 36.8%. We achieve a further reduction of inaccuracy and obtain 21.1% when the LIM parameters of the COPM are estimated for MTB deciles. This result is also reflected in the development of bias for different conservatism levels. The continuous line in Figure 1 depicts the development of bias when the COPM is estimated separately for each MTB decile. The corresponding errors are listed in table 6, panel A. Altogether we document that the systematic valuation errors are substantially reduced.

The median inaccuracy obtained for our sample (21.1%) is similar to implementations of the residual income model based on analyst forecasts. Francis/Olsson/Oswald (2000) report a median accuracy of 30.3% for the residual income model employing up to five years of analyst forecasts and an ad-hoc terminal value. Using a five year planning horizon and an ad-hoc terminal value, Courteau/Kao/Richardson (2001) obtain a median accuracy of 36.4%.

Alternatively, we estimate the LIM parameters for 17 different industries following the Barth/Beaver/Hand/Landsman (2005) classification (compare table 6, panel B). We follow Fama/French (1997), who document that the cost of capital vary significantly across industries, and we apply their approach to estimate industry-specific cost of capital. To proxy for different conservatism levels, we rank industries by their market-to-book ratio. We do not find evidence of a substantial reduction in inaccuracy. This result could be attributed to the fact that the growth rate is close to the cost of capital for some industries, resulting in very high value estimates.

Additionally, our estimation results for MTB deciles and industries also corroborate our findings in section 2.4.2. For the COPM bias and inaccuracy are reduced in nearly all MTB deciles (industry partitions) compared to the OM. The conservatism correction varies systematically. That is, deciles or industries with a low (high) degree of conservatism experience a low (high) correction. For example, in the lowest MTB decile the COPM reduces the bias of the OM from 46.3% to 37.5%. For more conservative deciles, the correction increases. Similarly, the correction for industries, like metal, with low conservatism is significantly lower as compared to highly conservative industries such as pharmaceuticals.

In summary, we document that accuracy for the COPM can be significantly improved if the conservatism correction is allowed to vary for different conservatism levels.

2.5 Sensitivity Analyses

This section summarizes the findings for different sensitivity tests conducted to evaluate the robustness of the results obtained so far. Specifically, we examine the sensitivity of our results with regard to (1) alternative model specifications, (2) alternative model estimation approaches, (3) adjusting for analyst forecast bias, and (4) different cost of capital, different treatments of extreme observations, and different proxies.

2.5.1 Alternative Model Specification

In their extension of the OM, Feltham/Ohlson (1995) propose a distinction between operating and financial assets. They argue that in contrast to operating assets financial assets are traded on almost perfect markets so that book and market values for financial assets coincide. Hence, a conservatism correction is critical for operating assets only. In the following, we assess the impact of disaggregating book value b_t, in net operating oa_t and financial assets fa_t, on the ability of the models to capture conservatism.

This requires replacing earnings x_t with operating earnings ox_t as well as replacing book value of equity with net operating assets in the respective LIM equations. For the COPM, we obtain:

$$\widetilde{ox}^{a}_{t+1} = \omega_0 oa_t + \omega_1 ox_t^a + v_t + \tilde{\varepsilon}_{1,t+1}, \tag{23}$$

$$\tilde{v}_{t+1} = \gamma_0 oa_t + \gamma_1 v_t + \tilde{\varepsilon}_{2,t+1}, \tag{24}$$

$$\widetilde{oa}_{t+1} = G \cdot oa_t + \tilde{\varepsilon}_{3,t+1}, \tag{25}$$

$$V_t = (oa_t + fa_t) + \beta_1 ox_t^a + \beta_2 v_t + (\beta_3 + \beta_4) oa_t. \tag{26}$$

For $\gamma_0 = 0$, we obtain the FOM and $\omega_0 = \gamma_0 = 0$ yields the OM. Except that we deflate by lagged net operating assets instead of lagged book value, the estimation procedure is the same as described in section 2.3.1.

Table 7, panel A reports the sample selection procedure. The definitions of all variables are presented in table 7, panel B. Panel C1 of table 7 lists summary statistics for the variables used to estimate the models. When we exclude less than the top and bottom 5% of observations, the results are partially distorted. We believe that this distortion arises for two reasons. First, it is not feasible to measure operating residual income and operating assets as precisely as residual income and total assets with the information provided in the balance sheet. Second, analysts do not separately forecast operating and financial earnings, which makes it difficult to measure the other information variable. Table 7, panel C2 reports the median LIM parameters and valuation multiples for the models. Whereas, in the specification without disaggregating book value, the conservatism correction in the first LIM equation ω_0 is negative, it is insignificant here due to the slightly positive residual operating income in the sample.

Accordingly, the FOM conservatism correction β_3 in the valuation function is positive. Table 7, panel C3 reports the valuation error metrics. Whether or not the FOM reduces the median valuation error compared to the OM, depends on the cost of capital. The results for the COPM are similar to those reported for the specification without disaggregating book value. The only difference is that instead of eliminating 1% for this specification based on operating income and operating assets we have to eliminate the 5% extreme observations.

Table 7, panel D presents portfolio-specific median bias and inaccuracy for the models. If we eliminate the top and bottom 1% of the observations, the FOM and COPM fail to reduce the error of the OM. Eliminating the top and bottom 5% of the observations, yields results comparable to those for the specification without disaggregating book value (compare table 4). We therefore conclude that disaggregating book value does not aid in capturing conservatism.

The delta regression results are presented in table 7, panel E. The results match our previous findings. We document that the OM and the FOM are not able to capture conservatism, whereas the coefficients of the conservatism proxies are significant for the COPM.

In summary, our findings suggest that disaggregating book value into operating and financial assets is a less robust specification.

2.5.2 Alternative Estimation Approach

To assess whether the poor performance of the FOM conservatism correction is driven by the estimation approach, instead of estimating the LIM equation-by-equation and then applying the estimated parameters in the valuation function to obtain market value estimates, we estimate the coefficients of the valuation function directly.[28] We follow Callen/Segal (2005) and estimate the Feltham/Ohlson (1995) valuation function as suggested by Liu/Ohlson (2000). With regard to empirical studies testing the FOM, this estimation approach has produced the most promising results so far.[29] Liu/Ohlson (2000) modify the valuation equation of the FOM (8) on the basis of linear transformations, the advantage being that the unspecified other information variables are replaced with expectational variables obtained from the LIM. Deflating with current operating assets yields:

$$\frac{V_t}{oa_t} = \rho_0 + \rho_1 \frac{fa_t}{oa_t} + \rho_2 \frac{E_t\left[\Delta \widetilde{ox}_{t+1}\right]}{oa_t} + \rho_3 \frac{E_t\left[\widetilde{ox}_{t+1}\right]}{oa_t} + \rho_4 \frac{E_t\left[\Delta \widetilde{oa}_{t+1}\right]}{oa_t} + \varepsilon_t, \tag{27}$$

where fa_t / oa_t is leverage, $E_t\left[\Delta \widetilde{ox}_{t+1}\right] / oa_t$ is expected change in operating earnings norma-

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28 Most empirical studies testing LIM-based models adopt both or one of these two approaches, e.g. Dechow/Hutton/Sloan (1999), Myers (1999), Ahmed/Morton/Schaefer (2000), Begley/Feltham (2002) and Choi/O'Hanlon/Pope (2006). A third approach applied by very few empirical studies requires the joint estimation of the LIM and the valuation functions. Recently, Barth et al. (2006) use SUR to estimate the OM as a system of equations.

29 Compare Callen/Segal (2005), who apply the Liu/Ohlson (2000) valuation function to test the FOM. The Liu/Ohlson (2000) transformation, however, cannot be applied for the COPM, as it ignores the conservatism correction of the COPM.

lized by net operating assets, $E_t\left[\widetilde{ox}_{t+1}\right]/oa_t$ is expected return on net operating assets and $E_t\left[\Delta\widetilde{oa}_{t+1}\right]/oa_t$ is expected growth in net operating assets. The model predicts $\rho_0 \geq 0, \rho_1 = 1, \rho_2 \geq 0, \rho_3 > 0, \rho_4 > 0$.

We estimate year specific parameters ρ_t with $t = 1988$ to 2004 using all available data up to t. The first regression is a cross-sectional regression that estimates the parameters in equation (27) for 1988. The second regression estimates the parameters for 1989 using two years of pooled data (1988 and 1989). This approach is continued until the last regression, in which data are pooled over all years available in the sample to obtain the coefficients for 2004. To obtain one year-ahead firm-level market value forecasts, the estimated valuation parameters are applied together with next year's firm-level data. For example, to forecast firm-level market values for 1990 the coefficients estimated from a pooled regression of 1988 and 1989 are used together with the 1990 values of the independent variables.

Callen/Segal (2005) show that for the nested OM, two additional restrictions need to be imposed: $\rho_0 = 1 - \rho_3(R-1)$ and $\rho_4 = 0$. We use the year-specific coefficient estimates of (27) and apply these two restrictions to obtain the OM coefficient estimates.[30] Market value forecasts based on the OM are obtained with the same forecasting procedure as applied for the FOM forecasts. The delta variable for the FOM is obtained as:

$$Delta_t^{FOM} \equiv V_t^{FOM} - V_t^{OM} = (\rho_0^{FOM} - 1 + \rho_3^{FOM} \cdot r + \rho_4^{FOM} E\left[\Delta\widetilde{oa}_{t+1}\right]/oa_t). \quad (28)$$

The delta regression is specified as in section 2.3.2.2, except that growth is measured as expected EPS long-term growth.[31]

Table 8, panel A reports the sample selection procedure. The definitions of all variables are presented in table 8, panel B. Panel C1 of table 8 reports descriptive statistics for the variables of the FOM valuation equation (27). The median of the leverage variable is negative, indicating that financial assets are lower than financial liabilities for most firms in the sample. Table 8, panel C2 reports the results from estimating the FOM valuation equation. Contrary to the model's parameter restrictions, the intercept coefficient is significantly negative and the leverage coefficient is significantly higher than its theoretical value of one. The remaining coefficients are as predicted positive and significant.[32] Panel C3 of table 8 reports median bias and inaccuracy for one-year-ahead forecasts of the OM and FOM. Median valuation bias of

[30] This approach has the advantage that the restricted OM's coefficient estimates are obtained by controlling for the additional variables in the unrestricted FOM. The procedure, however, puts the restricted model at a disadvantage because OLS minimizes the variance for the unrestricted model.

[31] We choose the proxy for growth in understated asset such that it is consistent with the proxy for growth in the FOM valuation equation.

[32] Callen/Segal (2005) show that the Liu/Ohlson (2000) implementation of the FOM does not allow to reverse engineer the sign or value of the conservatism correction coefficient of equation (4). The significantly negative intercept coefficient, though, indicates problems with the conservatism correction.

the FOM is almost zero.[33] The low bias of the FOM could be attributed to the mechanics of our OLS estimation.[34] Since we do not estimate the OM separately but apply the restrictions to the estimates of the unrestricted model (FOM), the average deviation from market value is higher per construction for the restricted model (OM).

Table 8, panel D presents portfolio-specific median bias and inaccuracy. Contrary to the prediction that the bias of the OM should be increasing in conservatism, we find that it decreases and obtain the lowest bias and inaccuracy in the high conservatism/high-growth partition. This result remains stable for both conservatism proxies – MTB and estimated reserve (we report only MTB). For the FOM, bias and inaccuracy are always lower compared to the OM. This result, however, can be attributed to the mechanics of our OLS estimation as explained above. In contrast to our prediction, we find that the reduction in bias and inaccuracy is largest in the low conservatism/low-growth partition and smallest in the high conservatism/high-growth partition.

Table 8, panel E presents the delta regression results. In the regression without controls, the coefficient of the estimated reserve is significant, but -0.57, that is, c.p. one dollar of hidden reserves, reduces market value by approximately 57 cents. In the specification with controls, the coefficient remains significantly negative -0.64 (t=-4.41). Whereas the coefficient of the interaction between growth and conservatism is significantly positive as predicted, the effect of accelerated depreciation is insignificant. The R-squared increases substantially after including the controls. This suggests that the conservatism correction might capture various other factors.

In summary, we find that estimating the FOM by applying the Liu/Ohlson (2000) valuation function does not improve the ability of the model to capture conservatism.

2.5.3 Adjusting for Analyst Forecast Bias

Our estimation approach assumes that analyst forecasts are the best available source of earnings forecasts beyond the autoregressive process in the LIM. However, there is a large amount of literature documenting that analyst forecast errors are positive proposing different possible explanations for this bias. Even though our previous analyses document that the ability of the COPM to capture conservatism cannot be explained by an arbitrary bias in earnings forecasts, we assess the impact of potential analyst forecast bias on our findings. Comparing realized earnings with the corresponding forecasts we confirm that the distribution of analyst forecast errors is highly skewed and positive. We find that the median (mean) forecast bias is +0.7% (+3.6%) of book value. Adjusting earnings forecasts by the median forecast

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[33] Our error metrics are lower compared to those reported by Callen/Segal (2005). This may be due to different prediction procedures and to sample differences. For example, our leverage coefficient employed in computing the forecasts is considerably closer to its theoretical benchmark of one than that obtained by Callen/Segal (2005).

[34] OLS forces the average signed error to equal zero in sample. Since we compute one-year ahead market value forecasts based on OLS coefficients bias is close to zero.

error has a minor effect on our analyses and our results remain robust (tables not reported). For example, in the overall estimation of the COPM, median bias is now (was) -14.7% (-3.3%) and median inaccuracy remains at 36.5% (36.8%). When bias adjustment is set to equal the mean of the analyst forecast error, the impact on our results is substantial and the COPM is comparable to the FOM. Both results are consistent with the findings of Choi/O'Hanlon/Pope (2006). We agree with Choi/O'Hanlon/Pope (2006) that the mean of a skewed distribution of forecast errors is not necessarily useful to mechanically adjust earnings forecasts. For example, Abarbanell/Lehavy (2003) document that potential analyst forecast bias can be attributed to a relatively few number of observations and is not well supported by their broader analysis of the distribution of forecast errors.

Overall, we do not find evidence that the correction of the COPM is due to an arbitrary upward shift in expected earnings, rather we demonstrate that it is consistent with conservative accounting.

2.5.4 Further Sensitivity Tests

We evaluate the robustness of our results with regard to changing the cost of capital: 8, 10, 12 or 14% as well as time varying cost of capital following Fama/French (1997). For all three models (OM, FOM and COPM), our overall estimation results (section 2.4.1), our partition results (section 4.2) and our delta regression results (section 2.4.3) vary systematically. In particular, the conservatism correction of the COPM depends systematically on the cost of capital. A discount rate of 12% yields the lowest bias (around zero) for the COPM. Lower (higher) discount rates lead to an increasingly positive (negative) bias and higher inaccuracy. Decreasing discount rates result in an increasing conservatism correction for the COPM, which leads to increasing conservatism coefficients in the delta regression. Our results also hold for the specification where book value is disaggregated into operating and financial assets and when the FOM and OM are estimated on the basis of the Liu/Ohlson (2000) valuation function. With respect to the industry estimation, we confirm the systematic dependence of valuation errors on the cost of capital as described above. Furthermore, compared to the Fama/French cost of capital, when we employ fixed cost of capital, inaccuracy for the COPM is reduced. According to us, this is the case because the Fama/French cost of capital are occasionally very low. Finally, varying the cost of capital does not affect the results we obtain for the OM and FOM when estimated using the valuation function.

We eliminate the top and bottom 0, 1, 3 or 5% extreme observations when estimating the LIM parameters. When we eliminate more observations, the results remain stable. Yet, some of the results are distorted when we eliminate fewer observations than reported so far. The results are also robust to the inclusion/exclusion of banks and financial institutions.

Forcing the leverage coefficient fa_t / oa_t of the FOM, estimated on the basis of the Liu/Ohlson (2000) valuation function to equal its theoretical value of 1 does not change our conclusions.

We also check whether alternative proxies for leverage and depreciation affect our findings. The main results of the delta regression change only marginally if we compute leverage according to Beaver/Ryan (2000) as the ratio of the book value of total liabilities to the market value of equity in the current period. Contrary to our expectations, the coefficient of the depreciation proxy, constructed following Ahmed/Morton/Schaefer (2000), is significantly negative, yet consistent with their own results for the Feltham/Ohlson (1996) model.

The coefficient of the estimated reserve for the COPM remains close to one, even if we do not deflate the variables of the delta regression and we regress the delta on the estimated reserve and growth in estimated reserve. Additionally, the coefficients of the conservatism and growth proxies are robust when scaling by lagged price to mitigate scale effects, as recommended by Brown/Lo/Lys (2000). Including an extra size proxy (log of market value), as suggested by Barth/Kallapur (1995), has the effect that some of the control coefficients lose significance, but our results do not change significantly.

2.6 Conclusions

This study is motivated by empirical results for linear information models that cast doubts on the effectiveness of their conservatism corrections. First, we determine whether, and to what extent, the conservatism corrections of different implementations of LIMs capture conservative accounting. Second, we examine why accuracy is not substantially reduced for LIM implementations that capture conservatism.

To address the first question, we conduct two different tests. First, we partition our sample and examine which of the different LIM implementations value particularly high conservative/high-growth firms more accurately in terms of bias and inaccuracy compared to the Ohlson (1995) model. Second, we introduce a regression approach to investigate whether the valuation difference between a model that corrects for conservatism and the Ohlson (1995) model is empirically explained by proxies for unconditional conservatism. We exploit the fact that the models examined here are generalizations of the Ohlson (1995) model. Thus, with the Ohlson (1995) model as the no conservatism benchmark, other factors that might influence the conservatism corrections are held constant.

Initially, we demonstrate that the Ohlson (1995) model is an appropriate no conservatism benchmark. Subsequently, we provide evidence that the correction of the Feltham/Ohlson (1995) model fails to adequately adjust for conservatism. More specifically, we find a negative association between the conservatism correction and our main proxy for unconditional conservatism, which contradicts the purpose of a correction. Our overall assessment of the conservatism correction suggested by Choi/O'Hanlon/Pope (2006) is positive. Our analyses provide evidence that the conservatism correction is not arbitrary but captures conservatism to a major extent. On average, one dollar of unrecorded reserves, measured as the estimated reserve by Penman/Zhang (2002), results in a correction of the market value forecast of approximately one dollar. However, the correction has its limitations reflected in its sensitivity towards the difference between the cost of capital and the growth rate.

Additionally, we find that a distinction between operating and financing activities does not help to improve the effectiveness of the conservatism corrections. We also document that ignoring the LIM and estimating the Feltham/Ohlson (1995) model directly via the valuation function, as suggested by Liu/Ohlson (2000), does not aid in capturing conservatism. While the signed valuation error is almost zero for the unrestricted Feltham/Ohlson (1995) model, the bias of the nested Ohlson (1995) model decreases with growing conservatism contrary to our expectations. According to us, this implies that the coefficients of the unrestricted Feltham/Ohlson (1995) model are biased and that the model is misspecified.

With regard to our second research question, we argue that the failure of the Choi/O'Hanlon/Pope (2007) model to markedly reduce inaccuracy for the whole sample is the consequence of forcing the model to value firms with different degrees of conservatism on the basis of the same conservatism coefficient. Consistent with this conjecture, Easton/Pae (2004) demonstrate that the magnitude of conservatism coefficients increases for higher conservatism levels. We implement two different approaches to form samples with more homogenous conservatism levels. First, we estimate industry-specific LIM parameters following the classification by Barth/Beaver/Hand/Landsman (2005). To additionally account for different conservatism levels within industries we consider a more direct conservatism measure and suggest estimating the LIM parameters according to market to book deciles. We document that median inaccuracy is reduced from 36.8% to 21.1% when the LIM modification by Choi/O'Hanlon/Pope (2006) is estimated separately according to MTB deciles. The median accuracy levels obtained for this LIM are comparable to implementations of the residual income model based on analyst forecasts without applying LIMs (e.g. Francis/Olsson/Oswald, 2000 and Courteau/Kao/Richardson, 2001). Even though by-industry estimations do not improve valuation errors, they corroborate that the correction by Choi/O'Hanlon/Pope (2006) discriminates between different levels of conservatism, i.e. the correction is higher (lower) for firms belonging to more (less) conservative industries.

We provide two main implications for future research aimed at extending LIMs: First, the modification suggested by Choi/O'Hanlon/Pope (2006) should be preferred to the Feltham/Ohlson (1995) model as it captures unconditional conservatism. For example, future research could use the Choi/O'Hanlon/Pope (2006) modification to incorporate conditional conservatism and, as suggested by Ryan (2006), to model the interaction between both types of conservatism. Second, our analyses provide preliminary evidence that the implementation of the residual income model on the basis of LIMs can be a promising alternative to the conventional implementation based on analyst forecasts.

3 Linear Information Models: The Effect of Conditional Conservatism

3.1 Introduction

In this paper, we demonstrate the impact of analysts' failure to adjust their optimistic forecast for conditional conservatism on linear information models (LIMs) that largely rely on analysts' forecasts, such as the Choi/O'Hanlon/Pope (2006) model.

Our attempt to incorporate conditional conservatism into LIMs has been motivated by promising recent refinements within this model class. In particular, Choi/O'Hanlon/Pope (2006) propose a modification of the Feltham/Ohlson (1995) model that eliminates the large negative bias characteristic for LIMs and that successfully captures unconditional conservatism. Building on the Choi/O'Hanlon/Pope (2006) model, Homburg/Henschke/Nasev (2007) find that a conservatism specific estimation of the model markedly improves valuation accuracy. As a result, valuation errors for LIMs have become comparably accurate as implementations of the residual income valuation model based on analysts' forecasts.

We believe that the successful incorporation of unconditional conservatism into LIMs has made it worth attempting to additionally incorporate conditional conservatism. According to Ryan (2006, p. 522), extending LIMs to capture conditional conservatism is an "important endeavor". Yet, little effort has been devoted into this direction so far. Price (2005) hints at an extension of the Ohlson (1995) model based on news dependent other information dynamics. We briefly outline an alternative extension that models different persistences in the stochastic process of residual income for good and bad news. However, both extensions impede the derivation of closed-form valuation functions because news is time variant.

To circumvent the difficulties related to modeling news in LIMs, we take a different approach. Although overall valuation errors are remarkably low for the Choi/O'Hanlon/Pope (2006) model (median bias (inaccuracy) is about 0% (20%)), the errors are largest for the 30% most conservative firms (median bias (inaccuracy) is about 35% (45%)). This indicates that the model's conservatism correction seems to work effectively for low and medium conservative firms but considerably over adjusts for high conservative firms. This could be related to the fact that the conservatism correction of the model largely relies on analyst earnings forecasts, which are typically upward biased. A recent study by Louis/Lys/Sun (2007) documents that the optimistic bias of analysts' forecasts can be ascribed to a considerable extent to the failure of analysts to fully adjust their forecast for the asymmetric timeliness of earnings.[35] We therefore conjecture that the tendency of the Choi/O'Hanlon/Pope (2006) model to overvalue high conservative firms is related to the upward bias in analysts' forecasts arising because analysts do not adequately account for the delayed recognition of good news subsequent to the initial forecast. If this is the case, adjusting the analyst forecast for the asymme-

[35] Pae/Thornton (2003) also find that analysts' earnings forecasts do not fully incorporate conditional conservatism. They document that the forecast error differs between good and bad news firms and between high and low market-to-book firms.

tric timeliness of earnings should allow the model to better capture conditional conservatism and should produce more accurate and less biased valuation estimates.

We therefore implement the Choi/O'Hanlon/Pope (2006) model on the basis of analysts' forecasts adjusted for the asymmetric timeliness of earnings. However, we have to acknowledge that since the analyst forecast refers to the next period our forecast adjustment is based on accounting information of the next period. Hence, the adjustment could be regarded as a benchmark to investigate conditional conservatism in LIMs. To assess the effect of the forecast adjustment, we examine (1) whether valuation errors decrease for the adjusted model and (2) whether the adjusted model better captures conditional conservatism.

With regard to the first research question, we find that three out of four error metrics (mean bias and inaccuracy as well as median inaccuracy) are improved for the joint parameter estimation of the adjusted model. For the separate parameter estimation, as suggested by Henschke/Homburg/Nasev (2007) implying the separate estimation of the model for market-to-book deciles[36], the adjustment considerably improves valuation errors for the 30% highest conservative firms. However, the adjustment fails to improve valuation for the low and medium conservative firms, where valuation bias is already about zero without the adjustment.

To assess whether the adjusted model better captures conditional conservatism, in a first analysis, we examine the conservatism correction for the adjusted model with rising conditional conservatism levels. We expect that the conditional conservatism adjustment will increase monotonically for rising levels of conditional conservatism if the adjusted model captures conditional conservatism better than the unadjusted model. Our results indicate that this is the case except for the three lowest conservatism deciles, where the adjustment remains constant. To further evaluate the extent to which the adjusted model captures conditional conservatism, in a second analysis, we compare the magnitude of the asymmetric timeliness left in the valuation error before and after the adjustment. We find evidence supporting that the conditional conservatism adjustment significantly reduces the asymmetric timeliness left in the valuation error. [37]

Overall, our evidence indicates that the adjusted model better captures conditional conservatism, in particular for high conditionally conservative firms.

We contribute to the literature on accounting based valuation models by providing evidence that the failure of analysts to adjust their forecast for conditional conservatism impacts the ability of LIMs such as the Choi/O'Hanlon/Pope (2006) model to correct for conservatism. In particular, the analysts' optimism results in an over valuation for high conservative

[36] The market-to-book ratio is an overall conservatism proxy, i.e. it measures conditional as well as unconditional conservatism. Please refer to section 3.2 for a discussion of these two conservatism types.

[37] For the separate parameter estimation, the results are distorted by one partition comprising firms, for which the growth rate is very close to the cost of capital, yielding extreme valuations. If we neglect this partition, the asymmetric timeliness left in the valuation error is as hypothesized significantly lower for the adjusted model compared to the unadjusted model. Henschke/Homburg/Nasev (2007) stress that a considerable limitation of the conservatism correction of the Choi/O'Hanlon/Pope (2006) model is its high sensitivity to the difference between the cost of capital and growth.

firms, which could be eliminated if analysts would adjust their forecast for the asymmetric timeliness of earnings. Our results imply that the Choi/O'Hanlon/Pope (2006) model will benefit from an adjustment for conditional conservatism particularly in the case of a non-conservatism-specific parameter estimation and when concern is with high conservative firms, i.e. the tails of the error distribution.

The remainder of the paper is organized as follows. In section 3.2 we sketch the differences between conditional and unconditional conservatism. In section 3.3 we briefly present the models. In section 3.4 we introduce the conditional conservatism adjustment. We outline the specification of the adjustment and develop the hypotheses in section 3.5. In section 3.6 we present the sample, define the variables and explain the estimation procedures. We discuss the estimation results in section 3.7 and conclude in section 3.8.

3.2 Accounting Conservatism

Accounting conservatism is one of the most debated principles in financial reporting. It refers to the average understatement of book value of equity relative to the market value of equity induced by conservative accounting principles. The academic literature distinguishes between unconditional and conditional conservatism. Unconditional conservatism refers to the downward bias in book value of equity, which is generated independently of news in a period (Feltham/Ohlson, 1995). Examples of unconditional conservatism include the immediate expensing of R&D, accelerated depreciation and historical cost accounting for positive NPV projects.

Conditional conservatism refers to the downward bias in earnings, which arises because good and bad news are recognized asymmetrically.[38] Since accounting principles generally require the immediate and complete anticipation of bad news whereas good news are not recognized until future benefits are realized, earnings reflect bad news faster than good news. Examples of conditional conservatism include the lower of cost or market accounting for inventories and impairment accounting.

3.3 The Models

The objective of this section is to provide a brief overview of the models used to derive and implement an adjustment of LIMs for conditional conservatism. Fist, we briefly illustrate two linear information models that we use to incorporate conditional conservatism: the Ohlson (1995) model (henceforth OM) and the Choi/O'Hanlon/Pope (2006) model (henceforth COPM). Secondly, we present two Basu (1997) models to motivate our adjustment and to test for conditional conservatism: the asymmetric timeliness of earnings and the asymmetric persistence of earnings changes.

3.3.1 Linear Information Models

Accounting based valuation models typically relate the intrinsic value of a firm's equity to expected realizations of future accounting numbers. LIMs use time series processes to ex-

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[38] Watts (2003) suggests contracting, litigation, taxes and regulation as the major explanations for conditional conservatism.

plain the behavior of future accounting numbers. Ideally, this yields a closed-form valuation function based on current accounting numbers only.

3.3.1.1 The Ohlson (1995) Model

The OM assumes that the dividend discount model and the clean surplus relation hold. Additionally, it assumes that next period's residual income $\tilde{x}^a_{t+1}$ follows a first order autoregressive process. Since next period's residual income is not exhaustively explained by current residual income Ohlson (1995) introduces another information variable v_t to capture value relevant information that have not yet entered the financial statements. This yields the following bivariate vector autoregressive process:

$$\tilde{x}^a_{t+1} = \omega x^a_t + v_t + \tilde{\varepsilon}_{1,t+1} \tag{29}$$

$$\tilde{v}_{t+1} = \gamma v_t + \tilde{\varepsilon}_{2,t+1}, \tag{30}$$

where $\tilde{\varepsilon}_{k,t+1}$ with $k = 1,\ 2$ are zero mean error terms. ω, γ ($0 \le \omega, \gamma < 1$) are the persistence parameters of the residual income variable and the other information variable, respectively. Together, the assumptions yield the following linear relation between current market value of equity and current accounting information:

$$V_t = b_t + \beta_1 x^a_t + \beta_2 v_t, \tag{31}$$

where $\beta_1 = \dfrac{\omega}{(R-\omega)}$ and $\beta_2 = \dfrac{R}{(R-\omega)(R-\gamma)}$. V_t is current market value of equity, b_t is current book value of equity and R is a constant, risk free interest rate plus one.

3.3.1.2 The Choi/O'Hanlon/Pope (2006) Model

The OM implicitly assumes unbiased accounting because $0 \le \omega, \gamma < 1$ and therefore book value equals market value in the long run $\lim_{\tau \to \infty} E_t\left[V_{t+\tau} - b_{t+\tau}\right] = 0$. Choi/O'Hanlon/Pope (2006) propose the following modification of the OM to incorporate unconditional conservatism:

$$\tilde{x}^a_{t+1} = \omega_0 b_t + \omega_1 x^a_t + v_t + \tilde{\varepsilon}_{1,t+1} \tag{32}$$

$$\tilde{v}_{t+1} = \gamma_0 b_t + \gamma_1 v_t + \tilde{\varepsilon}_{2,t+1} \tag{33}$$

$$\tilde{b}_{t+1} = G b_t + \tilde{\varepsilon}_{3,t+1}, \tag{34}$$

where $\tilde{\varepsilon}_{k,t+1}$ with $k = 1,2,3$ are zero mean error terms. ω_0, γ_0 are conservatism parameters, ω_1, γ_1 ($0 \le \omega_1, \gamma_1 < 1$) are persistence parameters and G ($1 \le G < R$) represents growth. They derive the following linear valuation function:

$$V_t = b_t + \beta_1 x^a_t + \beta_2 v_t + (\beta_3 + \beta_4) b_t, \tag{35}$$

where

$$\beta_1 = \frac{\omega_1}{R-\omega_1},\ \beta_2 = \frac{R}{(R-\omega_1)(R-\gamma_1)},\ \beta_3 = \frac{R\omega_0}{(R-\omega_1)(R-G)},\ \beta_4 = \frac{R\gamma_0}{(R-\omega_1)(R-\gamma_1)(R-G)}.$$

The COPM contains two conservatism corrections $\omega_0 b_t$ and $\gamma_0 b_t$. Under conservative accounting book value is understated relative to market value on average and $\lim_{\tau\to\infty} E_t\left[V_{t+\tau} - b_{t+\tau}\right] > 0$ implying that residual income is persistently positive $\lim_{\tau\to\infty} E_t\left[\tilde{x}^a_{t+\tau}\right] > 0$. To ensure that residual income does not approach zero, as is the case in the OM, the first correction extends the residual income process with a book value multiple that is expected to be positive. However, empirical tests yield a negative instead of a positive conservatism coefficient ω_0. This has been attributed to the negative sample mean of residual income. Consequently, instead of correcting the conservatism bias the correction reinforces the bias. To mitigate this problem Choi/O'Hanlon/Pope (2006) include an additional correction $\gamma_0 b_t$ in the second LIM equation exploiting that the mean of the other information variable (measured on the basis of analysts' forecasts of residual income) is generally positive over the estimation period. The authors argue that a positive mean other information variable is consistent with expected unwinding of conservatism.

3.3.2 The Basu (1997) Models

Conditional conservatism emerges because accounting principles generally require the anticipation of bad news but prohibit the anticipation of good news until they are realized. This translates in immediate write-downs of book value of net assets for sufficiently bad news but just gradual write-ups for good news leading to an understatement of net assets.[39]

Basu (1997) identifies two main implications of conditional conservatism: the asymmetric timeliness of earnings and the asymmetric persistence in earnings changes. With regard to the first implication, Basu (1997) conjectures that earnings should reflect bad news faster than good news given that accounting principles require a higher verification for the recognition of good than bad news. In contrast, if markets are efficient prices will reflect good and bad news equally timely. To test his prediction, Basu (1997) regresses current net income X_t deflated by prior period stock price on the contemporaneous stock return R_t in a piece-wise linear regression model:

$$X_t = \alpha_1 + \alpha_2 D_t + \beta_1 R_t + \beta_2 D_t \cdot R_t + \varepsilon_t, \quad D_t = \begin{cases} 1 \ \text{if } R_t < 0 \\ 0 \ \text{if } R_t \geq 0 \end{cases}, \tag{36}$$

where D_t is a dummy variable that is one for bad news measured as negative stock returns and zero otherwise. β_1 is the coefficient for positive returns observations (i.e., good news) and $\beta_1 + \beta_2$ is the coefficient for negative returns observations (i.e., bad news). As expected, Basu (1997) finds a stronger association between earnings and returns for bad news compared to good news (see figure 1). He refers to the incremental coefficient for negative returns β_2 as the asymmetric timeliness of earnings.

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39 See Ryan (2006).

The second implication of conditional conservatism identified by Basu (1997) is the asymmetric persistence of earnings changes. He argues that good news are persistent because their recognition in earnings is gradual, i.e., current good news have a positive effect on current and future earnings. In contrast, bad news are temporary because they are recognized completely in the period in which they occur, e.g. an impairment charge, and therefore reverse in the next period leaving future earnings unaffected. This leads Basu (1997) to predict that earnings increases are more likely to be persistent while earnings decreases are more likely to be temporary. To test this prediction he specifies:

$$\Delta X_t = \alpha_1 + \alpha_2 D_{t-1} + \beta_1 \Delta X_{t-1} + \beta_2 D_{t-1} \cdot \Delta X_{t-1} + \varepsilon_t, \quad D_{t-1} = \begin{cases} 1 & if\ R_{t-1} < 0 \\ 0 & if\ R_{t-1} \geq 0 \end{cases}, \tag{37}$$

where ΔX_t is the change in earnings between fiscal year t and $t-1$ deflated by stock price in $t-1$. D_{t-1} is a dummy variable that is one for bad news measured as negative stock returns in $t-1$ and zero otherwise.[40] β_1 is the persistence of earnings changes in the case of good news and $\beta_1 + \beta_2$ is the persistence of earnings changes in the case of bad news. As expected, Basu (1997) finds that $\beta_2 < 0$ implying that negative earnings changes are more likely to reverse in the next period.

In his recent survey of the conditional conservatism literature, Ryan (2006) concludes that albeit its limitations[41], Basu's (1997) asymmetric timeliness of earnings is superior to alternative measures of conditional conservatism including the asymmetric persistence of earnings changes.

3.4 Incorporating Conditional Conservatism into Linear Information Models

The objective of this section is to present two alternative approaches to adjust LIMs for conditional conservatism. As shown in section 3.3.2, conditional conservatism is characterized by nonlinearities in earnings (asymmetric timeliness of earnings and asymmetric persistence of earnings changes), which result from the unequal treatment of good and bad news in accounting. We expect that when implemented empirically LIMs will likely fail to fully account for the asymmetries implied by conditional conservatism. Accordingly, part of the valuation error should be attributable to conditional conservatism.

In section 3.4.1, we depict an adjustment of the OM that should account for the asymmetric persistence of earnings changes implied by conditional conservatism. This approach, although economically intuitive, does not lend itself to an adequate empirical implementation. We therefore introduce a different adjustment approach in section 3.4.2 that should correct for the asymmetric timeliness of earnings induced by conditional conservatism in the COPM.

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[40] Basu (1997) uses three alternative partitioning dummies: positive vs. negative changes in earnings, positive vs. negative earnings and positive vs. negative returns.

[41] Despite the frequent applications of the asymmetric timeliness as a measure for conditional conservatism, studies such as Callen/Hope/Segal (2006), Givoly/Hayn/Natarahan (2007) and Dietrich/Muller/Riedl (2007) draw attention to its limitations.

3.4.1 Adjusting the Persistence of the Residual Income Process

As described in section 3.3.2, prior research concludes that the asymmetric persistence of earnings changes is a major implication of conditional conservatism. We therefore motivate our first conditional conservatism adjustment with Basu's (1997) finding that negative earnings changes are less persistent than positive earnings changes (see equation (37)). Accordingly, we suggest a modification of the OM residual income dynamics allowing for different persistences for good and bad news:[42]

$$\tilde{x}_{t+1}^a = \omega_1 x_t^a + \omega_2 D_t x_t^a + v_t + \tilde{\varepsilon}_{1,t+1}, \quad D_t = \begin{cases} 1 \ \textit{if} \ R_t < 0 \\ 0 \ \textit{if} \ R_t \geq 0 \end{cases}, \tag{38}$$

where $\tilde{x}_{t+1}^a$ is next period's residual income, v_t is the other information variable, D_t is a dummy variable that is one for bad news measured as negative stock returns and zero otherwise.[43] ω_1 is the persistence of residual income in the case of good news and ω_2 is the incremental persistence in the case of bad news.

The major difference between (37) and (38) is that Basu (1997) refers to changes in earnings, whereas we refer to levels in residual income. With regard to substituting changes for levels in (37) we argue that different persistences for earnings changes should translate into different persistences of earnings levels. In the case of current good news earnings should have a positive, persistent impact on next period's earnings because under conditionally conservative accounting principles current good news are reflected in earnings over several periods. By contrast, generally current bad news are completely recognized by current earnings leading to a reversal of future earnings. Consequently, earnings will have different persistences for good and bad news, which is consistent with the different persistence of earnings changes argument by Basu (197) and legitimizes the levels regression in equation (38).

Substituting residual income for earnings should not prevent the different persistence argument to hold. Residual income is obtained by subtracting the cost of capital from earnings. Since the cost of capital reflect risk and risk likely increases conditional conservatism the difference in persistences for good and bad news will be likely lower but not eliminated.

Yet, we do not formally model a LIM adjusted for different persistences in residual income because a closed-form valuation function cannot be derived given that the news dummy variable D_t is time variant. In order to predict expected future news ($D_{t+\tau}, \tau > 1$) it is necessary to model the stochastic time series behavior of returns, which induces a circularity problem.[44] On the other hand, oversimplifying matters, e.g. assuming that $D_{t+\tau}, \tau \in$ equals the

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[42] Biddle/Chen/Zhang (2001) suggest a non-linear residual income dynamic including two dummy variables for the middle and high thirds. They argue that if investments are guided by profitability the residual income dynamics should be convex rather than linear.

[43] Following Basu (1997) we use a return-based partitioning dummy assuming that it is sufficiently correlated with positive and negative changes in residual income.

[44] Circularity arises because to estimate price we need to forecast returns and vice versa.

unconditional mean for good news, that is $D_{t+\tau} = E[D_k] =: p$, where $k \leq t, \tau \in$ is inadequate in serving the purpose of capturing conditional conservatism in LIMs.

3.4.2 Adjusting the Analyst Forecast

In the following, we intend to bypass the difficulties of modeling news in LIMs and take a different approach. We suppose that the COPM conservatism correction could be adjusted to better capture conditional conservatism as it exploits analysts' forecasts information.

Homburg/Henschke/Nasev (2007) document that the COPM conservatism correction over adjusts specifically for high conservative firms measured on the basis of the market-to-book ratio.[45] Consistent with the notion that market-to-book is an overall conservatism measure that comprises both unconditional and conditional conservatism, we find that the proportion of good to bad news firms increases with market-to-book and that good news firms are particularly over represented in the three highest market-to-book deciles (see figure 2). We argue that the over adjustment of the COPM in the high market-to-book deciles might be related to complications in particular with regard to the valuation of partitions comprising over proportionately many conditionally conservative observations.

To illustrate how this problem can be addressed by adjusting the COPM correction, we briefly outline the correction's characteristics. As explained in section 3.3.1.2 the COPM correction comprises two components: a conservatism correction in the residual income process $\omega_0 b_t$ and a correction in the other information variable process $\gamma_0 b_t$.[46] The latter correction represents the main difference between the COPM and the Feltham/Ohlson (1995) model. $\gamma_0 b_t$ plays a crucial role in mitigating the large negative valuation errors characteristic for the Feltham/Ohlson (1995) model. The correction is based on the other information variable, which is supposed to comprise value relevant information that is not yet reflected in current financial statements. Since it is assumed that the forecasts of analysts are the best available source for predicting future earnings beyond current earnings the other information variable is typically measured on the basis of analysts' earnings forecasts.

The COPM will over adjust for conservatism if the mean other information variable is too high and hence if the analyst forecast is too high. It is well documented that analysts' forecasts are upward biased on average (Brown, 1993). In addition, recent studies by Pae/Thornton (2003) and Louis/Lys/Sun (2007) demonstrate that analysts' forecasts fail to account for the asymmetric timeliness of earnings, i.e. conditional conservatism. They find that the forecast error is particularly high in the case of good news firms. We therefore conjec-

[45] Henschke/Homburg/Nasev (2007) show that this could be partly attributed to the sensitivity of the COPM with regard to the difference between the cost of capital and the growth rate. We document that the over valuation persists even after excluding observations where (R-G)<0.1.

[46] ω_0 is approximately the sample mean of residual income and γ_0 is approximately the sample mean of the other information variable.

ture that an adjustment of the analyst forecast for conditional conservatism should reduce the over adjustment of the COPM correction for high conditionally conservative firms.

3.5 Specifications and Hypotheses

The first objective of this section is to outline the specification of the proposed analyst forecast adjustment. Secondly, we present the hypotheses and model specifications that we employ to assess the performance of the analyst forecast adjustment with regard to reducing valuation error and better capturing conditional conservatism.

3.5.1 Specification of the Analyst Forecast Adjustment

Louis/Lys/Sun (2007) argue that the upward bias in the initial analyst forecast is related to the failure of analysts to reflect the conservatism of unexpected events, especially the deferred recognition of good news occurring subsequent to the initial forecast. They hypothesize that next to the unsystematic error forecast errors will therefore reflect conditional conservatism. They test this hypothesis by adopting Basu's (1997) asymmetric timeliness of earnings regression for the analyst earnings forecast:

$$FE_t = \alpha_0 + \alpha_1 GOOD_t + \alpha_2 RET_t + \alpha_3 GOOD_t \cdot RET_t + \sum_j \alpha_j \cdot Controls_{j,t} + \varepsilon_t \,, \qquad (39)$$

where FE_t is the forecast error measured as the difference between realized earnings x_t and the analyst earnings forecast issued in $t-1$ for t f_{t-1}^{t}, RET_t is the stock return, $GOOD_t$ is a dummy variable that equals one if the return is nonnegative and zero otherwise and $Controls_{j,t}$ are control variables (see section 3.6.2) that potentially affect the forecast error. As expected the forecast error is exacerbated for good news firms, i.e. α_3 is significantly negative. The authors conclude that analysts do not fully adjust their forecast for conditional conservatism.

Building on this insight, we correct for conditional conservatism by adjusting the upward biased analyst forecast for the estimated asymmetric timeliness contained in the forecast error of equation (39). Thus, we specify:

$$f_t^{t+1,adj} = f_t^{t+1} + (\widehat{\alpha}_0 + \widehat{\alpha}_1 GOOD_{t+1} + \widehat{\alpha}_2 RET_{t+1} + \widehat{\alpha}_3 GOOD_{t+1} \cdot RET_{t+1}) \,, \qquad (40)$$

where $f_t^{t+1,adj}$ is the adjusted analyst forecast issued in t for $t+1$.

Note that our forecast adjustment is based on news in $t+1$ and hence uses information not available in t. This is because the analyst forecast employed in the COPM conservatism correction refers to $t+1$. Thus, the adjustment could be viewed as a benchmark to investigate conditional conservatism in LIMs.

For good news observations, we expect that the adjusted forecast will be lower than the original forecast because the asymmetric timeliness coefficient for good news α_3 should be negative. This is consistent with the notion that the initial analyst earnings forecast is upward biased, as analysts do not fully anticipate the conditionally conservative recognition of good news. Consequently, the downward adjustment of the forecast for good news observations should result in a reduction of the over valuation in the high market-to-book deciles of the COPM.

3.5.2 Hypotheses Development

The objective of this section is to develop hypotheses to test whether the analyst forecast adjustment improves the COPM market value estimates with regard to capturing conditional conservatism. We start by testing the hypothesis that the analyst earnings forecast error does not fully account for the asymmetric timeliness of earnings. Second, we hypothesize that if the conditional conservatism adjustment is value relevant the valuation error should be reduced. Third, we develop three hypotheses that test whether the adjustment of the forecast enables the COPM to better capture conditional conservatism. All hypotheses are stated in the alternative form.

Note, that we employ two different estimation procedures: (1) a joint parameter estimation of the COPM as suggested by Choi/O'Hanlon/Pope (2006) and (2) a separate parameter estimation of the COPM for different market-to-book deciles as suggested by Henschke/Homburg/Nasev (2007). To prevent cumbersome notations and to enhance reading fluency in this section we refrain from explicitly distinguishing between the two estimation approaches. When we refer to the estimation of the COPM in this section we implicitly refer to both estimation procedures.

First, we build on the argument of Louis/Lys/Sun (2007) to back up the specification of our conditional conservatism adjustment, which requires adjusting the upward analyst forecast error for the asymmetric timeliness of earnings. The authors conjecture that the upward bias in the initial analyst forecast could to some extent be explained by the failure of analysts to reflect the conservative recognition of unexpected good news subsequent to the initial forecast. Hence, following Louis/Lys/Sun (2007) we hypothesize that:

H1: The relation between analyst forecast errors and stock returns is less positive for good news observations compared to bad news observations: $\alpha_3 < 0$ *in equation* ***(41)***.

To test this hypothesis, we specify:

$$FE_t = \alpha_0 + \alpha_1 GOOD_t + \alpha_2 RET_t + \alpha_3 GOOD_t \cdot RET_t + \sum_j \alpha_j Controls_{j,t} + \varepsilon_t \,, \qquad (41)$$

$$\begin{aligned} FE_t = {} & \alpha_0 + \alpha_1 GOOD_t + \alpha_2 RET_t + \alpha_3 GOOD_t \cdot RET_t + \alpha_4 MNMD_t + \alpha_5 MV_t \\ & + \alpha_6 AFLLW_t + \alpha_7 DISP_t + \alpha_8 CV_t + \alpha_9 INDROA_t + \alpha_{10} CHNI_t \\ & + \alpha_{11} TV_t + \alpha_{12} PRESTK_t + \alpha_{13} POSTSTK1_t + \alpha_{14} POSTSTK2_t + \varepsilon_t . \end{aligned}$$

All variables are defined in panel B of table 2. We follow prior research and control for a set of variables that potentially affect the forecast error: the difference between the mean and median earnings (MNMD), market value of equity (MV), analyst following (AFLLW), forecast dispersion (DISP), coefficient of variation of earnings (CV), future industry-adjusted return on assets (INDROA), change in earnings (CHNI), trading volume (TV), net stock issuance before the earnings announcement (PRESTK), and stock issuances after the earnings announcement (POSTSTK1 and POSTSTK2).[47]

Second, we expect that if the forecast adjustment for conditional conservatism is value relevant the valuation error obtained with the adjustment should be lower than the error without adjustment. Hence, we hypothesize that:

H2: The valuation errors (mean and median bias and inaccuracy) of the COPM with the adjustment are lower than without the adjustment: $Error^{adj} < Error$.

We employ two error metrics: bias and inaccuracy. $Bias = (\hat{V} - V)/V$ is the percentage prediction error and $Inaccuracy = \left|(\hat{V} - V)/V\right|$ is the absolute percentage prediction error, where $\hat{V}$ is the market value estimate and V is the actual market value of equity.

Third, to investigate whether the adjustment corrects for conditional conservatism we formulate three hypotheses. With hypothesis 3.1, we examine the behavior of the conservatism correction for the adjusted model with rising conditional conservatism levels. Since the adjusted and unadjusted models differ only with respect to the forecast adjustment, we interpret the difference between the value estimate of the COPM with and without adjustment as a proxy for the conditional conservatism adjustment ($Delta_t = \hat{V}_t^{adj} - \hat{V}_t$). Accordingly, we expect that if the adjusted model better captures conditional conservatism the absolute delta should increase monotonically.[48] We hypothesize that:

H3.1: The absolute value of $Delta$ *increases with the market-to-book ratio and with the proportion of good news.*

With hypothesis 3.2a, we compare the magnitude of the asymmetric timeliness left in the valuation error before and after adjusting for conditional conservatism. We specify:[49]

$$Error_t = \alpha_0 + \alpha_1 GOOD_t + \alpha_2 RET_t + \alpha_3 GOOD_t \cdot RET_t + \sum_j \alpha_j Controls_{j,t} + \varepsilon_t \,, \tag{42}$$

$$Error_t^{adj} = \alpha_0^{adj} + \alpha_1^{adj} GOOD_t + \alpha_2^{adj} RET_t + \alpha_3^{adj} GOOD_t \cdot RET_t + \sum_j \alpha_j^{adj} Controls_{j,t} + \varepsilon_t \,. \tag{43}$$

In the ideal case when the adjustment fully corrects for conditional conservatism, the valuation error will be free of the asymmetry induced by conditional conservatism ($\alpha_3^{adj} = 0$). We hypothesize that:

H3.2a: The asymmetric timeliness of the valuation error with adjustment is lower than without adjustment: $\left|\alpha_3^{adj}\right| < \left|\alpha_3\right|$.

[47] See Gu/Wu (2003) and Louis/Lys/Sun (2007) for more detail.

[48] We employ market-to-book as our main proxy for conditional conservatism and indirectly the proportion of good news in the sample, which is closely correlated with market to book.

[49] We control for the same set of variables as in the forecast error regression in equation (41) except for PRESTK and POSTSTK1 and 2 because these variables reduce our sample to an extent that we cannot reasonably estimate the COPM LIM following Choi/O'Hanlon/Pope (2006).

An equivalent alternative to the separate examination of the valuation errors is to directly examine the delta, i.e., the difference between the value estimate of the adjusted and unadjusted model, which in fact equals the difference between the errors of the adjusted and unadjusted model. We specify: [50]

$$Delta_t = \alpha_0 + \alpha_1 GOOD_t + \alpha_2 RET_t + \alpha_3 GOOD_t \cdot RET_t + \sum_j \alpha_j Controls_{j,t} + \varepsilon_t \,. \tag{44}$$

This specification has the advantage that it tests whether the difference in the asymmetric timeliness between the adjusted and unadjusted COPM is significant. Hence, we hypothesize that:

*H3.2b: The association between the $Delta$ and stock returns is less positive for good news observations compared to bad news observations: $\alpha_3 < 0$ in equation **(44)**.*

If the delta displays asymmetric timeliness we cannot unambiguously tell that it is the model with the correction that captures conservatism and not vice versa. But, if we can confirm hypothesis 3.2a, then confirming hypothesis 3.2b would imply that the COPM with adjustment better captures conditional conservatism.

The variables and the estimation procedure of all specifications depicted here are presented in section 3.6.

3.6 Sample, Variables and Estimation

3.6.1 Sample

To allow comparability, we estimate all models on the basis of the same sample. This sample is based on the intersection of COMPUSTAT, CRSP and IBES, for the period from 1985 to 2004. The merging procedures and sample compositions are described in table 1.

3.6.2 Variables

An overview of variable definitions and measurements is provided in table 2. Panel A refers to the variables used to estimate the COPM and panel B refers to the variables used in the forecast error regression, valuation error regression and delta regression.

3.6.3 Estimation Procedure

We follow Choi/O'Hanlon/Pope (2006) to estimate the COPM. We estimate year-specific parameters $\omega_{0,t}$ and $\omega_{1,t}$ for the first LIM equation (32) neglecting the initially unspecified other information variable and scaling with lagged book value of equity. We use all available data up to t:

$$\frac{x^a_{j,s}}{b_{j,s-1}} = \omega_{0,t} + \omega_{1,t} \frac{x^a_{j,s-1}}{b_{j,s-1}} + \varepsilon_{1,j,s} \,. \tag{45}$$

j is a firm index and s is a time index running from the first year for which lagged residual income is available, up to the current year t. To obtain $\omega_{0,1987}$ and $\omega_{1,1987}$ equation (45) is estimated for $t = 1987$. The parameters for 1988 are estimated using two years of pooled data

[50] We control for the same set of variables as in the forecast error regression in equation (41).

(1987 and 1988), until the last regression, in which the data is pooled over all years available in the sample to estimate the parameters for 2004.

In the same fashion, we estimate year-specific parameters $\gamma_{0,t}$ and $\gamma_{1,t}$ for the second LIM equation (33) scaling with lagged book value of equity, using all available data up to t:

$$\frac{v_{j,s}}{b_{j,s-1}} = \gamma_{0,t} + \gamma_{1,t} \frac{v_{j,s-1}}{b_{j,s-1}} + \varepsilon_{2,j,s} . \qquad (46)$$

To obtain the other information variable, the first LIM equation (32) is solved for v_t:

$$v_{j,t} = E_t\left[\tilde{x}^a_{j,t+1}\right] - (\omega_{0,t} b_{j,t} + \omega_{1,t} x^a_{j,t}) . \qquad (47)$$

We employ the median analyst forecast of residual income $f_t^{a,t+1}$ as a proxy for next year's expected residual income $E_t\left[\tilde{x}^a_{j,t+1}\right]$. It is computed as the difference between the median analyst forecast of next year's earnings f_t^{t+1} and the product of the cost of capital and book value of equity $(R_t - 1)b_{j,t}$. $\omega_{0,t}$ is the estimated intercept and $\omega_{1,t}$ is the estimated slope parameter from equation (45).

The third LIM equation (34) is implemented by estimating year specific growth in book value using all available book value data up to t:

$$G_t = \left(\sum_{s=k}^{t} \sum_{j=1}^{N_s} b_{j,s} \right) / \left(\sum_{s=k}^{t} \sum_{j=1}^{N_s} b_{j,s-1} \right) . \qquad (48)$$

N_s is the number of firms with book value data for year s, and k is the first year for which lagged book value is available.

Finally, the parameters of the valuation equation (35), $\beta_{1,t}$, $\beta_{2,t}$, $\beta_{3,t}$ and $\beta_{4,t}$ are calculated using the estimated parameters of the LIM

$$\beta_{1,t} = \frac{\omega_{1,t}}{(R_t - \omega_{1,t})}, \quad \beta_{2,t} = \frac{R_t}{(R_t - \omega_{1,t})(R_t - \gamma_{1,t})}, \quad \beta_{3,t} = \frac{R_t \omega_{0,t}}{(R_t - \omega_{1,t})(R_t - G_t)},$$

$$\beta_{4,t} = \frac{R_t \gamma_{0,t}}{(R_t - \omega_{1,t})(R_t - \gamma_{1,t})(R_t - G_t)}$$

and applied together with firm-level data for year t to obtain firm-level market value estimation for the COPM:

$$V_{j,t} = b_{j,t} + \beta_{1,t} x^a_{j,t} + \beta_{2,t} v_{j,t} + (\beta_{3,t} + \beta_{4,t}) b_{j,t} . \qquad (49)$$

To estimate the COPM, we use 12% as the constant cost of capital following Dechow/Hutton/Sloan (1999).

We employ two different estimation procedures to estimate the COPM: (1) a joint parameter estimation of the COPM as suggested by Choi/O'Hanlon/Pope (2006) and (2) a separate parameter estimation of the COPM for different market-to-book deciles as suggested by Henschke/Homburg/Nasev (2007).

We apply the same approaches to estimate the COPM with our proposed forecast adjustment. The only difference is that we substitute the analyst forecast f_t^{t+1} with the adjusted analyst forecast $f_t^{t+1,adj}$ as specified in section 3.5.1:

$$f_t^{t+1,adj} = f_t^{t+1} + (\widehat{\alpha}_0 + \widehat{\alpha}_1 GOOD_{t+1} + \widehat{\alpha}_2 RET_{t+1} + \widehat{\alpha}_3 GOOD_{t+1} \cdot RET_{t+1}). \quad (50)$$

The estimations of the forecast error regression (equation (41)), the valuation error regressions (equation (42) and (43)) and the delta regression (equation (44)) are based on pooled OLS over the period 1986-2004. t-statistics are calculated on the basis of White-corrected standard errors adjusted for intragroup correlation.

3.7 Estimation Results

3.7.1 Hypothesis 1

Table 3, panel A presents descriptive statistics of the variables used in the forecast error regression (equation (41)). Although our sample is substantially smaller than the sample used by Louis/Lys/Sun (2007) the descriptive statistics and the inferences are comparable.[51] Only the mean market value variable is considerably higher in our sample, suggesting a selection bias towards larger firms. The forecast error in the sample is negatively skewed (mean = -0.025 vs. median = -0.006), which is consistent with the expectation that the forecast error could reflect some of the asymmetric timeliness of earnings.

Table 3, Panel B reports the estimation results of the forecast error regression (equation (41)). We predict that the association between analyst forecast errors and stock returns is less positive for good news observations compared to bad news observations. Our results are similar to Louis/Lys/Sun (2007) and we can confirm H1. We find that the marginal coefficient for good news is significantly negative ($\alpha_3 = -0.049$) indicating that analysts do not fully anticipate the delayed recognition of good news in their initial forecast.

3.7.2 Hypothesis 2

In all three panels of table 4 we report (1) the joint parameter estimation of the models as suggested by Choi/O'Hanlon/Pope (2006) and (2) the separate parameter estimation of the models for different market-to-book deciles as suggested by Henschke/Homburg/Nasev (2007).

Panel A of table 4 lists summary statistics for the variables used to estimate the LIMs. Consistent with prior studies, the residual income variable is negative on average, whereas the mean of the other information variable is positive. As expected the mean other information variable decreases after the forecast is adjusted for conditional conservatism, in both the joint and separate estimation. This is the case because the adjustment for conditional conservatism

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[51] Sample differences (N=7,223 vs. N=32,197) might arise because we obtain IBES via Datastream, because we do not merge via WRDS and because we cover a different time period compared to Louis/Lys/Sun (2007). We lose about 70% of observations by employing the control variables PRESTK, POSTSTK1 and POSTSTK2. Since this sample is too small for the LIM estimation, we omit the three control variables in the subsequent analyses. This does not materially change the forecast error regression results.

reduces the upward biased analyst forecast, which in turn reduces the other information variable.

Panel B of table 4 reports the estimated median LIM parameters and valuation multiples. The conservatism parameter in the first LIM equation ω_0, which is identical for the COPM and COPM^{adj}, is slightly negative in the joint parameter estimation and slightly positive in the separate parameter estimation. The conservatism parameter in the second LIM equation γ_0 is positive for all models and as expected lower for the adjusted model.[52] Hence, the coefficient of the total correction in the valuation function $(\beta_3 + \beta_4)$ for the COPM^{adj} is smaller than for the COPM.

Panel C of table 4 reports the valuation errors.[53] For the joint parameter estimation the adjustment for conditional conservatism improves three of the four error metrics (mean bias and inaccuracy as well as median inaccuracy). While for the unadjusted COPM median bias is almost zero for the adjusted COPM mean bias is almost zero. For the separate parameter estimation, the adjustment improves just mean inaccuracy. Note that valuation bias for the unadjusted model is already almost zero and a median inaccuracy of 19% is remarkably low. Hence, overall valuation errors are difficult to improve. This indicates that the unadjusted COPM might capture conditional conservatism already. Whether this is the case, is examined in the next section.

3.7.3 Hypothesis 3

In the following, we discuss the results of H3.1, H3.2a and H3.2b, which provide evidence with regard to the extent the adjusted and unadjusted models discriminate between different levels of conditional conservatism.

In a first analysis, based on H3.1, we examine the conservatism correction for the adjusted model with rising conditional conservatism levels. In panel A of table 5 we present descriptive statistics for market-to-book deciles. The proportion of good news, the returns, the residual income and the analysts' forecasts of residual income increase monotonically with the market-to-book ratio. The finding that the proportion of good news increases monotonically with higher market-to-book deciles is consistent with conditional conservatism. Moreover, the analyst forecast of residual income is higher than the realized residual income in each decile and the difference rises monotonically between partition 4 and 10. This corroborates the notion that analysts' optimism increases with the proportion of good news. As we would expect, the analyst forecast (the other information variable) decreases after the adjustment for the asymmetric timeliness of earnings and the difference between the unadjusted and adjusted

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[52] γ_0 is approximately the mean of the other information variable. Since the other information variable declines after the forecast adjustment, γ_0 decreases as well.

[53] To ensure that the adjustment does not improve valuation just because the error of the unadjusted model is driven by firms for which the growth rate is very close to the cost of capital and hence the valuation multiple becomes extremely large in a sensitivity analysis we eliminate firms for which $R - G < 0.1$. The results remain comparable.

analyst forecast (other information variable) increases monotonically with market-to-book. These first descriptive results indicate that the adjustment for conditional conservatism seems to vary systematically with market-to-book and thus with the proportion of good news in the sample and hence conditional conservatism.

Panel B of table 5 reports median LIM parameters and valuation multiples for the unadjusted and the adjusted COPM. ω_0, which is approximately the sample mean of residual income increases with market-to-book. With the exception of partition 7, the conservatism parameter of the other information process of the adjusted model γ_0 is expected to decrease with market-to-book in order to compensate the increasing ω_0 conservatism correction in the residual income process. More importantly, both parameters are lower for the $COPM^{adj}$ compared to COPM. We want to emphasize that partition 7 (the only partition in the COPM, for which $\gamma_0 < 0$) distorts some of the results because it comprises firms, for which the growth rate is very close to the cost of capital, yielding very extreme valuations. If we neglect this partition, our findings indicate that the impact of the forecast adjustment on the LIM and valuation parameters is broadly consistent with conditional conservatism.

Panel C of table 5 presents market-to-book decile specific median and mean valuation errors for the COPM and the $COPM^{adj}$. The adjustment, proxied by the delta variable, which is the difference between the value estimates of the $COPM^{adj}$ and the COPM, is negative in all conservatism deciles. This indicates that the COPM valuation estimate is adjusted downwards. Furthermore, the adjustment increases monotonically except for the lowest market-to-book deciles. Together, these results indicate that with an increasing proportion of good news and thus conditional conservatism the forecast adjustment reduces the original COPM correction.

Although consistent with the idea of reducing the over valuation of the COPM in the high conservatism deciles, the adjustment for the separate parameter estimation of the COPM reduces valuation errors compared to the unadjusted COPM only in the high market-to-book deciles 8 to 10. In the lower and median market-to-book deciles the adjustment does not take into account that the COPM already produces remarkably low valuation errors and hence results in under valuation. Further analysis reveals that for the unadjusted model the valuation of the low and medium conservative firms decisively benefits from the optimistic bias of analysts' forecasts because mean residual income for these firms is mostly negative. In fact, the positive analyst forecast bias compensates the characteristic negative bias of the Feltham/Ohlson (1995) model for firms with negative or very low residual income, whereas it results in a positive bias for firms with higher residual income, i.e. for more conservative firms. Accordingly, for the former firms our proposed adjustment of analyst optimism results in under valuation while for the latter firms it effectively improves valuation by preventing an over adjustment.

To further assess the extent to which the adjusted model captures conditional conservatism, in a second analysis based on H3.2a and H3.2b, we test whether the asymmetric timeliness of the valuation error is lower for the adjusted model. Table 6, panel A reports descriptive statistics for the errors of the adjusted and unadjusted model as well as the distribution of the delta variable. For the separate parameter estimation, we report the errors and the delta including and excluding partition 7, which comprises firms, for which the growth rate is very close to the cost of capital resulting in distortions of the results for H3.2a and H3.2b. [54] The change in mean bias (from -0.01 to 0.08) for the unadjusted model and from -0.19 to -0.11 for the adjusted model) indicates the distorting effect of the firms in this partition. The distortion becomes even more apparent given the extremely high standard deviation of the delta variable in partition 7 (0.6 vs. 0.07 in partition 8) as well the maximum value of the delta variable in partition 7 being 2.7, in contrast to negative values in all other partitions.

In table 6, panel B we report the error regression results (H3.2.a) and the delta regression results (H3.2b). Because we define the delta as the difference between the value estimates of the adjusted and unadjusted model the coefficients of the delta regressions are equal to the difference between the corresponding coefficients of the error regression with adjustment and the error regression without adjustment. With regard to the joint parameter estimation, we confirm H3.2.a and H3.2b. In the error regressions we find that the asymmetric timeliness coefficient decreases after the adjustment ($\alpha_3^{adj} = 0.449 < 0.593 = \alpha_3$). Equivalently, in the delta regression the asymmetric timeliness coefficient is significantly negative ($\alpha_3 = -0.141$) indicating that the correction captures at least part of the asymmetry. With regard to the separate parameter estimation, we find no significant results, which we ascribe to the distorting effect of the firms in partition 7. As explained above, for these firms the growth rate is very close to the cost of capital yielding extreme valuation errors. We can confirm H3.2a and H3.2b if we exclude this partition. Overall, these results support the conjecture that the forecast adjustment aids in better capturing conditional conservatism in the COPM.

Taken together, the results of all three hypotheses tests H3.1, H3.2a and H3.2b provide evidence that the adjustment facilitates the incorporation of conditional conservatism in the COPM.

3.8 Conclusions

To bypass the difficulties of incorporating conditional conservatism in LIMs by modeling news, we implement the Choi/O'Hanlon/Pope (2006) model on the basis of analysts' forecasts adjusted for the asymmetric timeliness of earnings. Since the forecast adjustment is based on accounting information of the next period the adjusted model could be regarded as a benchmark to investigate conditional conservatism in LIMs.

To assess the effect of the forecast adjustment in LIMs, we examine (1) whether valuation errors decrease for the adjusted model and (2) whether the adjusted model better captures conditional conservatism.

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[54] Henschke/Homburg/Nasev (2007) stress that a considerable limitation of the conservatism correction of the Choi/O'Hanlon/Pope (2006) model is its high sensitivity to the difference between the cost of capital and growth.

With regard to the first research question, we find that valuation errors except for median bias are improved for the joint estimation of the Choi/O'Hanlon/Pope (2006) model. For the separate parameter estimation of the model, suggested by Henschke/Homburg/Nasev (2007), which requires the separate estimation of the model parameters for market-to-book deciles, the adjusted model considerably improves valuation errors for the 30% highest conservative firms. However, the adjustment fails to improve valuation for the low and medium conservative firms, where valuation bias is already about zero without the adjustment.

With regard to the second research question, our results indicate that the adjusted model better captures conditional conservatism. Specifically, we find that as hypothesized the conditional conservatism adjustment increases monotonically with market-to-book deciles except for the lowest three deciles. Furthermore, we confirm that the asymmetric timeliness left in the valuation error for the joint estimation of the Choi/O'Hanlon/Pope (2006) model, is significantly lower for the adjusted model compared to the unadjusted model. For the separate parameter estimation, the results are distorted by one partition comprising firms, for which the growth rate is very close to the cost of capital, yielding extreme valuations.[55] If we neglect this partition, the asymmetric timeliness left in the valuation error is as hypothesized significantly lower for the adjusted model compared to the unadjusted model.

We contribute to the literature on accounting based valuation models by providing evidence that the failure of analysts to adjust their forecast for conditional conservatism impacts the ability of LIMs such as the Choi/O'Hanlon/Pope (2006) model to correct for conservatism. In particular, the analysts' optimism results in an over valuation for high conservative firms, which could be eliminated if analysts would adjust their forecast for the asymmetric timeliness of earnings. Our results imply that the Choi/O'Hanlon/Pope (2006) model will benefit from an adjustment for conditional conservatism particularly in the case of a non-conservatism-specific parameter estimation and when concern is with high conservative firms, i.e. the tails of the error distribution.

[55] Henschke/Homburg/Nasev (2007) stress that a considerable limitation of the conservatism correction of the Choi/O'Hanlon/Pope (2006) model is its high sensitivity to the difference between the cost of capital and growth.

4 The Link between Conditional Conservatism and Cost Stickiness

4.1 Introduction

As a prominent characteristic of financial reporting, conditional conservatism has received great attention in the empirical financial accounting literature. Since financial reporting standards require a higher verification for the recognition of good compared to bad news, Basu (1997) argues that earnings will reflect bad news faster than good news. He assumes that if markets are efficient unlike earnings, returns will reflect good and bad news equally fast. Accordingly, he finds a stronger earnings-returns relation for bad news than for good news, branded as the asymmetric timeliness of earnings (see figure 1).

In this study, we aim at drawing attention to an additional concept that also evokes an asymmetry in earnings – cost stickiness. The concept of cost stickiness is grounded in the management accounting literature and describes an asymmetric cost-sales behavior. More specifically, cost stickiness refers to the fact that SG&A costs decrease less with a sales decrease than they increase with an equivalent sales increase. Traditionally, an increase in the SG&A costs to sales ratio when sales decline has been interpreted as a sign of inefficiency. In contrast, more recent studies argue that if managers expect that the decline in sales is temporary, they will decide to bear the costs of excess resources in order to avoid adjustment costs of cutting resources and building them up again when demand is restored.[56] In this case, cost stickiness is an efficient signal (see figure 2).

In this study, we interpret cost stickiness as a risky project with uncertain cash flows and examine its impact on conditional conservatism. Likewise but in a more general way, LaFond/Watts (2007) examine the association between future positive net present value projects and conditional conservatism. They argue that since future positive net present value projects are unverifiable they induce information asymmetry between managers and outside investors. This provides incentives for managers to overstate financial performance. Therefore future positive net present value projects create the need for higher conditional conservatism in order to reduce information asymmetry. The authors hypothesize that higher conditional conservatism will reduce information asymmetry because it restricts managers' discretion to overstate gains (e.g., by prohibiting the anticipation of gains related to the future project) and to understate losses (e.g., by requiring the anticipation of losses related to the future project).

This line of reasoning applies accordingly to the interpretation of cost stickiness as a current risky project. The manager, who faces a current drop in sales, has the choice to either cut resources or maintain unutilized resources. If he expects sales to rebound sufficiently fast, he will decide to bear the costs of unutilized resources. Since future sales are uncertain, the manager implicitly invests in a risky project. Nonetheless, he is better informed about the future prospects of his firm than outside investors but he cannot credibly convey his private informa-

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[56] See Anderson et al. (2003 and 2007).

tion. This increases information asymmetry between the cost sticky firm and investors. Higher information asymmetry, however, increases the incentives for the manager to overstate financial performance. Conditional conservatism should counteract this incentive by restricting managers' discretion to overstate gains (e.g., by anticipating uncertain gains) and to understate losses (e.g., by not anticipating uncertain losses) in order to reduce information asymmetry. We therefore conjecture that cost sticky firms should be subject to higher conditional conservatism. If this is the case, earnings will be less timely if costs are sticky.

Cost stickiness, i.e., the manager's decision to bear the costs of unutilized resources in the case of falling sales, affects current earnings as well as the expectation of future earnings. For simplicity, we distinguish between efficient and inefficient cost sticky firms. A cost sticky firm is efficient if current sales fall but future sales are expected to rebound, while it is inefficient if sales are expected to decline permanently. Irrespective of whether the cost sticky firm is efficient or inefficient, cost stickiness has a negative effect on current earnings because the drop in sales is not compensated by an equivalent drop in costs. For efficient firms, cost stickiness likely has a positive effect on future earnings because sales are expected to rebound. For inefficient firms, cost stickiness has likely a negative impact on future earnings because sales are expected to decline permanently.

We assume that conditional conservatism assists markets to better distinguish efficient from inefficient cost sticky firms because it restricts the discretion of managers to mask financial performance and hence makes the cost sticky investment project more costly. As a consequence, the efficient firms should be rewarded with positive returns (good news), whereas the inefficient firms should be punished with negative returns (bad news).[57]

For good news (efficient) firms, we hypothesize that the association between earnings and returns is lower for cost sticky firms than for the rest of the sample. While current earnings reflect just the current negative cost stickiness effect, current returns additionally should reflect the future positive effect related to the expectation of a sales rebound. Hence, c.p., earnings should reflect good news slower for cost sticky firms.

For bad news (inefficient) firms, we hypothesize that the association between earnings and returns is higher for cost sticky firms than for the rest of the sample. Next to the current negative cost stickiness effect for the inefficient firms returns should also anticipate the negative future cost stickiness effect. Since conditional conservatism might require the anticipation of future bad news related to the expectation of a permanent sales decline for inefficient cost sticky firms, the association between returns and earnings should be stronger for cost sticky firms. Hence, c.p., earnings should reflect bad news faster for cost sticky firms.

As the earnings-return association for good news is expected to decrease, while the earnings-return association for bad news is expected to increase, we hypothesize that in total, the

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[57] Please refer to section 4.3 for a more detailed explanation of this assumption.

asymmetric timeliness of earnings measured as the difference between both associations should increase. Hence, c.p., the asymmetric timeliness should be larger for cost sticky firms.

Finally, we investigate whether the association between cost stickiness and the asymmetric timeliness of earnings is mainly related to accounting factors consistent with greater conditional conservatism for sticky cost firms or whether the association is mainly determined by non-accounting factors distinct from conditional conservatism.

To empirically address the hypotheses with regard to the magnitude of the asymmetric timeliness of earnings for cost sticky firms, we partition our sample according to cost stickiness and estimate the Basu (1997) model in each partition separately. Equivalently, we estimate an interacted version of the Basu (1997) model using a dummy variable specification. To compare the total level of asymmetry between different sample partitions, we apply a trigonometric measure of the asymmetric timeliness of earnings suggested by Gassen/Fülbier/Sellhorn (2006). Our sample comprises firms from the intersection of CRSP and COMPUSTAT from 1988 to 2004. We estimate all models by running annual cross-sectional Fama/MacBeth regressions for the 17 years from 1988 to 2004. To assess whether the cost stickiness induced asymmetry is predominantly driven by accounting conservatism and/or non-accounting factors we follow Basu (1997) and estimate all models separately for the accrual and operating cash flow component of net income as dependent variables.

First, we confirm that cost stickiness increases the asymmetric timeliness of earnings by weakening the timeliness of earnings for good news firms and, at the same time, intensifying the timeliness of earnings for bad news firms. Secondly, the results suggest that the asymmetric timeliness of earnings for cost sticky firms is more strongly driven through accounting factors, as reflected in accruals than through non-accounting factors, as reflected in operating cash flow. Taken together, we find that cost stickiness leads to asymmetrically timely earnings generally consistent with conditional conservatism and conclude that sticky cost firms exhibit greater conditional conservatism.[58]

We contribute to the accounting literature by examining the impact of cost stickiness, which we interpret as a risky project, on conditional conservatism. Our results indicate that as cost sticky firms are subject to higher conditional conservatism, the project becomes more costly. This is consistent with findings by LaFond/Watts (2007) who demonstrate that by limiting the discretion of managers to overstate accounting numbers conditional conservatism reduces information asymmetry evoked by future positive net present value projects. An interesting question left open for future research is whether conditional conservatism facilitates the separation of the efficient from the inefficient cost sticky firms by making cost stickiness a more costly signal and hence reduces information asymmetry.

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[58] We have to acknowledge that in order to ensure internal validity, we need to control for additional factors that have been identified in the literature to explain conditional conservatism: contracting, litigation, taxation and regulation. However, we would need a larger sample to obtain enough power for the tests employed here.

The remainder of the paper is organized as follows. In section 4.2 we present the concepts of conditional conservatism, asymmetric timeliness and cost stickiness. In section 4.3 we develop the hypotheses. We describe our research design in section 4.4 (model specification and variable measurement) and 4.5 (estimation procedure, sample and descriptive results). We report the main empirical results in section 4.6 and conclude in section 4.7.

4.2 Concepts

The objective of this section is to highlight those aspects of the main concepts that facilitate the derivation of our hypotheses regarding the impact of cost stickiness on the asymmetric timeliness of earnings.

4.2.1 Asymmetric Timeliness and Conditional Conservatism

Building on the notion that accountants tend to require higher verification for the recognition of good compared to bad news, Basu (1997) hypothesizes that earnings should reflect bad news faster than good news. To measure news, Basu (1997) uses stock returns and assumes efficient markets, where prices reflect good and bad news equally timely. To test his prediction, Basu (1997) regresses earnings on stock returns in a piece-wise linear regression model:

$$X_t = \alpha_1 + \alpha_2 D_t + \beta_1 R_t + \beta_2 D_t \cdot R_t + \varepsilon_t, \quad D_t = \begin{cases} 1 \ \ if \ R_t < 0 \\ 0 \ \ if \ R_t > 0 \end{cases}, \tag{51}$$

X_t denotes earnings deflated by prior period stock price, R_t is the annual stock return and D_t is a dummy variable that is one for bad news measured as negative stock returns and zero for good news measured as positive stock returns. As expected, Basu (1997) finds a stronger association between earnings and returns for bad news firms as compared to good news firms. He refers to the incremental coefficient on negative returns, β_2, as the asymmetric timeliness coefficient and interprets it as a measure of accounting conservatism (see figure 1). Recent studies, such as Ball/Shivakumar (2005) and Beaver/Ryan (2005), specify that the asymmetric timelines is a measure of conditional conservatism. This type of conservatism is conditional upon the news of a period as it implies writing down the book value of net assets for bad news but not writing it up for good news.[59]

Watts (2003) attributes the existence of conditional conservatism to several factors, most importantly debt and compensation contracts.[60] According to the contracting explanation, contracting parties face asymmetric information and constraints to credibly convey private information. Conditional conservatism increases efficiency in contracting as it restricts the discretion of managers to overstate financial performance and hence reduces agency costs.[61]

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[59] Examples of conditional conservatism include the lower of cost or market accounting for inventory and impairment accounting for tangible and intangible assets.

[60] Watts (2003) offers four main explanations for conditional conservatism: contracting, litigation, taxes and regulation. Qiang (2007) empirically examines to what extent these four explanations apply to accounting conservatism and finds that mainly contracting induces conditional conservatism.

[61] See Qiang (2007), Garcia Lara/Osma/Penalva (2006), Watts (2003) and Ball/Kothari/Robin (2000).

In contrast, unconditional conservatism understates the book value of net assets independently of the news in a period.[62]

Meanwhile, the asymmetric timeliness of earnings has been extensively applied to explore determinants of conditional conservatism. [63] Prior studies examine the variation of conditional conservatism as measured by the asymmetric timeliness of earnings (a) across firms' characteristics[64] such as high- vs. low-tech firms (b) across economic contexts[65] such as legal systems and (c) across time[66].

Despite the frequent applications of the asymmetric timeliness measure to assess conditional conservatism, recent studies increasingly draw attention to its limitations. Callen/Hope/Segal (2006) address the criticism of a lack of theoretical foundation by conceptualizing the Basu (1997) approach on the basis of a return decomposition model. Givoly/Hayn/Natarahan (2007) identify aspects of the information environment unrelated to conservatism that affect the Basu measure and advocate using multiple measures to gauge conservatism. Dietrich/Muller/Riedl (2007) argue that because the Basu measure requires partitioning on an endogenous variable (returns are assumed endogenous because earnings cause returns), return based measures of asymmetric timeliness lead to biased coefficients.

An effort to address some of these allegations has been undertaken by Ball/Kothary (2007). They present an econometric model to demonstrate that the asymmetric timeliness measure is properly specified. Similarly, Ryan (2007) reaches the conclusion that albeit its limitations, the asymmetric timeliness coefficient is superior to alternative measures of conditional conservatism identified by the literature so far. Yet, he suggests that the specification of the asymmetric timeliness regression could be enhanced if controls for factors other than conditional conservatism are included in the model.[67]

Another concept that is also known to cause an asymmetry in earnings is cost stickiness. The concept of cost stickiness is grounded in the management accounting literature and describes an asymmetric cost-sales behavior. We present it in the next section.

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[62] Examples of unconditional conservatism include the immediate expensing of R&D or accelerated depreciation of long-lived assets.

[63] See Ball/Kothari (2007) or Ryan (2006) for a recent overview of empirical research on conditional conservatism.

[64] E.g., Chandra et al. (2004), Ball/Shivakumar (2005), Huijgen/Lubbernik (2005).

[65] E.g., Pope/Walker (1999), Ball et al. (2003), Giner/Rees (2001), Bushman/Piotroski (2006), Gassen et al. (2006).

[66] E.g., Ball et al. (2000), Givoly/Hayn (2000), Holthausen/Watts (2001), Ryan/Zarowin (2003), Liu/Thornton (2005).

[67] For example, Gassen/Fuelbier/Sellhorn (2006) examine to what extent unconditional conservatism and income smoothing contribute to the differences of asymmetric timeliness between code law and common law countries. Recently, Hsu/O'Hanlon/Peasnell (2007) find evidence that in addition to conditional conservatism the earnings asymmetry reflects the effect of financial distress and recommend controlling for financially distressed firms.

4.2.2 Cost Stickiness

Despite sufficiently advanced economic theory that explains cost behavior, conjectures about the sticky behavior of costs are largely based on anecdotal and empirical evidence.[68] We start by briefly sketching how the cost-volume-relationship can be derived from cost and production functions. Subsequently, we outline the economic reasoning underlying the sticky cost hypothesis and the econometric model used to test it.

The cost function relates total cost (c) to factor prices (p_j) and output quantity (y). In competitive markets, factor prices and output quantity are exogenous. A widely used production function in economics is the Cobb-Douglas production function:[69]

$$y_t = f(x_{1t}, x_{2t}) = A_t \cdot x_{1t}^{\alpha} x_{2t}^{\beta}, \tag{52}$$

where t is a time index, A_t is a positive constant, $x_{jt}, j = 1,2$ are input factors and α, β are positive, time-invariant fractions that add up to one implying constant returns to scale. The corresponding Cobb-Douglas cost function[70] is:

$$c_t(y_t) = K_t y_t^{1/(\alpha+\beta)}, \tag{53}$$

where K_t is a function of factor prices (p_j), A_t, α and β. The cost growth between $t-1$ and t can be expressed as:

$$\frac{c_t(y_t)}{c_{t-1}(y_{t-1})} = \frac{K_t}{K_{t-1}} \left(\frac{y_t}{y_{t-1}} \right)^{1/(\alpha+\beta)}. \tag{54}$$

Taking the log yields the following empirical model:[71]

$$\log\left(\frac{c_t}{c_{t-1}}\right) = \gamma_0 + \gamma_1 \log\left(\frac{y_t}{y_{t-1}}\right) + \varepsilon_t, \tag{55}$$

with $\gamma_0 = \log\left(\frac{K_t}{K_{t-1}}\right)$, $\gamma_1 = \frac{1}{\alpha+\beta}$ and ε_t being a zero mean error term.

This model is consistent with the traditional fixed- and variable-cost model, which assumes that variable costs change proportionately with the changes in activity level implying $\gamma_1 = 1$ (constant returns to scale $\alpha + \beta = 1$).[72] In addition, the model assumes that the change in variable costs is invariant to the direction of the change in volume. In other words, the cost-volume-relationship is assumed to be symmetric for volume increases and decreases, implying that γ_1 is equal in both cases. However, recent empirical studies provide evidence that

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68 See for example, Cooper/Kaplan (1998), Noreen/Soderstrom (1997) and Banker/Johnston (1993).

69 SeeVarian (1992), p. 17.

70 SeeVarian (1992), p. 70.

71 We implicitly assume that factor prices are constant over time. Otherwise the model would suffer from omitted variable bias, unless data on factor prices are considered in the empirical estimation.

72 For $\gamma_1 > 1$ (55) implies decreasing returns to scale and for $\gamma_1 < 1$ it implies increasing returns to scale or economies of scale.

certain cost types, such as SG&A costs, rise more with increases in volume than they fall with decreases in volume implying that γ_1 should be higher for increases than for decreases in activity level.[73] The literature defines the asymmetric cost behavior with respect to directions in volume changes as cost stickiness and typically uses SG&A costs instead of total costs and sales revenue instead of output volume to test the sticky cost hypothesis.[74]

Previous studies have identified three major factors that contribute to the asymmetry in SG&A costs with respect to increases and decreases in sales revenue.[75] The first factor is fixity of SG&A costs.[76] When a portion of SG&A costs is fixed and sales decline, the ratio between SG&A costs and revenue increases, because the fixed capacity costs are spread over a lower sales level.

The second and third factor are related to the part of SG&A costs that are variable. When the level of activity declines, the manager decides whether to adjust capacity in order to reduce variable SG&A costs. If the manager maximizes the value of the firm, he will trade off the costs of maintaining excess resources against the adjustment costs of cutting existent resources and building them up again, when demand is restored. His decision depends on his expectation of future demand and on the uncertainty of his expectation. If the manager expects demand to restore sufficiently fast in future periods, adjustment costs will be higher than the costs of unutilized capacity and he will decide to maintain excess resources. Similarly, if the uncertainty about future demand is high and cutting committed resources costly, the manager will decide to wait in order to obtain more information before incurring adjustment costs. The asymmetry in costs induced by the economic decision to bear the costs of excess resources is defined as cost stickiness.

Third, an asymmetric cost behavior with respect to sales increases and decreases will also arise, if the manager maintains excess capacity maximizing his own utility function, whereas the firm value maximizing decision would be to cut recourses. In this case, the manager expects a permanent decline in future demand; yet, he decides to keep capacity because he incurs a higher disutility with understaffing than with overstaffing. For example, in the case of managerial empire building, managers might be willing to maintain unutilized resources for reasons such as status, prestige and power.[77] Another reason why managers might be reluctant to cut resources, particularly staff, is when they face considerable public pressure with regard to their social responsibility.

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[73] See Anderson et al. (2007), Calleja et al. (2006), Anderson et al. (2003).

[74] Anderson et al. (2003) explain their measurement choice with a lack of large datasets on activity levels and total costs. Anderson/Lanen (2007) warn that the changes in sales is not an exogenous regressor because in addition to volume, sales depend on prices, which are set by management. They also point out that the classification of costs is subject to managerial choice and using one cost component (SG&A) that represents about 30% of total costs is problematic.

[75] See Anderson et al. (2007), Banker/Chen (2006), Anderson et al. (2003).

[76] See Banker/Hughes (1994).

[77] See for example Jensen/Meckling (1976), Jensen (1986), Hope/Thomas (2007) and Chen/Lu/Sougiannis (2007).

To test the sticky cost hypothesis, (55) is extended to allow different slopes for positive and negative changes in volume:

$$\log\left(\frac{c_t}{c_{t-1}}\right) = \gamma_0 + \gamma_1 \log\left(\frac{y_t}{y_{t-1}}\right) + \gamma_2 D_t \log\left(\frac{y_t}{y_{t-1}}\right) + \varepsilon_t, \quad D_t = \begin{cases} 1 & if\ \Delta y_t < 0 \\ 0 & if\ \Delta y_t > 0 \end{cases} \tag{56}$$

Anderson et al. (2003, p. 52) employ SG&A costs instead of total costs and sales revenue instead of output volume:

$$\log\left(\frac{SG\&A_t}{SG\&A_{t-1}}\right) = \gamma_0 + \gamma_1 \log\left(\frac{SALES_t}{SALES_{t-1}}\right) + \gamma_2 D_t \log\left(\frac{SALES_t}{SALES_{t-1}}\right) + \varepsilon_t, \quad D_t = \begin{cases} 1 & if\ \Delta SALES_t < 0 \\ 0 & if\ \Delta SALES_t > 1 \end{cases} \tag{57}$$

γ_1 measures the percentage increase in SG&A costs with a 1% increase in sales revenue and ($\gamma_1 + \gamma_2$) measures the percentage increase in SG&A costs with a 1% decrease in sales revenue. The traditional fixed- and variable-cost model postulates that total cost changes are invariant to the direction of the change in activity ($\gamma_2 = 0$). Anderson et al. (2003) find that the variation of SG&A costs with revenue increases are significantly higher than with revenue decreases ($\gamma_2 < 0$) and attribute this asymmetric cost behavior to the presence of cost stickiness.

Figure 2 depicts how cost stickiness induces an asymmetry between SG&A costs and sales. In the case of a sales increase, SG&A costs rise proportionately, whereas in the case of a sales decline, SG&A costs fall only under proportionately.

4.3 Hypotheses Development

The objective of this section is to elaborate on the economic arguments and assumptions, on which we build our hypotheses.

In this paper, we interpret cost stickiness, i.e., the manager's decision to bear the costs of unutilized resources in the case of falling sales, as a risky project. Cost stickiness affects current earnings as well as the expectation of future earnings. For simplicity, we distinguish between efficient and inefficient cost sticky firms. A cost sticky firm is efficient if current sales fall but future sales are expected to rebound, while it is inefficient if sales are expected to decline permanently. Irrespective of whether the cost sticky firm is efficient or inefficient, cost stickiness has a negative effect on current earnings because the drop in sales is not compensated by an equivalent drop in costs. For efficient firms, cost stickiness likely has a positive effect on future earnings because sales are expected to rebound. For inefficient firms, cost stickiness likely has a negative impact on future earnings because sales are expected to decline permanently.

Consider the following situation. The management is confronted with falling sales and needs to decide whether to cut or maintain resources. It chooses the risky cost stickiness project, which requires maintaining unutilized resources. In this situation, the management is better informed about the future prospects of the firm and can better assess whether keeping resources will pay off. Yet, the management cannot credibly convey its private information to the markets. As a result, the information asymmetry between the management and outside investors is expected to increase. Higher information asymmetry, however, increases the incentives for the manager to overstate financial performance. Conditional conservatism should counteract this incentive by restricting managers' discretion to overstate gains (e.g., by prohibiting the anticipation of uncertain gains) and to understate losses (e.g., by requiring the anticipation of uncertain losses) and hence should reduce information asymmetry. We therefore conjecture that cost sticky firms should be subject to higher conditional conservatism.

For efficient cost sticky firms, conditional conservatism exacerbates the negative cost stickiness effect on current earnings as it prohibits the anticipation of good news related to the expected future sales rebound. For inefficient cost sticky firms, conditional conservatism might require the anticipation of future bad news related to the expected permanent sales decline. Hence, for both types of firms conditional conservatism has a negative impact on current earnings. By restricting discretion due to the requirement of a higher verification for the recognition of good compared to bad news conditional conservatism makes cost stickiness a more costly project.

Therefore, we suppose that conditional conservatism may facilitate the separation of efficient and inefficient cost sticky firms. From the pool of efficient firms the project will be attractive only for the most efficient firms, i.e., the firms that expect a very likely and strong rebound in demand. From the pool of inefficient firms only the most inefficient ones will fail to gain control over costs and will be forced to be cost sticky. This could be interpreted as a self-selection effect, which helps the market to better separate the efficient from the inefficient firms and hence reduces information asymmetry.[78] As a consequence, the market should reward the efficient firms with positive returns (good news), whereas the inefficient firms should be punished with negative returns (bad news).

For good news (efficient) firms, we hypothesize that the association between earnings and returns is lower for cost sticky firms than for the rest of the sample. While current earnings reflect just the current negative cost stickiness effect, current returns additionally should reflect the future positive effect related to the expectation of a sales rebound (see figure 3).

H1: C.p., earnings should reflect good news slower for cost sticky firms.

For example, a toy company faces a sharp decline in current sales because one of its toy components is toxic. Hence, the toys comprising the toxic component violate the health standards of the country, where they are sold. Since the firm maintains connections to several suppliers, it will likely manage to purchase components free of toxin from a different supplier. Accordingly, management expects sales to rebound in the next period and therefore it refrains from cutting resources. In this example, current earnings will reflect the current decline in sales while current returns should additionally reflect the positive future expectations. As a result, the association between earnings and returns should be weaker for cost sticky firms compared to the rest of the sample.

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[78] We do not test this implication. We need this assumption to hypothesize that cost sticky firms should be more conditionally conservative measured using the asymmetric timeliness of earnings.

For bad news (inefficient) firms, we hypothesize that the association between earnings and returns is higher for cost sticky firms than for the rest of the sample. Returns should reflect both the current and future negative cost stickiness effects. For the inefficient cost sticky firms, current earnings will reflect the current negative effect and likely part of the future negative effect as well because conditional conservatism might require the anticipation of future bad news related to the expectation of a permanent sales decline. Hence, the association between returns and earnings should be stronger for cost sticky firms (see figure 3).

H2: C.p., earnings should reflect bad news faster for cost sticky firms.

For example, another toy company as well faces a sharp decline in current sales because of a toxic component. However, this firm fails to change suppliers and to source a component that meets the health standards of the country. Yet, the firm meets the lower health standards of a neighbor country but has to take into account that the demand and the selling price will be considerably lower. Accordingly, management expects sales to further decline in the next periods. Since the management had hoped to find a new supplier resources have not been cut. In this example, current earnings will reflect the current decline in sales. Beyond that since inventory declines in value the lower-of-cost-or-market rule (ARB 43, Chapter 4, FASB) prescribes a write down. Hence, almost like returns that reflect both current and future bad news, current earnings will reflect current bad news and part of the future bad news. Hence, the association between earnings and returns should be higher for cost sticky firms compared to the rest of the sample.

As the earnings-return association for good news is expected to decrease, while the earnings-return association for bad news is expected to increase, we hypothesize that in total, the asymmetric timeliness of earnings measured as the difference between both associations should increase (see figure 3).

H3: C.p., the asymmetric timeliness should be larger for cost sticky firms.

Finally, we investigate whether the association between cost stickiness and the asymmetric timeliness of earnings is mainly related to accounting factors consistent with greater conditional conservatism for sticky cost firms or whether the association is mainly determined by non-accounting factors distinct from conditional conservatism.

4.4 Model Specification and Variable Measurement

The objective of this section is to present the empirical models that we test and the corresponding hypotheses as developed in section 4.3. To examine the asymmetric timeliness for cost sticky firms, we build on the Basu (1997) model and implement a partition approach as well as a dummy model specification. We then proceed to examine whether the asymmetry related to cost stickiness is consistent with conditional conservatism and follow Basu (1997) who estimates all models separately for the accrual and operating cash flow component of net income as dependent variables.

4.4.1 The Basu (1997) Regression

We start by estimating the standard Basu (1997) regression:

$$X_{it} = \alpha_1^{BASU} + \alpha_2^{BASU} D_{it}^R + \beta_1^{BASU} R_{it} + \beta_2^{BASU} D_{it}^R \cdot R_{it} + \varepsilon_{it}, \qquad (58)$$

where $D_{it}^R = \begin{cases} 1 \ if \ R_{it} < 0 \\ 0 \ if \ R_{it} > 0 \end{cases}.$

X_{it} denotes net income (COMPUSTAT item 172) for firm i in year t, deflated by the product of lagged fiscal year price (COMPUSTAT item 199) and the number of common shares outstanding (COMPUSTAT item 25). R_{it} is the annual stock return for firm i in year t obtained by compounding monthly CRSP returns from nine months before to three months after fiscal year end. D_{it}^R is a dummy variable that is one for bad news measured as negative stock returns ($R_{it} < 0$) and zero otherwise. α_j^{BASU} with $j = 1,2$ are intercept coefficients and β_k^{BASU} with $k = 1,2$ are slope coefficients and ε_{it} is a zero mean error term. β_1^{BASU} measures the association between earnings and positive returns and $(\beta_1^{BASU} + \beta_2^{BASU})$ measures the association between earnings and negative returns. Basu (1997) hypothesizes that if earnings respond timelier to bad than good news as a result of conditional conservatism, β_2^{BASU} will be positive and hence: $(\beta_1^{BASU} + \beta_2^{BASU}) > \beta_1^{BASU} \Rightarrow \beta_2^{BASU} > 0$.[79]

4.4.2 Partition Approach

To examine the asymmetric timeliness of earnings for cost sticky firms, we partition our sample into sticky firms and "other" firms. The "other" firms comprise anti-sticky and non-sticky firms. For anti-sticky firms sales fall like for sticky firms, however, in contrast to sticky firms the SG&A ratio declines. Anderson et al. (2007) define the SG&A ratio as the difference between the current and the lagged SG&A costs to sales ratio:

$$SG\&A\_RATIO_t = \frac{SG\&A_t}{SALES_t} - \frac{SG\&A_{t-1}}{SALES_{t-1}}. \qquad (59)$$

Non-sticky firms are those for which sales increase. We measure cost stickiness (CS_{it}) as the SG&A ratio conditional on decreasing sales and conditional on SG&A costs falling under proportionately compared to sales (implying a positive SG&A ratio).

$$CS_{it} = SG\&A\_RATIO_{it} \cdot D_{it}^{SALES} \cdot D_{it}^{SG\&A} = \left(\frac{SG\&A_{it}}{SALES_{it}} - \frac{SG\&A_{it-1}}{SALES_{it-1}} \right) \cdot D_{it}^{SALES} \cdot D_{it}^{SG\&A}, \qquad (60)$$

where

$$D_{it}^{SALES} = \begin{cases} 1 \ if \ \frac{SALES_{it}}{SALES_{it-1}} < 1 \\ 0 \ otherwise \end{cases}, \quad D_{it}^{SG\&A} = \begin{cases} 1 \ if \ SG\&A\_RATIO_{it} = \frac{SG\&A_{it}}{SALES_{it}} - \frac{SG\&A_{it-1}}{SALES_{it-1}} > 0 \\ 0 \ otherwise \end{cases}.$$

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[79] See figure 1 and the argumentation in section 2.1.

We estimate the Basu (1997) regression separately for the sticky cost partition

$$X_{it} = \alpha_1^{CS} + \alpha_2^{CS} D_{it}^R + \beta_1^{CS} R_{it} + \beta_2^{CS} D_{it}^R \cdot R_{it} + \varepsilon_{it}, \quad if\ CS_{it} \neq 0 \tag{61}$$

and for the partition comprising all firms except the sticky cost ones ("other" firms):

$$X_{it} = \alpha_1^{OTHER} + \alpha_2^{OTHER} D_{it}^R + \beta_1^{OTHER} R_{it} + \beta_2^{OTHER} D_{it}^R \cdot R_{it} + \varepsilon_{it}, \quad if\ CS_{it} = 0 . \tag{62}$$

We hypothesize that:

$$H1: \beta_1^{CS} < \beta_1^{BASU} < \beta_1^{OTHER}$$

and

$$H2: (\beta_1^{CS} + \beta_2^{CS}) > (\beta_1^{BASU} + \beta_2^{BASU}) > (\beta_1^{OTHER} + \beta_2^{OTHER}).$$ [80]

We expect that the cost stickiness partition exhibits higher asymmetric timeliness of earnings compared to the full sample and the full sample exhibits higher asymmetric timeliness compared to the sample comprising the anti-sticky and non-sticky firms.

Basu (1997) assesses the level of the asymmetric timeliness primarily on the basis of the magnitude and significance of β_2^{BASU}. In order to compare the relative asymmetry levels of two samples, he proposes the following measure:

$$AT = (\beta_2^{BASU} + \beta_1^{BASU}) / \beta_1^{BASU} = \beta^{BAD} / \beta^{GOOD} . \tag{63}$$

Gassen/Fülbier/Sellhorn (2006) criticize that this measure fails to adequately assess asymmetric timeliness if the coefficient for the good news sample $\beta_1^{BASU} = \beta^{GOOD}$ is close to or below zero and propose the following trigonometric measure:

$$AT = \arctan(\beta_2 + \beta_1) - \arctan(\beta_1) = \arctan(\beta^{BAD}) - \arctan(\beta^{GOOD}) . \tag{64}$$

We employ this measure to compare the asymmetry between the full sample, the cost stickiness sample and the sample including the remaining observations and expect that:

$$H3: AT^{CS} > AT^{BASU} > AT^{OTHER} .$$

4.4.3 Dummy Specification

Equivalently to partitioning the sample, we estimate a dummy variable specification of the Basu (1997) regression:

$$X_{it} = \alpha_1 + \alpha_2 D_{it}^R + \alpha_3 D_{it}^{CS} + \alpha_4 D_{it}^R \cdot D_{it}^{CS} + \beta_1 R_{it} + \beta_2 D_{it}^R \cdot R_{it} + \gamma_1 D_{it}^{CS} \cdot R_{it} + \gamma_2 D_{it}^R \cdot D_{it}^{CS} \cdot R_{it} + \varepsilon_{it}, \tag{65}$$

where $D_{it}^R = \begin{cases} 1 \ if\ R_{it} < 0 \\ 0 \ if\ R_{it} > 0 \end{cases}$, $D_{it}^{CS} = \begin{cases} 1 \ if \ \dfrac{SALES_t}{SALES_{t-1}} < 1 \wedge \dfrac{SG\&A_t}{SALES_t} - \dfrac{SG\&A_{t-1}}{SALES_{t-1}} > 0 \\ 0 \ otherwise \end{cases}$.

D_{it}^{CS} is a dummy for sticky firms, which is one if sales decline and the SG&A ratio increases, implying that SG&A costs fall under proportionately compared to sales. The other notation is as defined above. The coefficient γ_1 measures the additional sensitivity to positive returns for sticky cost firms and γ_2 measures the additional sensitivity to negative returns for sticky cost

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[80] See figure 3 and the argumentation in section 3.

firms. The sensitivity of earnings with respect to good news in the sticky cost partition of model (61) β_1^{CS} equals $(\beta_1 + \gamma_1)$ of model (65). Similarly, the sensitivity of earnings with respect to bad news in the sticky cost partition of model (61) $(\beta_1^{CS} + \beta_2^{CS})$ estimated for the sticky cost partition equals $(\beta_1 + \gamma_1 + \beta_2 + \gamma_2)$ of model (65). In analogy to the hypotheses for the partition approach, we expect that c.p. sticky firms are less timely with respect to good news and timelier with respect to bad news:

$H1' : (\beta_1 + \gamma_1) < \beta_1^{BASU}$ and $H2' : (\beta_1 + \gamma_1 + \beta_2 + \gamma_2) > (\beta_1^{BASU} + \beta_2^{BASU})$.[81]

4.4.4 Accruals and Operating Cash Flow Regressions

Next, we implement the above models separately for the accrual and operating cash flow component of net income to investigate whether the obtained asymmetry in earnings due to cost stickiness is primarily driven by accounting or non-accounting factors. We follow Hsu et al. (2007) and measure operating cash flow as COMPUSTAT item 308 (operating activities net cash flow). We use the broad definition of accruals for the period after the implementation of SFAS 95 following Hsu et al. (2007) and Pae et al. (2005) and measure accruals as the difference between net income and operating cash flow. We estimate all models ((58), (61), (62) and (65)) separately for the accrual (ACC) and operating cash flow (OCF) components of net income. We expect to replicate Basu's (1997) result that the asymmetry in earnings is driven by both accruals and operating cash flows.[82] However, we expect to find that cost stickiness driven asymmetric timeliness is induced to a larger extent by accruals. With respect to the partition comprising the remaining firms, similarly to the full sample Basu (1997) regression, we expect that the asymmetry is about equally induced by accruals and operating cash flows.

81 See figure 3 and the argumentation in section 3.

82 While Dietrich et al. (2007) attribute the asymmetric timeliness of operating cash flows to bias, Ryan (2007), p. 516 ascribes most of the asymmetry in operating cash flows to economic phenomena such as the abandonment option. Recently Hsu et al. (2007) argue that the operating cash flow asymmetry can hardly be attributed to conservatism and provide evidence that part of it is explained by the effect of financial distress.

4.5 Estimation Procedure, Data and Descriptive Statistics

We estimate all models by running annual cross-sectional Fama/MacBeth regressions for the 17 years from 1988 to 2004. We report time-series averages of the estimated annual coefficients and the average of the regressions' R^2. We obtain t-statistics from the ratio of the average estimated annual coefficients to the standard deviation of the distribution of the estimated annual coefficients divided by the square root of the number of years.

Our sample comprises firms for which monthly returns are available from CRSP and financial statement data is available from COMPUSTAT (net income #172; operating cash flows #308; sales #12; selling, general and administrative expense #189; market value of equity #199 and common shares outstanding #25) between 1988[83] and 2004. We eliminate financial institutions (SIC 6000-6999), observations with negative book value of equity and observations with negative sales. Furthermore, we exclude firm years with annual returns outside the range of [-50%; +100%] in order to examine conservative accounting and sticky cost behavior for firms operating in a "regular" state of the business cycle.[84] Finally, we delete the 1% top and bottom observations for deflated[85] net income, deflated operating cash flows, annual stock return and the SG&A ratio, which is used to compute our cost stickiness measure. Our final sample comprises 44,361 firm-year observations.

Table 1 reports descriptive statistics for the variables used in the regressions. Panel A presents statistics for all firms-years, panel B for positive and panel C for negative return firm years. Consistent with the literature, in all three panels net income and accruals are left skewed, whereas operating cash flows and returns are right skewed. The mean SG&A ratio as defined in (59) is positive in the negative return sample, implying an increase in the SG&A costs to sales ratio for bad news firms. In contrast, it is negative for the good news sample implying a decrease in the SG&A costs to sales ratio. About 20% of all observations exhibit cost stickiness as defined in (60). Mean cost stickiness is twice as high in the bad news sample compared to the good news sample.

Table 2 provides Pearson and Spearman correlation coefficients between the main variables. We report the correlations for the full sample in panel A, for positive stock returns (good news) in table B and negative stock returns (bad news) in table C. In the bad news sample, our measure of cost stickiness is more negatively correlated to net income and to returns than in the good news sample. Furthermore, consistent with the asymmetric timeliness hypothesis, the correlation between return and net income is larger for the negative return firms than for the positive return firms.

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83 Our sample period starts in 1988 because cash flow statements became mandatory under SFAS 95 in 1988.

84 Hsu et al. (2007) advise controlling for financial distress, which is driving a part of the asymmetry between earnings and returns through operating cash flows. By dropping firms with unusually low returns, we counteract this effect.

85 We follow Basu (1997) and deflate net income, operating cash flows and accruals with lagged market value of equity.

4.6 Results

To determine whether our sample exhibits conditional conservatism, initially we apply the standard Basu (1997) model. Next to the asymmetry in net income, we also examine the asymmetry in accruals and operating cash flows as components of net income. Table 3 reports the results. Because we define accruals as the difference between net income and operating cash flows, the coefficients of the accrual regression are equal to the difference between the corresponding coefficients of the net income regression and the operating cash flow regression. The magnitude of our coefficients is slightly lower but comparable to corresponding coefficients reported in Basu (1997). The asymmetric timeliness coefficient $\beta_2^{BASU} = 0.194$ for net income corroborates the existence of conditional conservatism in our sample. We also confirm that the asymmetric reaction to good vs. bad news is evoked by both operating cash flow ($\beta_2^{BASU} = 0.106$) and accruals ($\beta_2^{BASU} = 0.088$).

In addition to the descriptive results, which indicate that our sample comprises around 20% of sticky cost firms, we implement the model suggested by Banker/Chen (2006) to obtain an impression of the impact of sticky costs on future earnings in our sample. Consistent with Banker/Chen (2006) we find that a negative SG&A ratio is positively related to future profitability (not reported here). This is evidence on the conjectured positive future effect of sticky costs.

Next, we discuss the results regarding our question of whether cost stickiness increases the asymmetric timeliness of earnings. In table 4, we report results of separate Basu (1997) regressions for a partition comprising only sticky cost firm-year observations (panel A) and a second partition comprising the remaining firm-year observations, i.e., anti-sticky and non-sticky firms (panel B). As outlined in section 4.3, we expect that in the good news partition cost sticky firms exhibit less timely earnings compared to the rest of the sample. Whereas, in the bad news partition, we expect that cost sticky firms exhibit more timely earnings compared to the rest of the sample.

With regard to the good news sample, we confirm $H1: \beta_1^{CS} < \beta_1^{BASU} < \beta_1^{OTHER}$. We find that while the association between earnings and returns for good news is significantly positive in the full sample ($\beta_1^{BASU} = 0.022$) as well as the sample excluding the sticky cost firm observations ($\beta_1^{OTHER} = 0.032$), it is not significantly different from zero in the sticky cost partition ($\beta_1^{CS} = -0.021$). This result implies that for sticky cost firms earnings are less timely in the good news sample.

With respect to the bad news sample, we support $H2: (\beta_1^{CS} + \beta_2^{CS}) > (\beta_1^{BASU} + \beta_2^{BASU}) > (\beta_1^{OTHER} + \beta_2^{OTHER})$. We find that the association between earnings and returns in the bad news sample is higher for sticky cost firms $(\beta_1^{CS} + \beta_2^{CS}) = 0.235$ compared to all firms $(\beta_1^{BASU} + \beta_2^{BASU}) = 0.216$ and compared to the remaining firms $(\beta_1^{OTHER} + \beta_2^{OTHER}) = 0.168$. Consequently, our results provide evidence that sticky cost firms exhibit timelier earnings in the bad news sample.

To compare the total level of asymmetry between the full sample, the cost stickiness sample and the sample including the remaining observations we apply the trigonometric measure defined in (64). We find evidence in favor of H3 suggesting that the level of asymmetric timeliness is highest in the sticky cost partition: $H3: AT^{CS} = 0.25 > AT^{BASU} = 0.19 > AT^{OTHER} = 0.13$.

Table 5 reports the coefficients for the dummy specification of the Basu (1997) regression conditional on cost stickiness. The results are equivalent to those of the partition approach and support $H1': (\beta_1 + \gamma_1) < \beta_1^{BASU}$ and $H2': (\beta_1 + \gamma_1 + \beta_2 + \gamma_2) > (\beta_1^{BASU} + \beta_2^{BASU})$. The significantly negative γ_1 implies that earnings for sticky cost firms are less timely with respect to positive returns, whereas the significantly positive γ_2 coefficient indicates that earnings for sticky cost firms are timelier with respect to negative returns.

Taken together, our results provide evidence that cost stickiness affects the earnings-returns relation asymmetrically and that cost stickiness increases the asymmetric timeliness of earnings.[86]

Finally, we address the question of whether cost stickiness is consistent with or distinct from conditional conservatism. The results for the accruals and operating cash flow regressions in table 4 and 5 provide first hints as to whether the association between cost stickiness and the asymmetric timeliness of earnings reflects accounting conservatism and/or other factors. Consistent with Basu (1997), for the full sample we confirm that the asymmetric timeliness of earnings is driven by both accruals and operating cash flows. We report similar results for the partition excluding the cost sticky firms. Our results for the cost sticky partition suggest that cost stickiness affects the asymmetric timeliness of earnings more strongly through accounting factors, as reflected in accruals than through non-accounting factors, as reflected in operating cash flow and hence is consistent with conditional conservatism.

We conclude that sticky cost firms are more conditionally conservative compared to anti-sticky and non-sticky firms.

4.7 Conclusions

In this study, we interpret cost stickiness, i.e., the manager's decision to bear the costs of unutilized resources in the case of falling sales, as a risky project and examine its impact on conditional conservatism.

We provide evidence that cost stickiness increases the asymmetric timeliness of earnings by weakening the timeliness of earnings for good news firms and, at the same time, intensifying the timeliness of earnings for bad news firms. In addition, the results suggest that the

[86] To ensure internal validity, we need to control for additional factors that explain conditional conservatism: contracting, litigation, taxation and regulation. However, we would need a larger sample to obtain enough power for our tests.

asymmetric timeliness of earnings for cost sticky firms is more strongly driven through accounting factors, as reflected in accruals than through non-accounting factors, as reflected in operating cash flow. Taken together, we find that cost stickiness leads to asymmetrically timely earnings generally consistent with conditional conservatism and conclude that sticky cost firms exhibit greater conditional conservatism. [87]

Our results have two implications: First, the findings indicate that since cost sticky firms are subject to higher conditional conservatism, the cost stickiness project is more costly under conditionally conservative accounting rules. Secondly, the results suggest that the market effectively distinguishes between efficient and inefficient cost sticky firms, indicating that information asymmetry is low. If the fact that the project of cost stickiness becomes more costly facilitates the separation of the efficient from the inefficient cost sticky firms future research could test whether conditional conservatism mitigates some of the information asymmetry induced by cost stickiness and hence reduces agency costs.

Our results and their implications are consistent with findings by LaFond/Watts (2007) who demonstrate that by limiting the discretion of managers to overstate accounting numbers conditional conservatism reduces information asymmetry evoked by future positive net present value projects.

[87] To ensure internal validity of the results, however, we need to control for additional factors that explain conditional conservatism: contracting, litigation, taxation and regulation. Yet, we need a larger sample to obtain enough power for these tests.

5 Conclusions

The three studies of this dissertation thesis are unified around the topic of accounting conservatism. The first two studies address the incorporation of unconditional as well as conditional conservatism in accounting based valuation models. The third study examines the variation of conditional conservatism with the riskiness of a project illustrated in the context of cost stickiness.

The results of the first study demonstrate (1) to what extent different implementations of linear information models empirically capture unconditional conservatism and (2) how inaccuracy could be markedly reduced. With regard to the first research question, we find that conservatism is captured when the Feltham/Ohlson (1995) model is estimated according to the modification suggested by Choi/O'Hanlon/Pope (2006). On average, one dollar of unrecorded reserves, measured as the estimated reserve by Penman/Zhang (2002), results in a correction of market value forecasts of approximately one dollar. Furthermore, the results suggest no improvement of the conservatism corrections for the following cases: disaggregating book value into operating and financial assets and estimating the Feltham/Ohlson (1995) model via the valuation function. With regard to the second research question, we argue that the failure of the models to markedly reduce inaccuracy is the consequence of forcing the models to value different firms on the basis of the same conservatism coefficient. We therefore suggest an estimation procedure, in which linear information model's parameters are estimated separately for different conservatism levels. This implementation reduces median inaccuracy from 36.8% to 21.1%, which is comparable to implementations of the residual income model based on analyst forecasts.

The results of the second study provide evidence that linear information models, which largely rely on analysts' forecasts, could better capture conditional conservatism if analysts would adjust their optimistic forecast for the asymmetric timeliness of earnings. Since adjusting the forecast requires information of the next period the adjusted model could be regarded as a benchmark to investigate conditional conservatism in linear information models. We demonstrate that for a joint parameter estimation of the Choi/O'Hanlon/Pope (2006) model based on adjusted forecasts valuation errors are reduced. For a market-to-book specific implementation the adjusted model improves valuation errors for the 30% highest conservative firms. Moreover, the adjustment reduces the asymmetric timeliness in the valuation error indicating that the adjusted model helps capturing conditional conservatism. The results imply that linear information models will benefit from an adjustment for conditional conservatism particularly in the case of a joint parameter estimation and when concern is with high conservative firms.

In the third study, we interpret cost stickiness, i.e., the manager's decision to bear the costs of unutilized resources when sales decline as a risky project and examine its impact on conditional conservatism. As expected, we find that a more risky project such as cost stickiness increases conditional conservatism. For cost sticky firms we observe that the asymmetric timeliness of earnings increases by weakening the timeliness of earnings for good news firms and, at the same time, intensifying the timeliness of earnings for bad news firms. Additionally, the results suggest that the asymmetric timeliness of earnings for cost sticky firms is more strongly driven through accounting factors, as reflected in accruals than through non-accounting factors, as reflected in cash flow.

This dissertation contributes to the conservatism literature in several ways. The first two studies demonstrate that linear information models should be implemented using the additional conservatism correction based on analysts' forecasts as suggested by Choi/O'Hanlon/Pope (2006). While the additional correction is crucial in mitigating conservatism-related valuation bias, the results reveal that the model better corrects for unconditional than conditional conservatism. The analysis suggests that, at least in part, this is related to the failure of analysts to fully adjust their forecast for the asymmetric timeliness of earnings. Extending this analysis, future research could address the interaction between unconditional and conditional conservatism. A second contribution of the first two studies is that the implementation of the residual income valuation model on the basis of linear information models provides a promising alternative to conventional implementations based on analysts' forecasts, when the estimation accounts for different conservatism levels and for the asymmetric timeliness of earnings.

The third study contributes to the literature by demonstrating that conditional conservatism increases with the riskiness of a project illustrated in the context of cost stickiness. This is consistent with the notion that conditional conservatism serves the purpose of protecting shareholders from management's opportunistic behavior. This result is also in line with findings by LaFond/Watts (2007) who show that by limiting the discretion of managers to overstate accounting numbers conditional conservatism reduces information asymmetry evoked by future positive net present value projects. An interesting question arising from this study is whether conditional conservatism helps mitigating information asymmetry induced by cost stickiness.

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Appendix

Tables and Figures: Chapter 2

Table 1: Sample Selection

1	Firm-year observations after **merging COMPUSTAT/CRSP/IBES 1985-2004** COMPUSTAT items: #235, #237 IBES items via Datastream: F1MD, IBNOSH CRSP items: market capitalization	54,460
2	Firm-year observations after excluding **(1) negative book value of equity observations** **(2) observations with changes in book value of equity exceeding 200%** (requires lagged book value of equity to be non-missing)	52,297
3	Firm-year observations after deleting **(1) missing values for lagged variables used in the regressions** **(2) the top and bottom percentile for each variable used in the regressions**	34,862

Table 2, Panel A: Variables Used to Estimate the Models

Label	*Variable*	*Measurement*
V_t	= market value of equity in t	= market capitalization
$R_t - 1$	= cost of equity capital at date t	= 12%
b_t	= book value of equity at date t	= book value of common equity (#235) · 1000000
x_t	= earnings for period (t–1,t)	= earnings before extraordinary items available for common stockholders (#237) · 1000000
x_t^a	= residual income for period (t–1,t)	= earnings – cost of equity · lagged book value of equity
$E_t\left[\tilde{x}_{t+1}^a\right]$	= expected next year's residual income	= (F1MD · IBNOSH) – cost of equity · book value of equity
v_t	= other information at date t	$= E_t\left[\tilde{x}_{t+1}^a\right] - \omega_{1,t} x_t^a$

NOTES:
We obtain the following items from COMPUSTAT:
#237 (IBCOM): Earnings before Extraordinary Items Available for Common Stockholders
#235 (CEQL): Book Value of Common Equity

We obtain the following items from IBES:
F1MD = median EPS estimate from IBES (median forecast of one period ahead earnings per share split adjusted, measured as of the first month after publication of the annual financial report but no later than four months after the fiscal year-end). IBNOSH = number of shares outstanding split adjusted from IBES

We obtain the following items from CRSP:
Market capitalization is measured at the date corresponding to the analyst earnings forecast date – first month after publication of the annual financial report but no later than four months after the fiscal year-end.

Table 2, Panel B: Variables Used in the Delta Regressions

Label	*Variable*	*Measurement*
$Delta_t$	= conservatism correction proxy	$=(V_t^{OM}-V_t^{OM-v})/V_t$ for the OM $=(V_t^{FOM}-V_t^{OM})/V_t$ for the FOM $=(V_t^{COPM}-V_t^{OM})/V_t$ for the COPM V_t = market value. V_t^{MODEL} = market value estimate.
ER_t	= estimated reserve at date t	= estimated reserve / market cap (according to Penman/Zhang (2002), see section 2.3.2.2)
$Growth_t$	= growth at date t	1. Estimation of the Valuation Function: = LTMD 2. Estimation of the LIM without an asset split = median [book value of equity in t (#235) / book value of equity in t-1 (#235)] 3. Estimation of the LIM with an asset split = median [net operating assets in t / net operating assets in t-1]
$ER_t \cdot Growth_t$	= interaction between estimated reserve and growth at date t	= (estimated reserve/market cap) · growth
$Depr_t$	= depreciation proxy at date t	= 0 if COMPUSTAT footnote equals TS (computed using a straight-line depreciation method) or = accumulated depreciation (#196) / gross property plant and equipment (# 7) if COMPUSTAT footnote equals TC (computed using an accelerated depreciation method or TB (a combination of TS and TC)
Lev_t	= leverage at date t	= (long term debt (#9) + debt in current liabilities (#34) + preferred stock (#130) + notes payable (#206)) / market cap
$MShare_t$	= market share at date t	= sales (#12) / sum of sales (#12) over the industry (three digit SICs)
$CapIn_t$	= capital intensity at date t	= depreciation expense (#14) / sales (#12)
$AssetTurn_t$	= change in asset turnover at date t	= (sales in t (#12) / total assets in t (#6)) – (sales in t-1 (#12) / total assets in t-1 (#6))
$LaborEf_t$	= labor efficiency at date t	= (sales in t (#12) / employees in t (#29)) / (sales in t-1 (#12)/ employees in t-1 (#29))
SpI_t	= special items at date t	= special items (#17)/ market cap

Table 2, Panel B continued

NOTES: We obtain the following items from COMPUSTAT to construct the variables for the delta regressions

#6 (AT):	Assets Total	#130 (PSTK):	Preferred Shares
#7 (PPEGT):	Property, Plant and Equipment	#181 (LT):	Liabilities Total
#9 (DLTT):	Long Term Debt Total	#193 (IVST):	Short-Tem Investments Total
#12 (SALE):	Net Sales	#196 (DPACT):	Depreciation, Depletion and Amortization (Accumulated)
#14 (DP):	Depreciation and Amortization	#206 (NP):	Notes Payable
#17 (SPI):	Special Items	#237 (IBCOM):	Earnings before Extraordinary Items Available for Common Stockholders
#29 (EMP):	Number of Employees	#235 (CEQL):	Book Value of Common Equity
#33 (INTAN):	Intangible Assets	#240 (LIFR):	LIFO Reserve Expense
#34 (DLC):	Debt in Current Liabilities		
#45 (XAD):	Advertising Expense		
#46 (XRD):	Research and Development		

We obtain the following item from IBES: LTMD = expected EPS long-term growth from IBES.
Alternatively, we calculate $Depr_t$ following Ahmed/Morton/Schaefer (2000) as firm median of [depreciation expense (#14) / (property, plant and equipment (#7) + intangible assets (#33))] over the period available in COMPUSTAT.

Table 3, Panel A: Descriptive Statistics of the Variables Used in the Estimation

	Mean	SD	Min	Q 25%	Median	Q 75%	Max
residual income (OM, FOM & COPM)	-0.032	0.191	-1.357	-0.064	0.007	0.060	0.365
other information (OM)	0.032	0.066	-0.204	-0.003	0.021	0.055	0.390
other information (FOM & COPM)	0.032	0.055	-0.114	0.000	0.023	0.055	0.268

Table 3, Panel B: Estimation Results

	LIM 1		LIM 2		Valuation multiples			
	ω_0	ω_1	γ_0	γ_1	β_1	β_2	β_3	β_4
OM	-0.003	0.554	0.020	0.508	0.978	3.214		
	(-2.51)	(34.88)	(29.01)	(36.55)				
COPM	-0.003	0.554	0.019	0.552	0.978	3.431	-0.094	0.868
	(-2.51)	(34.88)	(31.60)	(37.98)				

Table 3, Panel C: Valuation Errors

n=34,862	Bias median	Bias mean	Inaccuracy median	Inaccuracy mean
discount rate 12%				
OM	-0.442	-0.312	0.480	0.522
FOM	-0.485*	-0.353	0.516*	0.541
COPM	-0.033*	0.225	0.368*	0.600
time varying discount rate				
OM	-0.424	-0.294	0.466	0.516
FOM	-0.457*	-0.332	0.488*	0.528
COPM	0.158*	0.515	0.425*	0.787

NOTES:
Panel A reports the descriptive statistics for the variables used to estimate the LIM, all items are scaled by lagged book value of equity. For a detailed variable definition refer to table 2. Panel B reports the median of the 17 yearly estimates for each regression coefficient in the LIM and each valuation coefficient for the years 1988-2004 following the Choi/O'Hanlon/Pope (2006) estimation procedure. Median t-values are reported in parenthesis and are computed on the basis of White-heteroscedasticity-robust standard errors adjusted for intragroup correlation. The estimated median growth parameter in the COPM is $G = 1.048$. The R-square for the first LIM equation is 35.57% for both the OM and COPM, 17.73% for the second LIM equation of the OM and 18.98% for the second LIM equation of the COPM. Panel A and panel B are reported for fix cost of capital (12%) as defined in section 2.3. To compare the models' abilities to estimate market value of equity we employ two error metrics in panel C: bias and inaccuracy. $Bias = (\hat{V}_{j,t} - V_{j,t}) / V_{j,t}$ is the signed percentage prediction error and $Inaccuracy = |(\hat{V}_{j,t} - V_{j,t}) / V_{j,t}|$ is the absolute percentage prediction error. For the FOM and the COPM we compare median bias and inaccuracy against the OM using a nonparametric paired sign test that does not require symmetry of paired differences in the ranks. * denotes that the change in bias/inaccuracy is significant at the 0.01% level.

Table 4: Partition According to Market-to-Book and Growth

	Pooled	High conservatism		Low conservatism	
		High Growth	Low Growth	High Growth	Low Growth
discount rate 12%	n=19,285	n=5,687	n=3,580	n=5,212	n=4,806
OM (bias)	-0.399	-0.542	-0.581	-0.255	-0.213
FOM (bias)	-0.542*	-0.342*	-0.795*	-0.490*	-0.622*
COPM (bias)	-0.101*	0.014*	-0.338*	-0.072*	-0.091*
OM (inac.)	0.447	0.545	0.588	0.329	0.336
FOM (inac.)	0.557*	0.379*	0.796*	0.507*	0.629*
COPM (inac.)	0.306*	0.287*	0.401*	0.280*	0.300*
time varying discount rate	n=17,370	n=4,836	n=3,460	n=4,737	n=4,337
OM (bias)	-0.374	-0.524	-0.571	-0.228	-0.191
FOM (bias)	-0.586*	-0.227*	-0.830*	-0.555*	-0.689*
COPM (bias)	0.014*	0.270*	-0.265*	0.019*	0.000*
OM (inac.)	0.429	0.528	0.579	0.309	0.328
FOM (inac.)	0.602*	0.312*	0.831*	0.564*	0.692*
COPM (inac.)	0.311*	0.392*	0.372*	0.250*	0.275*

NOTES:
This table reports the median valuation errors of the different models, when the parameters are estimated separately for conservatism/growth partitions. $Bias = (\hat{V}_{j,t} - V_{j,t}) / V_{j,t}$ is the signed percentage prediction error and $Inaccuracy = | (\hat{V}_{j,t} - V_{j,t}) / V_{j,t} |$ is the absolute percentage prediction error. Conservatism is measured as the median market-to-book ratio of the company during the sample period. In order to remain consistent with the estimation of the models, growth is measured as the median growth rate of the firm’s book value of equity over all periods. We eliminate up to 17,492 observations, for which R>G. For the FOM and the COPM we compare median bias and inaccuracy against the OM using a nonparametric paired sign test that does not require symmetry of paired differences in the ranks. * denotes that the change in bias/inaccuracy is significant at the 0.01% level.

Table 5: Delta Regressions

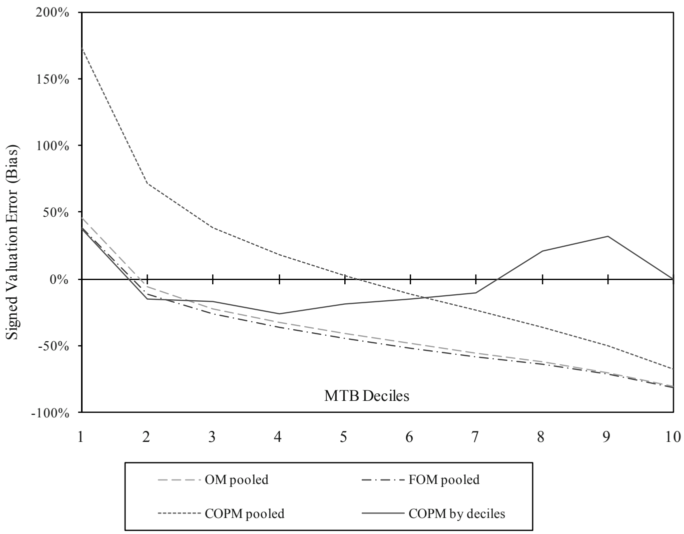
$$Delta_t = \alpha_0 + \alpha_1 ER_t + \alpha_2 ER_t \cdot Growth_t + \alpha_3 Depr_t + \alpha_4 Lev_t + \alpha_5 Growth_t + \alpha_6 MShare_t + \alpha_7 CapIn_t + \alpha_8 AssetTurn_t + \alpha_9 LaborEf_t + \alpha_{10} SpI_t + \varepsilon_t$$

n=12,180	α_0	α_1	α_2	α_3	α_4	α_5	α_6	α_7	α_8	α_9	α_{10}	R^2
OM	0.018 (4.49)	0.235 (7.06)	-0.129 (-0.80)									0.048
OM	0.016 (2.30)	0.071 (2.08)	-0.185 (-1.05)	0.007 (0.68)	-0.003 (-0.33)	0.071 (2.13)	0.013 (0.76)	-0.285 (-4.29)	0.045 (3.88)	-0.002 (-0.13)	-1.652 (-18.41)	0.296
FOM	-0.042 (-30.89)	-0.115 (-13.15)	-0.074 (-1.83)									0.073
FOM	-0.032 (-12.85)	-0.079 (-8.92)	-0.118 (-2.45)	-0.006 (-1.19)	-0.027 (-8.56)	0.018 (1.69)	0.020 (2.29)	-0.089 (-3.56)	-0.001 (-0.33)	0.013 (3.47)	0.059 (2.49)	0.153
COPM	0.510 (43.37)	1.049 (16.31)	0.129 (0.41)									0.123
COPM	0.510 (23.75)	0.619 (9.69)	1.053 (2.93)	0.095 (2.09)	0.321 (11.02)	-0.551 (-6.33)	-0.497 (-7.96)	-0.331 (-1.57)	0.016 (0.61)	-0.102 (-3.77)	-0.610 (-3.78)	0.352

NOTES:

This table reports the results for different delta regression specifications introduced in section 2.3.2.2. The main idea is to investigate to what extent the conservatism corrections – measured as the valuation difference between the FOM and OM, respectively COPM and OM – are empirically explained by proxies for unconditional conservatism. For each model we report one regression without controls and a second regression with controls. Please refer to table 2, panel B for a specification of the variables. Estimations are based on pooled OLS over the period 1988-2004. t-statistics are reported in parentheses and calculated on the basis of White-corrected standard errors adjusted for intragroup correlation. All estimations are based on fix cost of capital (12%) as defined in section 2.3. For each model we report one regression without controls and a second regression with controls.

Figure 1: Valuation Errors for Different MTB Deciles



NOTES:

This figure depicts bias (the signed valuation error) of the models for different MTB deciles (the lowest MTB decile = 1 and the highest MTB decile = 10). The discontinuous lines indicate that the models are estimated using pooled LIM parameters, which are the same for all deciles. The continuous line depicts the bias when the COPM is estimated according to our approach separately for each decile. The corresponding errors for our approach are listed in table 6, panel A.

Table 6, Panel A: Conservatism Specific Estimation for 10 Levels of MTB

	MTB (median)	n	Bias OM	Bias FOM	Bias COPM	Inaccuracy OM	Inaccuracy FOM	Inaccuracy COPM
Joint parameter estimation								
All firms	1.88	34,862	-0.442	-0.485*	-0.033*	0.480	0.516*	0.368*
Separate parameter estimation								
All deciles pooled	1.88	34,875	-0.444	-0.437*	-0.091*	0.480	0.459*	0.211*
1 (lowest)	0.62	3,544	0.463	-1.439*	0.375*	0.474	1.439*	0.391*
2	1.00	3,546	-0.044	-0.675*	-0.148*	0.082	0.675*	0.153*
3	1.27	3,573	-0.223	-0.579*	-0.166*	0.223	0.579*	0.172*
4	1.50	3,561	-0.332	-0.469*	-0.256*	0.332	0.469*	0.256*
5	1.75	3,576	-0.413	-0.463*	-0.184*	0.413	0.463*	0.186*
6	2.06	3,563	-0.486	-0.444*	-0.144*	0.486	0.444*	0.145*
7	2.46	3,538	-0.555	-0.088*	-0.100*	0.555	0.360*	0.187*
8	3.02	3,487	-0.625	-0.289*	0.210*	0.625	0.289*	0.213*
9	3.99	3,386	-0.698	-0.047*	0.320*	0.698	0.153*	0.326*
10 (highest)	6.63	3,101	-0.788	-0.225*	0.004*	0.788	0.384*	0.438*

Table 6, Panel B: Conservatism Specific Estimation for 17 Industries

Industry	MTB (median)	n	Bias OM	Bias FOM	Bias COPM	Inaccuracy OM	Inaccuracy FOM	Inaccuracy COPM
Metal	1.55	1,180	-0.362	-0.560*	-0.307*	0.429	0.570*	0.387*
Miscellaneous Manufacturers	1.67	244	-0.352	-0.657*	-0.024*	0.398	0.666*	0.360*
Rubber/Plastic/Leather/Stone/Glass/Clay	1.72	683	-0.402	-0.415*	-0.227*	0.439	0.448*	0.368*
Wholesale	1.75	1,341	-0.388	-0.570*	-0.141*	0.446	0.582*	0.371*
Transportation Equipment	1.84	882	-0.427	-0.450*	-0.169*	0.452	0.472*	0.335*
Extractive Industries	1.86	1,184	-0.456	-0.606*	0.059*	0.487	0.614*	0.357*
Textiles/Printing/Publishing	1.86	2,301	-0.420	-0.381*	-0.067*	0.463	0.446*	0.374*
Miscellaneous Retail	1.95	2,267	-0.428	-0.201*	0.481*	0.494	0.443*	0.581
Machinery	1.99	1,395	-0.476	-0.547*	-0.034*	0.496	0.560*	0.343*
Electrical Equipment	2.12	1,513	-0.471	-0.740*	0.362*	0.501	0.746*	0.539
Restaurant	2.17	559	-0.522	-0.652*	0.226*	0.535	0.656*	0.442*
Services	2.20	2,761	-0.458	-0.466	0.180*	0.521	0.528	0.607
Food	2.40	878	-0.479	0.130*	0.372*	0.512	0.462*	0.520
Chemicals	2.41	960	-0.534	-0.382*	-0.137*	0.549	0.415*	0.313*
Instruments	2.55	1,888	-0.534	-0.660*	0.712*	0.555	0.665*	0.741*
Computers	2.64	4,439	-0.533	-0.656*	0.369*	0.557	0.665*	0.571*
Pharmaceuticals	3.70	1,186	-0.696	-0.883*	0.657*	0.712	0.888*	0.776
Pooled	2.07	25,661	-0.476	-0.545*	0.119*	0.511	0.585*	0.462*

NOTES:
Panel A reports the median valuation errors when the models' parameters are estimated according to MTB deciles. $Bias = (\hat{V}_{j,t} - V_{j,t}) / V_{j,t}$ is the signed percentage prediction error and $Inaccuracy = | (\hat{V}_{j,t} - V_{j,t}) / V_{j,t} |$ is the absolute percentage prediction error. Panel B reports the median valuation errors, when the LIM parameters are estimated by industry. Industries are ranked according to the conservatism level measured by the market-to-book ratio. The industry classification is based on Barth/Beaver/Hand/Landsman (2005). We employ industry specific cost of capital following Fama/French (1997). For the FOM and the COPM we compare median bias and inaccuracy against the OM using a nonparametric paired sign test that does not require symmetry of paired differences in the ranks. * denotes that the change in bias/inaccuracy is significant at the 0.01% level.

Table 7, Panel A: Sample Selection

1	Firm-year observations after **merging COMPUSTAT/CRSP/IBES 1985-2004** COMPUSTAT items: #1, #6, #9, #15, #32, #34, #130, #181, #193, #206 IBES items via Datastream: F1MD, IBNOSH CRSP items: market capitalization	23,491
2	Firm-year observations after excluding **(1) negative book value of equity observations** **(2) financial institutions (SIC 6000-6999)** **(3) observations with changes in book value of equity exceeding 200%** (requires lagged book value of equity to be non-missing)	19,991
3	Firm-year observations after deleting **(1) missing values for lagged variables used in the regressions** **(2) the top and bottom percentile for each variable used in the regressions**	7,097

Table 7, Panel B: Variable Definition

Label	Variable	Measurement
V_t	= market value of equity at date t	= market capitalization
oa_t	= net operating assets at date t	= (#6 - (#1+#32+#193)) - (#130+#181 - (#9+#34+#130+#206))
fa_t	= net financial assets at date t	= (#1+#32+#193) - (#9+#34+#130+#206)
i_t	= interest rate on debt	= #15 / average(#9+#34+#130+#206) if the interest rate is missing or in the top or bottom 5th percentile, we use the median interest rate for that industry instead
$R_t - 1$	= cost of equity capital at date t	= 12%
$E_t\left[ox_{t+1}\right]$	= expected operating earnings	$= F1MD \cdot IBNOSH - i_t \cdot fa_t$
ox_t	= operating earnings at date t	$= F0EPS \cdot IBNOSH - i_t \cdot fa_t$
ox_t^a	= operating residual income at date t	= operating earnings – cost of equity · lagged net operating assets
$E_t\left[ox_{t+1}^a\right]$	= expected next year's operating residual income	$=E_t\left[ox_{t+1}\right]$ – cost of equity · net operating assets
v_t	= other information at date t	$= E_t\left[ox_{t+1}^a\right] - \omega_{1,t} ox_t^a$

NOTES: We obtain the following items from COMPUSTAT:

#1 (CHE):	Cash and Short-Term Investments	#34 (DLC):	Debt in Current Liabilities
#6 (AT):	Assets Total	#130 (PSTK):	Preferred Shares
#9 (DLTT):	Long Term Debt Total	#181 (LT):	Liabilities Total
#15 (XINT):	Interest and Related Expense Total	#193 (IVST):	Short-Tem Investments Total
#32 (IVAO):	Investment and Advances	#206 (NP):	Notes Payable

We obtain the following items from IBES:
F1MD = median EPS estimate from IBES (median forecast of one period ahead earnings per share split adjusted, measured as of the first month after publication of the annual financial report but no later than four months after the fiscal year-end)
IBNOSH = number of shares outstanding split adjusted from IBES

We obtain the following items from CRSP:
Market capitalization is measured at the date corresponding to the analyst earnings forecast date – first month after publication of the annual financial report but no later than four months after the fiscal year-end.

Table 7, Panel C1: Descriptive Statistics of the Variables Used in the Estimation

	Mean	SD	Min	Q 25%	Median	Q 75%	Max
operating residual income (OM, FOM & COPM)	0.007	0.077	-0.217	-0.039	0.001	0.048	0.262
other information (OM)	0.010	0.027	-0.041	-0.008	0.006	0.025	0.091
other information (FOM & COPM)	0.009	0.020	-0.027	-0.006	0.006	0.022	0.062

Table 7, Panel C2: Estimation Results

	LIM 1		LIM 2		Valuation multiples			
	ω_0	ω_1	γ_0	γ_1	β_1	β_2	β_3	β_4
OM	0.002	0.760	0.007	0.482	2.115	4.851		
	(1.43)	(33.42)	(12.20)	(20.41)				
COPM	0.002	0.760	0.006	0.444	2.115	4.639	0.047	0.353
	(1.43)	(33.42)	(12.24)	(17.83)				

Table 7, Panel C3: Valuation Errors

	Bias		Inaccuracy	
n=7,097	median	mean	median	mean
discount rate 12%				
OM	-0.493	-0.064	0.515	0.848
FOM	-0.502*	-0.024	0.532*	0.946
COPM	-0.120*	0.878	0.382*	1.305
time varying discount rate				
OM	-0.458	-0.003	0.484	0.841
FOM	-0.344*	0.347	0.438*	1.052
COPM	0.093*	1.375	0.387*	1.651

NOTES:

Panel C1 reports the descriptive statistics for the variables used to estimate the LIM, when book value is disaggregated into operating and financial assets. All items are scaled by lagged net operating assets. Panel C2 reports the median of the 17 yearly estimates for each regression coefficient in the LIM and each valuation coefficient for the years 1988-2004 following the Choi/O'Hanlon/Pope (2006) estimation procedure explained in section 2.3.1. Median t-values are reported in parenthesis and computed on the basis of White-heteroscedasticity-robust standard errors adjusted for intragroup correlation. The estimated median growth parameter in the COPM is $G = 1.038$. The R-square for the first LIM equation is 38.57% for both the OM and the COPM, 15.81% for the second LIM equation of the OM and 14.24% for the second LIM equation of the COPM. Panel C1 and panel C2 are reported for fix cost of capital (12%) as defined in section 2.3. To compare the models' abilities to estimate market value of equity we employ two error metrics: bias and inaccuracy in panel C3. $Bias = (\hat{V}_{j,t} - V_{j,t}) / V_{j,t}$ is the signed percentage prediction error and $Inaccuracy = | (\hat{V}_{j,t} - V_{j,t}) / V_{j,t} |$ is the absolute percentage prediction error. For the FOM and the COPM we compare median bias and inaccuracy against the OM using a nonparametric paired sign test that does not require symmetry of paired differences in the ranks. * denotes that the change in bias/inaccuracy is significant at the 0.01% level.

Table 7, Panel D: Partition According to Market-to-Book and Growth

	Pooled	High conservatism		Low conservatism	
		High Growth	Low Growth	High Growth	Low Growth
discount rate 12%	n=4,799	n=1,248	n=852	n=1,505	n=1,194
OM (bias)	-0.454	-0.597	-0.576	-0.338	-0.299
FOM (bias)	-0.562*	-0.317*	-0.484*	-0.726*	-0.643*
COPM (bias)	-0.241*	-0.010*	-0.358*	-0.246*	-0.284*
OM (inac.)	0.486	0.598	0.576	0.395	0.379
FOM (inac.)	0.599*	0.412*	0.509*	0.759*	0.665*
COPM (inac.)	0.389*	0.449*	0.409*	0.358*	0.377
time varying discount rate	n=4,566	n=1,166	n=837	n=1,461	n=1,102
OM (bias)	-0.420	-0.565	-0.541	-0.311	-0.258
FOM (bias)	-0.479*	0.001*	-0.422*	-0.689*	-0.608*
COPM (bias)	-0.075*	0.332*	-0.224*	-0.084*	-0.189*
OM (inac.)	0.457	0.565	0.543	0.376	0.359
FOM (inac.)	0.550*	0.359*	0.442*	0.712*	0.638*
COPM (inac.)	0.359*	0.460*	0.340*	0.338*	0.348*

NOTES:
Panel D reports median valuation errors of the models, when book value is disaggregated into operating and financial assets and the parameters are estimated separately for conservatism/growth partitions. $Bias = (\hat{V}_{j,t} - V_{j,t}) / V_{j,t}$ is the signed percentage prediction error and $Inaccuracy = |(\hat{V}_{j,t} - V_{j,t}) / V_{j,t}|$ is the absolute percentage prediction error. The parameters are estimated separately for each partition. Conservatism is measured as the median market-to-book ratio of the company during the sample period. In order to remain consistent with the estimation of the models, growth is measured as the median growth rate of the firm's net operating assets over all periods. We eliminate up to 2,531 observations, for which R>G. For the FOM and the COPM we compare median bias and inaccuracy against the OM using a nonparametric paired sign test that does not require symmetry of paired differences in the ranks. * denotes that the change in bias/inaccuracy is significant at the 0.01% level.

Table 7, Panel E: Delta Regressions

$$Delta_t = \alpha_0 + \alpha_1 ER_t + \alpha_2 ER_t \cdot Growth_t + \alpha_3 Depr_t + \alpha_4 Lev_t + \alpha_5 Growth_t$$
$$+ \alpha_6 MShare_t + \alpha_7 CapIn_t + \alpha_8 AssetTurn_t + \alpha_9 LaborEf_t + \alpha_{10} SpI_t + \varepsilon_t$$

n=3,067	α_0	α_1	α_2	α_3	α_4	α_5	α_6	α_7	α_8	α_9	α_{10}	R^2
OM	0.033	0.061	-0.120									0.015
	(5.50)	(1.87)	(-1.31)									
OM	0.038	0.042	-0.067	-0.014	-0.022	-0.043	-0.030	0.059	0.131	0.014	-0.478	0.076
	(4.09)	(1.34)	(-0.47)	(-1.19)	(-1.54)	(-0.47)	(-1.53)	(0.44)	(4.64)	(0.71)	(-4.15)	
FOM	0.096	-0.433	-0.087									0.007
	(1.54)	(-1.83)	(-0.10)									
FOM	0.036	-0.395	-0.066	-0.047	-0.050	0.104	-0.088	1.436	0.081	0.065	-0.545	0.015
	(0.90)	(-1.78)	(-0.08)	(-0.61)	(-0.35)	(0.25)	(-0.73)	(1.81)	(0.94)	(0.90)	(-0.81)	
COPM	0.254	2.341	4.146									0.246
	(2.75)	(6.08)	(3.29)									
COPM	0.367	0.858	1.989	0.101	1.096	-1.527	-0.355	-2.344	0.070	-0.183	1.426	0.578
	(6.36)	(3.24)	(2.38)	(1.10)	(7.04)	(-3.45)	(-2.31)	(-2.30)	(0.75)	(-2.04)	(1.86)	

NOTES:

This table reports the results for different delta regression specifications introduced in section 2.3.2.2. The main idea is to investigate to what extent the conservatism corrections – measured as the valuation difference between the FOM and OM, respectively COPM and OM – are empirically explained by proxies for unconditional conservatism. For each model we report one regression without controls and a second regression with controls. Please refer to table 2, panel B for a specification of the variables. Estimations are based on pooled OLS over the period 1988-2004. t-statistics are reported in parentheses and calculated on the basis of White-corrected standard errors adjusted for intragroup correlation. All estimations are based on fix cost of capital (12%) as defined in section 2.3. For each model we report one regression without controls and a second regression with controls.

Table 8, Panel A: Sample Selection

1	Firm-year observations after **merging COMPUSTAT/CRSP/IBES 1985-2004** COMPUSTAT items #1, #6, #9, #15, #32, #34, #130, #181, #193, #206 IBES items via Datastream: F0EPS, F1MD, LTMD, IBNOSH CRSP item: market cap	19,587
2	Firm-year observations after excluding **(1) financial institutions (SIC 6000-6999)** **(2) observations with negative operating and financial liabilities, operating and financial assets and net operating assets** **(3) observations with negative book value of equity** **(4) observations with changes in book value of equity exceeding 200%** (requires lagged book value of equity to be non-missing)	15,140
3	Firm-year observations after deleting **(1) missing values for variables used in the regression** **(2) the top and bottom percentile for each variable used in the regression**	9,747

Table 8, Panel B: Variable Definition

Label	*Variable*	*Measurement*
V_t	= market value of equity at date t	= market capitalization
oa_t	= net operating assets at date t	= (#6 - (#1+#32+#193)) - (#130+#181 - (#9+#34+#130+#206))
fa_t	= net financial assets at date t	= (#1+#32+#193) - (#9+#34+#130+#206)
i_t	= interest rate on debt	= #15 / average(#9+#34+#130+#206)
$E_t\left[ox_{t+1}\right]$	= expected operating earnings	$= F1MD \cdot IBNOSH - i_t \cdot fa_t$
ox_t	= operating earnings at date t	$= F0EPS \cdot IBNOSH - i_t \cdot fa_t$
c_t	= free cash flow at date t	$= ox_t - (oa_t - oa_{t-1})$
$R_t - 1$	= cost of equity capital at date t	= 12%
$E_t\left[\Delta ox_{t+1}\right]$	= expected change in operating earnings	$= ox_{t+1} - (R_t \cdot ox_t - (R_t - 1)c_t)$
$\frac{E_t\left[\Delta oa_{t+1}\right]}{oa_t}$	= expected growth in net operating assets	= LTMD

Table 8, Panel B continued

NOTES: We obtain the following items from COMPUSTAT:

#1 (CHE):	Cash and Short-Term Investments	#32 (IVAO):	Investment and Advances
		#34 (DLC):	Debt in Current Liabilities
#6 (AT):	Assets Total	#130 (PSTK):	Preferred Shares
#9 (DLTT):	Long Term Debt Total	#181 (LT):	Liabilities Total
#15 (XINT):	Interest and Related Expense Total	#193 (IVST):	Short-Tem Investments Total
		#206 (NP):	Notes Payable

We obtain the following items from IBES:

F0EPS = last fiscal year EPS from IBES

F1MD = median EPS estimate from IBES (median forecast of one period ahead earnings per share split adjusted, measured as of the first month after publication of the annual financial report but no later than four months after the fiscal year-end)

LTMD = expected EPS long-term growth from IBES

IBNOSH = number of shares outstanding split adjusted from IBES

We obtain the following items from CRSP:

Market capitalization is measured at the date corresponding to the analyst earnings forecast date – first month after publication of the annual financial report but no later than four months after the fiscal year-end.

Table 8, Panel C1: Descriptive Statistics of the Variables Used in the Estimation

n=9,747	Mean	SD	Min	Q 25%	Median	Q 75%	Max
Market value normalized by net operating assets	3.155	4.699	0.079	0.855	1.645	3.322	53.955
Net financial assets normalized by net operating assets	0.043	0.981	-0.860	-0.457	-0.231	0.142	11.303
Change in operating earnings normalized by net operating assets	0.033	0.102	-0.143	-0.008	0.011	0.039	1.196
Return on net operating assets	0.157	0.155	-0.526	0.086	0.124	0.184	1.352
Growth rate in net operating assets	0.163	0.076	0.026	0.110	0.150	0.200	0.500

Table 8, Panel C2: Estimation Results

	ρ_0	ρ_1	ρ_2	ρ_3	ρ_4
FOM (median parameters)	-0.938	1.539	3.398	13.402	10.073
	(-5.45)	(12.45)	(3.66)	(15.22)	(9.34)

Table 8, Panel C3: Valuation Errors

	Bias		Inaccuracy	
n=9,747	median	mean	median	mean
discount rate 12%				
OM	-0.591	-0.784	0.616	0.958
FOM	-0.030*	0.151	0.347*	0.712
time varying discount rate				
OM	-0.521	-0.624	0.551	0.827
FOM	-0.028*	0.153	0.347*	0.711

NOTES:
Panel C1 reports the descriptive statistics for the variables used to estimate the valuation equation. Panel C2 reports the median of the of the 17 yearly estimates for each regression coefficient of the valuation function for the years 1988-2004 following the Liu/Ohlson (2000) approach. Median t-values are reported in parenthesis and computed on the basis of White-heteroscedasticity-robust standard errors adjusted for intragroup correlation. The R-squared is 70.35%. The coefficients for the Ohlson (1995) model differ with respect to $\rho_0 = -0.608$ and $\rho_4 = 0$. Panel C1 and panel C2 are reported for fix cost of capital (12%) as defined in section 2.3. To compare the models' abilities to estimate market value of equity we employ two error metrics in panel C3: bias and inaccuracy. $Bias = (\hat{V}_{j,t} - V_{j,t}) / V_{j,t}$ is the signed percentage prediction error and $Inaccuracy = |(\hat{V}_{j,t} - V_{j,t}) / V_{j,t}|$ is the absolute percentage prediction error. For the FOM, we compare median bias and inaccuracy against the OM using a nonparametric paired sign test that does not require symmetry of paired differences in the ranks. * denotes that the change in bias/inaccuracy is significant at the 0.01% level.

Table 8, Panel D: Partition According to Market-to-Book and Growth

	Pooled	High conservatism		Low conservatism	
		High Growth	Low Growth	High Growth	Low Growth
discount rate 12%	n=9,744	n=2,606	n=2,270	n=1,649	n=3,219
OM (bias)	-0.532	-0.514	-0.475	-0.535	-0.617
FOM (bias)	-0.054*	-0.010*	-0.097*	0.002*	-0.069*
OM (inac.)	0.555	0.529	0.485	0.578	0.641
FOM (inac.)	0.278*	0.289*	0.239*	0.332*	0.279*
time varying discount rate	n=9,746	n=2,608	n=2,268	n=1,650	n=3,220
OM (bias)	-0.470	-0.471	-0.404	-0.464	-0.543
FOM (bias)	-0.052*	-0.009*	-0.098*	0.005*	-0.069*
OM (inac.)	0.494	0.489	0.419	0.513	0.573
FOM (inac.)	0.278*	0.288*	0.239*	0.334*	0.279*

NOTES:
Panel D reports the median valuation errors of the two models, when the parameters are estimated separately for conservatism/growth partitions. Conservatism is measured as the median market-to-book ratio of the company during the sample period. In order to remain consistent with the estimation of the model, growth is measured as expected EPS long-term growth from IBES. $Bias = (\hat{V}_{j,t} - V_{j,t}) / V_{j,t}$ is the signed percentage prediction error and $Inaccuracy = |(\hat{V}_{j,t} - V_{j,t}) / V_{j,t}|$ is the absolute percentage prediction error. We compare median bias and inaccuracy against the OM using a nonparametric paired sign test that does not require symmetry of paired differences in the ranks. * denotes that the change in bias/inaccuracy is significant at the 0.01% level.

Table 8, Panel E: Delta Regressions

$$Delta_t = \alpha_0 + \alpha_1 ER_t + \alpha_2 ER_t \cdot Growth_t + \alpha_3 Depr_t + \alpha_4 Lev_t + \alpha_5 Growth_t$$
$$+ \alpha_6 MShare_t + \alpha_7 CapIn_t + \alpha_8 AssetTurn_t + \alpha_9 LaborEf_t + \alpha_{10} SpI_t + \varepsilon_t$$

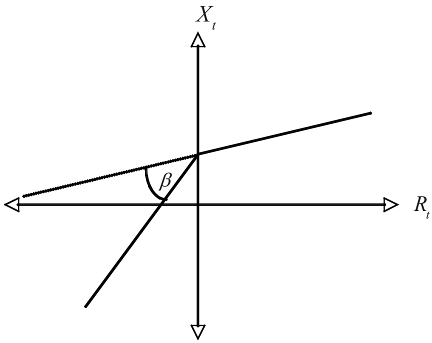
n=4,448	α_0	α_1	α_2	α_3	α_4	α_5	α_6	α_7	α_8	α_9	α_{10}	R^2
FOM	0.528	-0.573	7.478									0.059
	(30.40)	(-3.62)	(7.79)									
FOM	-0.160	-0.642	5.254	-0.005	0.814	2.851	-0.111	0.311	0.185	-0.126	-0.349	0.496
	(-3.87)	(-4.41)	(5.77)	(-0.11)	(19.21)	(11.99)	(-1.61)	(0.92)	(4.29)	(-2.50)	(-1.77)	

NOTES**:**

This table reports the results for different delta regression specifications introduced in section 2.3.2.2. The main idea is to investigate to what extent the conservatism corrections – measured as the valuation difference between the FOM and OM – are empirically explained by proxies for unconditional conservatism. We report one regression without controls and a second regression with controls. Please refer to table 2, panel B for a specification of the variables. Estimations are based on pooled OLS over the period 1988-2004. t-statistics are reported in parentheses and calculated on the basis of White-corrected standard errors adjusted for intragroup correlation. All estimations are based on fix cost of capital (12%) as defined in section 2.3. For each model we report one regression without controls and a second regression with controls.

Tables and Figures: Chapter 3

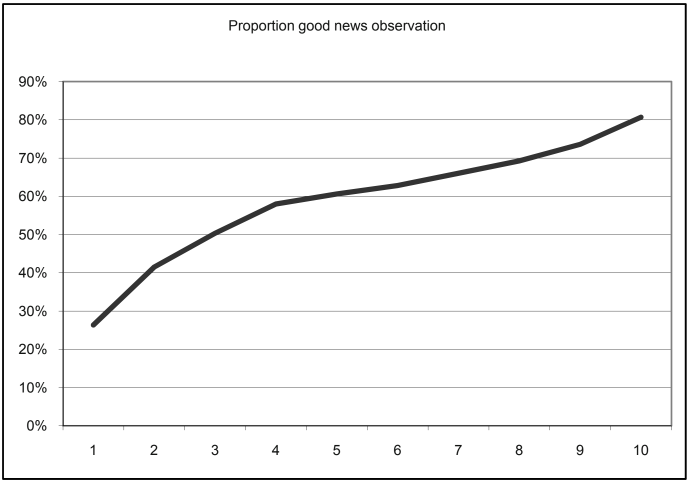
Figure 1: The Asymmetric Timeliness of Earnings (Basu, 1997)



NOTES:

This figure depicts the contemporaneous earnings-returns relation as specified in equation (36). X_t denotes net income in year t, deflated by lagged stock price. R_t is the annual stock return in year t. Bad news are measured as negative stock returns ($R_t < 0$) and good news are measured as positive stock returns ($R_t > 0$). β is the asymmetric timeliness as defined by Basu (1997): the difference between the earnings-return association for good and bad news.

Figure 2: Proportion of Good News for MTB Deciles



NOTES:
This fugure illustrates the proportion of good news (positive returns) in the sample for market-to-book deciles. The lowest MTB decile = 1 and the highest MTB decile = 10.

Table 1, Panel A: Forecast Error Regression

1	Firm-year observations after merging COMPUSTAT/CRSP/IBES 1985-2004	52,776
2	Firm-year observations after deleting the top and bottom percentile for each variable used in the forecast error regression (equation 13)	45,895
3	Firm-year observations after deleting missing values used in the forecast error regression including PRESTK, POSTSTK1 and POSTSTK2	7,223

Table 1, Panel B: Choi/O'Hanlon/Pope (2006) Estimation

1	Firm-year observations after merging COMPUSTAT/CRSP/IBES 1985-2004	52,776	
2	Firm-year observations after excluding (1) negative book value of equity observations (2) observations with changes in book value of equity exceeding 200% (requires lagged book value of equity to be non-missing)	51,586	
3	Firm-year observations after deleting the top and bottom percentile for each variable used in the forecast regression excluding PRESTK, POSTSTK1 and POSTSTK2 (equation 13)	44,715	
4	Number of observations available to calculate the adjusted analyst forecast (equation 12) on the basis of the forecast error regression excluding PRESTK, POSTSTK1 and POSTSTK2 (equation 13)		26,659
5	Firm-year observations after deleting the top and bottom percentile for each variable used in the Choi/O'Hanlon/Pope (2006) model estimation	41,625	
6	Firm-year observations after deleting missing values to obtain value estimates	21,637	

Table 2, Panel A: Variables Used to Estimate the Choi/O'Hanlon/Pope (2006) Model

Label	*Variable*	*Measurement*
V_t	= market value of equity in t	= market capitalization
$R_t - 1$	= cost of equity capital at date t	= 12%
b_t	= book value of equity at date t	= book value of common equity (#235) $\cdot$ 1000000
x_t	= earnings for period (t–1,t)	= earnings before extraordinary items available for common stockholders (#237) $\cdot$ 1000000
x_t^a	= residual income for period (t–1,t)	= earnings – cost of equity $\cdot$ lagged book value of equity
$E_t\left[\tilde{x}_{t+1}^a\right]$	= expected next year's residual income	= (F1MD $\cdot$ IBNOSH) – cost of equity $\cdot$ book value of equity
v_t	= other information at date t	$= E_t\left[\tilde{x}_{t+1}^a\right] - \left(\omega_{0,t} b_t + \omega_{1,t} x_t^a\right)$

NOTES:
We obtain the following items from COMPUSTAT:
#237 (IBCOM): Earnings before Extraordinary Items Available for Common Stockholders
#235 (CEQL): Book Value of Common Equity

We obtain the following items from IBES:
F1MD = median EPS estimate from IBES (median forecast of one period ahead earnings per share split adjusted, measured as of the first month after publication of the annual financial report but no later than four months after the fiscal year-end)
IBNOSH = number of shares outstanding split adjusted from IBES

We obtain the following items from CRSP:
Market capitalization is measured at the date corresponding to the analyst earnings forecast date – first month after publication of the annual financial report but no later than four months after the fiscal year-end.

Table 2, Panel B: Variables Used to compute Forecast/Valuation Errors and Deltas

Label	*Variable Measurement*
FE	is the difference between the Institutional Brokers Estimate System (IBES) actual earnings and the first analyst forecast issued subsequent to the earnings announcement of the previous year, deflated by stock price one day prior to the initial earnings forecast.
RET	is the buy-and-hold return measured from one day after the first analyst forecast issued after the earnings announcement of the previous year to one day prior to the earnings announcement of the current year.
GOOD	is dummy variable taking the value one if *RET* is nonnegative and zero otherwise.
MNMD	is the difference between the mean and the median IBES actual earnings over the past five years (a minimum of three observations is required), deflated by the stock price at the beginning of the year.
MV	is the natural logarithm of the market value of common equity at the beginning of the year.
AFLLW	is the natural logarithm of the number of analysts issuing forecasts over the period from the day after the earnings announcement of the previous year to the day prior to the earnings announcement of the current year.
DISP	is the forecast dispersion measured as the standard deviation of stock price-deflated analyst forecasts issued over the period from the day after the earnings announcement of the previous year to the day prior to the earnings announcement of the current year.
CV	is the coefficient of variation of the IBES actual earnings over the past five years (a minimum of three observations is required).
INDORA	is (future) industry-adjusted ROA of the following year, measured as the return on assets (income before extraordinary items divided by total assets at the beginning of the following year), minus the median return on assets of all firms in the same year in the same two-digit SIC industry.
CHNI	is the change in IBES actual earnings of the previous year (earnings for year-1 minus earnings for year-2) deflated by the stock price at the beginning of the previous year.
TV	is the natural logarithm of the total trading volume (million shares) over the 12 months prior to the first forecast after the earnings announcement of the previous year.
PRESTK	is net stock issuance, measured as the quarterly sale of common and preferred stock (COMPUSTAT quarterly data item #84) minus the quarterly purchase of common and preferred stock (COMPUSTAT quarterly data item #93) deflated by the market value at the beginning of the quarter, cumulated over the four fiscal quarters ending after the first forecast after the earnings announcement of the previous year.
POSTSTK1	is net stock issuance, measured as the sale of common and preferred stock (COMPUSTAT quarterly data item #84) minus the purchase of common and preferred stock (COMPUSTAT quarterly data item #93) deflated by the market value at the beginning of the quarter, for the first fiscal quarters of the following year.
POSTSTK2	is net stock issuance, measured as the sale of common and preferred stock (COMPUSTAT quarterly data item #84) minus the purchase of common and preferred stock (COMPUSTAT quarterly data item #93) deflated by the market value at the beginning of the quarter, for the second fiscal quarters of the following year.
Delta	= proxy for the conditional conservatism correction $Delta = \hat{V}^{adj} - \hat{V}$ $\hat{V}$ = value estimate of the COPM $\hat{V}^{adj}$ = value estimate of the $COPM^{adj}$

Table 3, Panel A*: *Descriptive Statistics for H1

n=7,223	Mean	SD	Min	Q 25%	Median	Q 75%	Max
FE	-0.025	0.077	-0.699	-0.036	-0.006	0.006	0.223
RET	0.103	0.460	-0.798	-0.198	0.051	0.323	2.300
GOOD	0.558	0.497	0.000	0.000	1.000	1.000	1.000
MNMD	-0.004	0.022	-0.226	-0.007	0.000	0.004	0.076
MV	20.245	1.613	16.451	19.031	20.112	21.322	24.481
AFLLW	4.366	0.717	2.996	3.807	4.317	4.927	5.989
DISP	0.005	0.008	0.000	0.001	0.003	0.006	0.116
CV	0.401	2.000	-14.422	0.189	0.368	0.692	15.269
INDROA	-0.001	0.110	-0.784	-0.029	0.006	0.052	0.287
CHNI	0.005	0.071	-0.400	-0.015	0.008	0.026	0.546
TV	3.463	1.468	-0.822	2.400	3.438	4.511	7.112
PRESTK	0.005	0.084	-0.575	-0.010	0.001	0.007	3.321
POSTSTK1	0.001	0.031	-0.685	0.000	0.000	0.001	0.651
POSTSTK2	0.002	0.037	-0.948	0.000	0.000	0.002	0.838

Table 3, Panel B: Estimation Results for H1

$$FE_t = \alpha_0 + \alpha_1 GOOD_t + \alpha_2 RET_t + \alpha_3 GOOD_t \cdot RET_t$$
$$+ \alpha_4 MNMD_t + \alpha_5 MV_t + \alpha_6 AFLLW_t + \alpha_7 DISP_t + \alpha_8 CV_t + \alpha_9 INDROA_t + \alpha_{10} CHNI_t + \alpha_{11} TV_t$$
$$+ \alpha_{12} PRESTK_t + \alpha_{13} POSTSTK1_t + \alpha_{14} POSTSTK2_t + \varepsilon_t.$$

N=7,223	Coefficent	t-value
INTERCEPT	-0.1229	-7.23 ***
GOOD	-0.0041	-1.65 ***
RET	0.0768	9.11 ***
GOOD*RET	**-0.0494**	**-5.36** ***
MNMD	0.9415	10.46 ***
MV	0.0069	6.96 ***
AFLLW	0.0024	1.22
DISP	-2.4869	-9.86 ***
CV	0.0006	1.06
INDROA	0.0403	3.80 ***
CHNI	0.0240	1.28
TV	-0.0089	-8.83 ***
PRESTK	-0.0369	-1.46
POSTSTK1	-0.0049	-0.15
POSTSTK2	-0.0370	-1.42
R^2	32.71%	

NOTES:

Panel A reports descriptive statistics of the variables used in the forecast error regression (equation 13). For a detailed variable definition refer to table 2, panel B.

Panel B reports the estimates for each regression coefficient in the forecast error regression. The association between analyst earnings forecast errors and positive returns α_3 is displayed in bold figures. For a detailed variable definition refer to table 2, panel B. The estimation is based on pooled OLS over the period 1987-2004. t-statistics are calculated on the basis of White-corrected standard errors adjusted for intragroup correlation. *** indicate significance at the 1% level, ** indicate significance at the 5% level and * indicates significance at the 10% level.

Table 4, Panel A**:** ***Descriptive Statistics for H2***

	n	Mean	SD	Min	Q 25%	Median	Q 75%	Max
residual income	24,896	-0.009	0.137	-0.726	-0.058	0.007	0.062	0.450
Joint parameter estimation								
other information (COPM)	17,839	0.030	0.052	-0.158	0.002	0.022	0.052	0.280
other information ($COPM^{adj}$)	17,839	0.020	0.050	-0.179	-0.006	0.013	0.041	0.267
Separate parameter estimation								
other information (COPM)	17,846	0.024	0.046	-0.171	0.000	0.019	0.044	0.249
other information ($COPM^{adj}$)	17,846	0.014	0.047	-0.194	-0.010	0.011	0.036	0.235

Table 4, Panel B: ***Estimation Results for H2***

	LIM 1		LIM 2		Valuation multiples			
	ω_0	ω_1	γ_0	γ_1	β_1	β_2	β_3	β_4
Joint parameter estimation								
COPM	-0.002	0.657	0.017	0.436	1.422	3.538	-0.099	0.994
	(-2.26)	(39.99)	(24.46)	(24.63)				
$COPM^{adj}$	-0.002	0.657	0.013	0.398	1.422	3.350	-0.099	0.702
	(-2.26)	(39.99)	(21.77)	(22.29)				
Separate parameter estimation								
COPM	0.003	0.528	0.015	0.296	0.893	2.274	0.055	0.682
	(0.58)	(11.30)	(9.12)	(6.29)				
$COPM^{adj}$	0.003	0.528	0.007	0.274	0.893	2.238	0.055	0.436
	(0.58)	(11.30)	(5.06)	(6.33)				

Table 4, Panel C*: *Valuation Errors for H2

n=21,637	Bias		Inaccuracy	
	median	mean	median	mean
Joint parameter estimation				
COPM	0.009	0.128	0.337	0.451
$COPM^{adj}$	-0.143	-0.045	0.332	0.400
Separate parameter estimation				
COPM	-0.038	-0.010	0.195	0.353
$COPM^{adj}$	-0.191	-0.193	0.239	0.324

NOTES:

Panel A reports descriptive statistics for the variables used to estimate the LIM of the COPM. For a detailed variable definition refer to table 2. All items are scaled by lagged book value of equity. The cost of capital equal 12%.

Panel B: We employ two different procedures to estimate the COPM and the COPMadj: (1) a joint parameter estimation as suggested by Choi/O'Hanlon/Pope (2006) and (2) a separate parameter estimation for different market-to-book deciles as suggested by Henschke/Homburg/Nasev (2007). This panel reports the median of the 17 yearly estimates for each regression coefficient in the LIM and each valuation coefficient for the years 1988-2004. Median t-values are reported in parenthesis and are computed on the basis of White-heteroscedasticity-robust standard errors adjusted for intragroup correlation. The estimated median growth parameter in the COPM is $G = 1.067$. The cost of capital equal 12%.

Panel C: To compare the models' abilities to estimate market value of equity we employ two error metrics: bias and inaccuracy. $Bias = (\hat{V} - V)/V$ is the signed percentage prediction error and $Inaccuracy = \left|(\hat{V} - V)/V\right|$ is the absolute percentage prediction error.

Table 5, Panel A: *Descriptive Statistics for H3.1*

					Return			COPM		COPM^{adj}		
MTB Decile	MTB ratio (median)	n	% of GN	x_t^a	all	good	bad	$f_t^{a,t+1}$	v_t	$f_t^{a,t+1}$	v_t	Δf
1 (lowest)	0.739	1,779	26.36%	-0.062	-18.70%	15.50%	-28.40%	-0.051	0.058	-0.057	0.052	0.006
2	1.055	2,206	41.52%	-0.032	-5.80%	16.70%	-20.20%	-0.021	0.034	-0.027	0.029	0.006
3	1.303	2,280	50.35%	-0.012	0.00%	17.80%	-18.20%	-0.003	0.021	-0.009	0.016	0.006
4	1.525	2,257	58.00%	-0.001	5.00%	18.90%	-16.80%	0.007	0.015	0.001	0.008	0.006
5	1.762	2,286	60.63%	0.010	7.20%	21.40%	-16.80%	0.018	0.017	0.012	0.009	0.006
6	2.050	2,201	62.84%	0.021	9.20%	22.70%	-15.90%	0.032	0.016	0.024	0.008	0.008
7	2.418	2,250	66.04%	0.037	12.20%	26.60%	-14.70%	0.048	0.005	0.039	-0.006	0.009
8	2.919	2,219	69.27%	0.051	14.60%	27.50%	-15.60%	0.070	0.015	0.059	0.003	0.011
9	3.740	2,155	73.60%	0.079	18.00%	29.20%	-15.10%	0.102	0.015	0.087	0.001	0.015
10 (highest)	5.713	2,004	80.69%	0.123	30.50%	41.10%	-14.00%	0.157	0.010	0.135	-0.011	0.022

Table 5, Panel B: *Estimation Results for H3.1*

	LIM 1		LIM 2				Valuation multiples					
			COPM		COPM^{adj}				COPM		COPM^{adj}	
MTB Decile	ω_0	ω_1	γ_0	γ_1	γ_0	γ_1	β_1	β_3	β_2	β_4	β_2	β_4
1 (lowest)	-0.073	0.475	0.058	0.187	0.056	0.160	0.729	-1.269	1.923	1.062	1.880	0.989
2	-0.036	0.496	0.026	0.229	0.023	0.227	0.813	-0.794	2.047	0.604	2.030	0.527
3	-0.020	0.509	0.017	0.249	0.013	0.238	0.849	-0.581	2.103	0.588	2.100	0.440
4	-0.006	0.481	0.009	0.322	0.005	0.314	0.769	-0.183	2.217	0.298	2.193	0.182
5	-0.002	0.480	0.015	0.320	0.011	0.286	0.782	-0.110	2.162	0.658	2.122	0.454
6	0.002	0.653	0.014	0.280	0.009	0.272	1.356	0.094	2.804	0.721	2.807	0.454
7	0.026	0.527	-0.006	0.311	-0.012	0.295	0.889	1.958	2.332	-0.499	2.263	-1.304
8	0.022	0.588	0.015	0.247	0.006	0.261	1.105	1.636	2.424	1.519	2.472	0.613
9	0.025	0.691	0.016	0.338	0.006	0.334	1.625	2.193	3.358	1.986	3.306	0.743
10 (highest)	0.043	0.767	0.014	0.363	-0.001	0.331	2.174	5.633	4.195	2.250	4.029	-0.300

Table 5, Panel C: ***Valuation Errors for H3.1***

			Bias						Inaccuracy			
			Mean			Median			Mean		Median	
MTB Decile	% of GN	n	COPM	$COPM^{adj}$	$\|Delta\|$	COPM	$COPM^{adj}$	$\|Delta\|$	COPM	$COPM^{adj}$	COPM	$COPM^{adj}$
1 (lowest)	26.36%	1,779	0.335	0.191	0.144	0.223	0.095	0.129	0.367	0.277	0.233	0.156
2	41.52%	2,206	-0.139	-0.234	0.096	-0.143	-0.237	0.094	0.157	0.239	0.147	0.237
3	50.35%	2,280	-0.154	-0.280	0.126	-0.183	-0.299	0.120	0.195	0.287	0.194	0.299
4	58.00%	2,257	-0.234	-0.325	0.091	-0.247	-0.330	0.088	0.239	0.326	0.247	0.330
5	60.63%	2,286	-0.035	-0.167	0.132	-0.090	-0.210	0.130	0.155	0.229	0.119	0.226
6	62.84%	2,201	-0.068	-0.235	0.167	-0.066	-0.232	0.172	0.095	0.236	0.079	0.233
7	66.04%	2,250	-0.754	-0.906	0.152	0.015	-0.266	0.281	1.023	0.956	0.147	0.273
8	69.27%	2,219	0.421	0.138	0.282	0.423	0.123	0.305	0.425	0.189	0.423	0.147
9	73.60%	2,155	0.296	0.019	0.277	0.334	0.024	0.309	0.345	0.167	0.338	0.153
10 (highest)	80.69%	2,004	0.364	-0.024	0.388	0.330	-0.037	0.394	0.552	0.309	0.461	0.304

NOTES:

Panel A reports median values of variables for the adjusted and unadjusted Choi/O'Hanlon/Pope (2006) model. (% of GN) is the proportion of good news (i. e. Ret>0) per market-to-book decile. Δf is the difference between the analyst forecast of the unadjusted and adjusted Choi/O'Hanlon/Pope (2006) model. For a detailed variable definition refer to table 2.

Panel B reports the median of the 17 yearly estimates of the LIM parameters and valuation coefficients of the adjusted and unadjusted Choi/O'Hanlon/Pope (2006) model for the years 1988-2004 seperately for each MTB decile.

Panel C reports the median valuation errors when the adjusted and unadjusted Choi/O'Hanlon/Pope (2006) model are estimated according to MTB deciles.

Table 6, Panel A: Descriptive Statistics for H3.2a and H3.2b

	Mean	SD	Min	Q 25%	Median	Q 75%	Max
Joint parameter estimation (n=21,673)							
Error	0.128	0.654	-1.149	-0.305	0.009	0.386	8.682
$Error^{adj}$	-0.045	0.549	-1.292	-0.408	-0.143	0.180	7.595
Delta	-0.172	0.120	-1.720	-0.213	-0.143	-0.095	-0.005
Separate parameter estimation							
including MTB Decile 7 (n=21,637)							
Error	-0.010	1.222	-18.664	-0.175	-0.038	0.270	4.191
$Error^{adj}$	-0.193	1.022	-15.973	-0.305	-0.191	0.026	3.792
Delta	-0.184	0.223	-0.922	-0.271	-0.143	-0.109	2.691
excluding MTB Decile 7 (n=19,387)							
Error	0.076	0.378	-1.248	-0.180	-0.045	0.285	4.191
$Error^{adj}$	-0.111	0.284	-1.411	-0.297	-0.181	0.040	3.792
Delta	-0.187	0.130	-0.922	-0.221	-0.136	-0.106	0.013
Delta MTB Decile specific							
1 (lowest)	-0.144	0.053	-0.490	-0.166	-0.129	-0.108	-0.067
2	-0.096	0.028	-0.278	-0.117	-0.094	-0.071	-0.028
3	-0.126	0.029	-0.390	-0.134	-0.120	-0.108	-0.077
4	-0.091	0.021	-0.240	-0.106	-0.088	-0.073	-0.026
5	-0.132	0.043	-0.394	-0.140	-0.130	-0.109	-0.058
6	-0.167	0.037	-0.366	-0.193	-0.172	-0.133	-0.086
7	**-0.152**	**0.577**	**-0.563**	**-0.335**	**-0.281**	**-0.228**	**2.691**
8	-0.282	0.070	-0.408	-0.336	-0.305	-0.231	-0.136
9	-0.277	0.107	-0.547	-0.364	-0.309	-0.167	-0.082
10 (highest)	-0.388	0.222	-0.922	-0.576	-0.394	-0.195	0.013

NOTES:
Table 6, Panel A reports descriptive statistics for the left hand variables used in the regressions of Panel B. Delta is the difference between the value estimate of the COPM without adjustment $\hat{V}$ and the value estimate of the COPM with adjustment $\hat{V}^{adj}$. $Error = (\hat{V} - V) / V$ and $Error^{adj} = (\hat{V}^{adj} - V) / V$ are relative valuation errors (bias) of the COPM without and with adjustment, respectively. We also report descriptive statistics of the $Delta$ variable to highlight the valuation problems in MTB decile 7.

Table 6, Panel B*: *Estimation Results for H3.2a and H3.2b

$$Error_t = \alpha_0 + \alpha_1 GOOD_t + \alpha_2 RET_t + \alpha_3 GOOD_t \cdot RET_t + \sum_j \alpha_j Controls_{tj} + \varepsilon_t$$

$$Error_t^{adj} = \alpha_0^{adj} + \alpha_1^{adj} GOOD_t + \alpha_2^{adj} RET_t + \alpha_3^{adj} GOOD_t \cdot RET_t + \sum_j \alpha_j^{adj} Controls_{tj} + \varepsilon_t$$

$$Delta_t = \alpha_0 + \alpha_1 GOOD_t + \alpha_2 RET_t + \alpha_3 GOOD_t \cdot RET_t + \sum_j \alpha_j Controls_{tj} + \varepsilon_t$$

	INTERCEPT	GOOD	RET	**GOOD*RET**
Joint parameter estimation				
Error	1.065	-0.027	-0.940	**0.593**
	7.02 ***	-1.99 **	-15.08 ***	**9.11** ***
$Error^{adj}$	0.606	-0.027	-0.742	**0.449**
	4.70 ***	-2.39 **	-14.39 ***	**8.32** ***
Delta	-0.459	0.000	0.198	**-0.144**
	-17.94 ***	0.00	16.84 ***	**-11.80** ***
Separate parameter estimation including MTB Decile 7				
Error	0.017	-0.031	-0.015	**0.032**
	0.08	-1.51	-0.31	**0.53**
$Error^{adj}$	-0.195	-0.032	-0.053	**0.022**
	-1.10	-1.89 *	-1.28	**0.44**
Delta	-0.211	-0.001	-0.038	**-0.010**
	-4.93 ***	-0.33	-3.54 ***	**-0.76**
Separate parameter estimation excluding MTB Decile 7				
Error	-0.024	0.027	-0.106	**0.189**
	-0.25	3.01 ***	-3.27 ***	**5.21** ***
$Error^{adj}$	-0.213	0.019	-0.126	**0.148**
	-3.14	2.77 ***	-4.71 ***	**5.10** ***
Delta	-0.190	-0.008	-0.020	**-0.041**
	-5.80 ***	-2.83 **	-2.26	**-3.84** ***

Table 6, Panel B continued

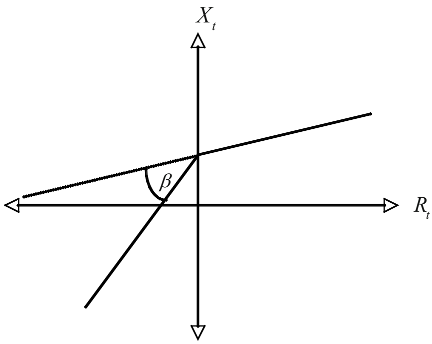
	MNMD	MV	AFLLW	DISP	CV	INDROA	CHNI	TV
Joint parameter estimation								
Error	-1.922	-0.040	-0.018	23.496	0.021	-0.990	-0.223	-0.051
	-3.18 ***	-4.33 ***	-1.23	11.67 ***	4.93 ***	-8.51 ***	-2.36 **	-6.75 ***
$Error^{adj}$	-1.545	-0.031	0.017	20.994	0.018	-0.792	-0.098	-0.062
	-3.05 ***	-3.93 ***	1.35	11.87 ***	5.09 ***	-8.04 ***	-1.25	-9.68 ***
Delta	0.377	0.009	0.035	-2.503	-0.003	0.198	0.124	-0.011
	3.44 ***	5.87 ***	13.97 ***	-8.55 ***	-3.61 ***	10.35 ***	7.06 ***	-8.50 ***
Separate parameter estimation including MTB Decile 7								
Error	-0.393	0.017	-0.146	0.019	0.003	0.724	-0.016	0.094
	-0.70	1.29	-6.53 ***	0.01	0.85	4.71 ***	-0.14	8.22 ***
$Error^{adj}$	-0.406	0.011	-0.086	2.667	0.005	0.448	0.017	0.051
	-0.85	1.07	-4.65 ***	1.93 *	1.62	3.50 ***	0.17	5.35 ***
Delta	-0.013	-0.005	0.060	2.649	0.002	-0.276	0.033	-0.043
	-0.12	-2.00 **	13.73 ***	7.94 ***	1.72 *	-8.83 ***	1.49	-19.23 ***
Separate parameter estimation excluding MTB Decile 7								
Error	0.041	0.002	-0.023	0.616	0.002	0.936	0.136	0.038
	0.14	0.31	-2.61 ***	0.72	0.98	15.16 ***	2.79 ***	7.9 ***
$Error^{adj}$	-0.025	-0.001	0.017	2.941	0.004	0.610	0.150	0.003
	-0.10	-0.29	2.55 **	3.90 ***	2.21 **	13.87 ***	3.80 ***	0.91
Delta	-0.066	-0.003	0.040	2.325	0.002	-0.326	0.014	-0.034
	-0.94	-1.49	13.16 ***	9.15 ***	1.89 *	-13.20 ***	0.95	-20.73 ***

NOTES:

Panel B reports the estimates for each regression coefficient in (1) the forecast error regression and (2) the error regressions. The association between the errors ($Delta$ respectively) and positive returns α_3 is displayed in bold figures. For a detailed variable definition refer to table 2, panel B. The estimation is based on pooled OLS over the period 1988-2004. t-statistics are calculated on the basis of White-corrected standard errors adjusted for intragroup correlation. *** indicate significance at the 1% level, ** indicate significance at the 5% level and * indicates significance at the 10% level.

Tables and Figures: Chapter 4

Figure 1: Asymmetric Timeliness of Earnings



NOTES:

X_t denotes earnings, R_t denotes stock returns, β is the angle capturing the asymmetric timeliness of earnings with regard to good ($R_t > 0$) vs. bad ($R_t < 0$) news.

Figure 2: Cost Stickiness

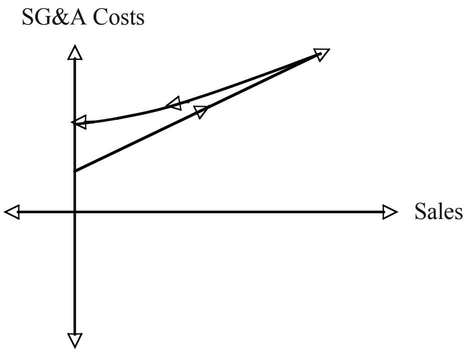
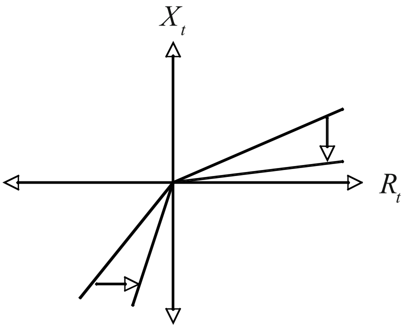


Figure 3: The Impact of Cost Stickiness on the Earnings-Returns Relationship



NOTES:

X_t denotes earnings, R_t denotes stock returns, good news are measured as $R_t > 0$ and bad news as $R_t < 0$. We hypothesize that the contemporaneous earnings-return association should be lower for good news sticky firms and higher for bad news sticky firms.

Table 1: Descriptive Statistics

PANEL A: All Firm-Years

Variable	Mean	Std. Dev.	Q1	Median	Q3	Min.	Max.
Return	0.083	0.334	-0.175	0.048	0.302	-0.492	0.975
Net Income	0.012	0.149	-0.011	0.048	0.083	-1.735	0.478
Net Cash Flow	0.099	0.160	0.021	0.088	0.166	-0.660	1.368
Accruals	-0.087	0.182	-0.131	-0.050	-0.005	-2.406	0.928
Market Value	2,300	12,000	35.7	160	855	0.026	508,000
SG&A Ratio	-0.003	0.085	-0.013	0	0.013	-1.207	0.902
CS	0.010	0.042	0	0	0	0.000	0.902

PANEL B: Positive-Return Firm-Years

Variable	Mean	Std. Dev.	Q1	Median	Q3	Min.	Max.
Return	0.322	0.239	0.125	0.269	0.477	0	0.975
Net Income	0.036	0.131	0.020	0.061	0.094	-1.599	0.467
Net Cash Flow	0.118	0.158	0.042	0.104	0.183	-0.635	1.368
Accruals	-0.081	0.171	-0.126	-0.050	-0.006	-2.406	0.928
Market Value	2,800	13,000	53	250	1,200	26,000	510,000
SG&A Ratio	-0.006	0.074	-0.014	-0.002	0.009	-1.205	0.862
CS	0.007	0.035	0	0	0	0.000	0.862

PANEL C: Negative-Return Firm-Years

Variable	Mean	Std. Dev.	Q1	Median	Q3	Min.	Max.
Return	-0.215	0.137	-0.327	-0.203	-0.096	-0.492	0
Net Income	-0.018	0.163	-0.052	0.028	0.066	-1.735	0.478
Net Cash Flow	0.076	0.159	-0.002	0.068	0.142	-0.660	1.263
Accruals	-0.094	0.196	-0.140	-0.049	-0.003	-2.288	0.792
Market Value	1,700	10,000	24	94	490	0.180	480,000
SG&A Ratio	0.002	0.096	-0.012	0.002	0.019	-1.207	0.902
CS	0.014	0.050	0	0	0	0.000	0.902

NOTES:

Sample: Our final sample comprises 44,361 firm-year observations from 1988 to 2004. See section 4.4 for the sample selection procedure. Around 20% (8,644) of all firm-year observations exhibit cost stickiness.

Variables: Returns are annual stock returns obtained by compounding monthly CRSP returns from nine months before to three months after fiscal year end. Net income is COMPUSTAT item 172, operating cash flow is COMPUSTAT item 308, and accruals are calculated as the difference between net income and operating cash flow. Net income, operating cash flow and accruals are deflated by the lagged market value of equity, which is computed as the product of lagged fiscal year price (COMPUSTAT item 199) and the number of common shares outstanding (COMPUSTAT item 25). Market value of equity is reported in million Dollars. The SG&A ratio is defined as:

$SG\&A\_RATIO_t = SG\&A_t / SALES_t - SG\&A_{t-1} / SALES_{t-1}$. We measure cost stickiness (CS) as the SG&A ratio conditional on decreasing sales and conditional on SG&A costs falling under proportionately compared to sales, see (60).

Table 2: Pearson and Spearman Correlation Coefficients

PANEL A: All Firm-Years

	Return	Net Income	Net Cash Flow	Accruals	Market Value	SG&A Ratio	CS
Return	1.0000	0.1873 (0.000)	0.1320 (0.000)	0.0372 (0.000)	0.0417 (0.000)	-0.0012 (0.806)	-0.0933 (0.000)
Net Income	0.2769 (0.000)	1.0000	0.3035 (0.000)	0.5503 (0.000)	0.0427 (0.000)	0.0139 (0.003)	-0.2289 (0.000)
Net Cash Flow	0.1607 (0.000)	0.4012 (0.000)	1.0000	-0.6285 (0.000)	0.0118 (0.007)	0.0179 (0.000)	-0.1314 (0.000)
Accruals	0.0327 (0.000)	0.2779 (0.000)	-0.6439 (0.000)	1.0000	0.0245 (0.000)	-0.0041 (0.389)	-0.0714 (0.000)
Market Value	0.1919 (0.000)	0.1735 (0.000)	0.1138 (0.000)	0.0772 (0.000)	1.0000	0.0027 (0.568)	-0.0291 (0.000)
SG&A Ratio	-0.1243 (0.000)	-0.1260 (0.000)	-0.0358 (0.000)	-0.0629 (0.000)	-0.0051 (0.276)	1.0000	0.0089 (0.059)
CS	-0.1422 (0.000)	-0.2542 (0.000)	-0.0487 (0.000)	-0.1685 (0.000)	-0.1410 (0.000)	0.5326 (0.000)	1.0000

PANEL B: Positiv-Return Firm-Years

	Return	Net Income	Net Cash Flow	Accruals	Market Value	SG&A Ratio	CS
Return	1.0000	0.0189 (0.001)	0.0195 (0.001)	-0.0036 (0.539)	-0.0093 (0.109)	-0.0013 (0.835)	-0.0238 (0.000)
Net Income	0.0873 (0.000)	1.0000	0.3163 (0.000)	0.4750 (0.000)	0.0255 (0.000)	0.0165 (0.010)	-0.2245 (0.000)
Net Cash Flow	0.0264 (0.000)	0.4023 (0.000)	1.0000	-0.6846 (0.000)	-0.0028 (0.631)	0.0167 (0.009)	-0.1187 (0.000)
Accruals	0.0135 (0.034)	0.2045 (0.000)	-0.7009 (0.000)	1.0000	0.0222 (0.000)	-0.0028 (0.666)	-0.0606 (0.000)
Market Value	0.0007 (0.917)	0.0339 (0.000)	0.0461 (0.000)	0.0442 (0.000)	1.0000	0.0025 (0.698)	-0.0248 (0.000)
SG&A Ratio	-0.0842 (0.000)	-0.0818 (0.000)	-0.0024 (0.705)	-0.0573 (0.000)	0.0519 (0.000)	1.0000	0.0059 (0.356)
CS	-0.0688 (0.000)	-0.2102 (0.000)	-0.0222 (0.001)	-0.1506 (0.000)	-0.0998 (0.000)	0.4871 (0.000)	1.0000

PANEL C: Negative-Return Firm-Years

	Return	Net Income	Net Cash Flow	Accruals	Market Value	SG&A Ratio	CS
Return	1.0000	0.1703 (0.000)	0.1088 (0.000)	0.0538 (0.000)	0.0520 (0.000)	0.0024 (0.732)	-0.0766 (0.000)
Net Income	0.2099 (0.000)	1.0000	0.2604 (0.000)	0.6227 (0.000)	0.0484 (0.000)	0.0159 (0.023)	-0.2148 (0.000)
Net Cash Flow	0.1216 (0.000)	0.3615 (0.000)	1.0000	-0.5933 (0.000)	0.0192 (0.003)	0.0282 (0.000)	-0.1295 (0.000)
Accruals	0.0427 (0.000)	0.3717 (0.000)	-0.6017 (0.000)	1.0000	0.0249 (0.000)	-0.0090 (0.202)	-0.0746 (0.000)
Market Value	0.1546 (0.000)	0.2450 (0.000)	0.1358 (0.000)	0.1098 (0.000)	1.0000	0.0042 (0.551)	-0.0283 (0.000)
SG&A Ratio	-0.0602 (0.000)	-0.1349 (0.000)	-0.0466 (0.000)	-0.0652 (0.000)	-0.0275 (0.000)	1.0000	0.0200 (0.004)
CS	-0.0756 (0.000)	-0.2568 (0.000)	-0.0401 (0.000)	-0.1837 (0.000)	-0.1437 (0.000)	0.5661 (0.000)	1.0000

Table 2 continued

NOTES:
Pearson (Spearman) correlation coefficients are above (below) the diagonal, and p-values are in parentheses.

Sample: The sample comprises 44,361 firm-year observations from 1988 to 2004. See section 4.4 for the sample selection procedure. Around 20% (8,644) of all firm-year observations exhibit cost stickiness.

Variables: Returns are annual stock returns obtained by compounding monthly CRSP returns from nine months before to three months after fiscal year end. Net income is COMPUSTAT item 172, operating cash flow is COMPUSTAT item 308, and accruals are calculated as the difference between net income and operating cash flow. Net income, operating cash flow and accruals are deflated by the lagged market value of equity, which is computed as the product of lagged fiscal year price (COMPUSTAT item 199) and the number of common shares outstanding (COMPUSTAT item 25). Market value of equity is reported in million Dollars. The SG&A ratio is defined: $SG\&A\_RATIO_t = SG\&A_t / SALES_t - SG\&A_{t-1} / SALES_{t-1}$. We measure cost stickiness (CS) as the SG&A ratio conditional on decreasing sales and conditional on SG&A costs falling under proportionately compared to sales, see (60).

Table 3: Asymmetric Timeliness of Net Income, Accruals and Operating Cash Flows

$$X_{it} = \alpha_1^{BASU} + \alpha_2^{BASU} D_{it}^R + \beta_1^{BASU} R_{it} + \beta_2^{BASU} D_{it}^R \cdot R_{it} + \varepsilon_{it}$$

	α_1	α_2	β_1	β_2	R^2
Net Income	0.030	-0.008	0.022	0.194	0.067
	(6.49)	(-2.88)	(3.18)	(10.64)	
Accruals	-0.083	0.005	0.002	0.088	0.006
	(-14.04)	(1.89)	(0.25)	(3.72)	
Operating Cash Flow	0.113	-0.013	0.020	0.106	0.035
	(21.54)	(-3.84)	(2.21)	(5.05)	

NOTES:

Sample: The sample comprises 44,361 firm-year observations from 1988 to 2004. See section 4.4 for the sample selection procedure.

Estimation: We estimate the Basu (1997) regression model (58) by running annual cross-sectional Fama/MacBeth regressions for the 17 years from 1988 to 2004; the coefficients are time-series averages of the estimated annual coefficients; R^2 is the average of the regressions'; t-statistics are presented in parentheses and computed from the ratio of the average estimated annual coefficients to the standard deviation of the distribution of the estimated annual coefficients divided by the square root of the number of years.

Variables: X_{it} denotes net income (COMPUSTAT item 172) or operating cash flow (COMPUSTAT item 308) or accruals (calculated as the difference between net income and operating cash flow) for firm i in year t, deflated by the product of lagged fiscal year price (COMPUSTAT item 199) and the number of common shares outstanding (COMPUSTAT item 25). R_{it} is the annual stock return for firm i in year t obtained by compounding monthly CRSP returns from nine months before to three months after fiscal year end. D_{it}^R is a dummy variable that is one for bad news measured as negative stock returns ($R_{it} < 0$) and zero otherwise.

Table 4: Cost Stickiness Partitions

PANEL A: Asymmetric Timeliness Regressions for the Cost Stickiness Partition

$$X_{it} = \alpha_1^{CS} + \alpha_2^{CS} D_{it}^R + \beta_1^{CS} R_{it} + \beta_2^{CS} D_{it}^R \cdot R_{it} + \varepsilon_{it}, \quad if\ CS_{it} \neq 0$$

	α_1	α_2	β_1	β_2	R^2
Net Income	-0.013	-0.011	-0.021	0.256	0.054
	(-2.33)	(-1.94)	(-1.60)	(5.86)	
Accruals	-0.120	0.000	-0.039	0.173	0.013
	(-19.47)	(0.09)	(-1.66)	(3.83)	
Operating Cash Flow	0.107	-0.011	0.018	0.083	0.030
	(16.86)	(-1.66)	(0.91)	(2.80)	

PANEL B: Asymmetric Timeliness Regressions for the Remaining Partition

$$X_{it} = \alpha_1^{OTHER} + \alpha_2^{OTHER} D_{it}^R + \beta_1^{OTHER} R_{it} + \beta_2^{OTHER} D_{it}^R \cdot R_{it} + \varepsilon_{it}, \quad if\ CS_{it} = 0$$

	α_1	α_2	β_1	β_2	R^2
Net Income	0.037	-0.004	0.032	0.136	0.055
	(8.63)	(-1.32)	(5.42)	(10.50)	
Accruals	-0.072	0.009	0.004	0.067	0.005
	(-11.23)	(2.77)	(0.71)	(3.10)	
Operating Cash Flow	0.109	-0.013	0.027	0.069	0.030
	(20.31)	(-3.88)	(3.75)	(3.13)	

NOTES:

Sample: We partition our sample into sticky cost firms and "other" firms. The latter comprise anti-sticky and non-sticky firms. For anti-sticky firms sales fall, however, in contrast to sticky-firms, where the SG&A ratio increases, the SG&A ratio for anti-sticky firms declines. Non-sticky firms are those for which sales increase. The full sample comprises 44,361 firm-years, the sticky cost partition comprises 8,644 firm-years and the partition containing the "other" firms comprises 35,717 firm-years.

Estimation: We estimate the Basu (1997) regression model separately for both partitions (61) and (62) by running annual cross-sectional Fama/MacBeth regressions for the 17 years from 1988 to 2004; the coefficients are time-series averages of the estimated annual coefficients; R2 is the average of the regressions'; t-statistics are presented in parentheses and computed from the ratio of the average estimated annual coefficients to the standard deviation of the distribution of the estimated annual coefficients divided by the square root of the number of years.

Variables: X_{it} denotes net income (COMPUSTAT items 172) or operating cash flow (COMPUSTAT item 308) or accruals (calculated as the difference between net income and operating cash flow) for firm i in year t, deflated by the product of lagged fiscal year price (COMPUSTAT item 199) and the number of common shares outstanding (COMPUSTAT item 25). R_{it} is the annual stock return for firm i in year t obtained by compounding monthly CRSP returns from nine months before to three months after fiscal year end. D_{it}^R is a dummy variable that is one for bad news measured as negative stock returns ($R_{it} < 0$) and zero otherwise. We measure cost stickiness (CS_{it}) as the SG&A ratio conditional on decreasing sales and conditional on SG&A costs falling under proportionately compared to sales, see (60).

Table 5: Cost Stickiness Dummies

$$X_{it} = \alpha_1 + \alpha_2 D_{it}^{R} + \alpha_3 D_{it}^{CS} + \alpha_4 D_{it}^{R} \cdot D_{it}^{CS} + \beta_1 R_{it} + \beta_2 D_{it}^{R} \cdot R_{it} + \gamma_1 D_{it}^{CS} \cdot R_{it} + \gamma_2 D_{it}^{R} \cdot D_{it}^{CS} \cdot R_{it} + \varepsilon_{it}$$

	α_1	α_2	α_3	α_4	β_1	β_2	γ_1	γ_2	R^2
Net Income	0.037	-0.004	-0.050	-0.007	0.032	0.136	-0.0529	0.12031	0.1
	(8.63)	(-1.32)	(-11.05)	(-1.03)	5.42	(10.50)	(-4.62)	(3.22)	
Accruals	-0.072	0.009	-0.048	-0.009	0.004	0.067	-0.04332	0.10578	0.029
	(-11.23)	(2.77)	(-8.66)	(-1.60)	(0.71)	(3.10)	(-2.01)	(2.79)	
Operating Cash Flow	0.109	-0.013	-0.002	0.001	0.027	0.069	-0.00958	0.01454	0.032
	(20.31)	(-3.88)	(-0.54)	(0.21)	(3.75)	(3.13)	(-0.56)	(0.51)	

NOTES:

Sample: We partition our sample into sticky cost firms and "other" firms. The latter comprise anti-sticky and non-sticky firms. For anti-sticky firms sales fall, however, in contrast to sticky-firms, where the SG&A ratio increases, the SG&A ratio for anti-sticky firms declines. Non-sticky firms are those for which sales increase. The full sample comprises 44,361 firm-years, the sticky cost partition comprises 8,644 firm-years and the partition containing the "other" firms comprises 35,717 firm-years.

Estimation: We estimate the Basu (1997) regression model separately for both partitions (61) and (62) by running annual cross-sectional Fama/MacBeth regressions for the 17 years from 1988 to 2004; the coefficients are time-series averages of the estimated annual coefficients; R2 is the average of the regressions'; t-statistics are presented in parentheses and computed from the ratio of the average estimated annual coefficients to the standard deviation of the distribution of the estimated annual coefficients divided by the square root of the number of years.

Variables: X_{it} denotes net income (COMPUSTAT item 172) or operating cash flow (COMPUSTAT item 308) or accruals (calculated as the difference between net income and operating cash flow) for firm i in year t, deflated by the product of lagged fiscal year price (COMPUSTAT item 199) and the number of common shares outstanding (COMPUSTAT item 25). R_{it} is the annual stock return for firm i in year t obtained by compounding monthly CRSP returns from nine months before to three months after fiscal year end. D_{it}^{R} is a dummy variable that is one for bad news measured as negative stock returns ($R_{it} < 0$) and zero otherwise. We measure cost stickiness (CS_{it}) as the SG&A ratio conditional on decreasing sales and conditional on SG&A costs falling under proportionately compared to sales, see (60).