



Can analysts assess fundamental risk and valuation uncertainty? An empirical analysis of scenario-based value estimates[☆]



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ARTICLE INFO

Article history:

Received 12 March 2014

Revised 14 August 2015

Accepted 12 October 2015

Available online 24 May 2016

JEL classifications:

G24

G11

G01

Keywords:

Analysts

Fundamental risk assessment

Scenario-based valuations

Target prices

ABSTRACT

We use a data set of sell-side analysts' scenario-based equity valuation estimates to examine whether analysts can assess the state-contingent risk surrounding a firm's fundamental value. We find that the spread in analysts' scenario-based valuations captures the riskiness of operations and predicts the absolute magnitude of long-run valuation errors and future changes in firm fundamentals. We also show that analysts' assessment of fundamental risk and its predictive ability systematically improved after the financial crisis, consistent with the macroeconomic shock raising analysts' awareness of firms' systematic risk exposures.

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1. Introduction

Sell-side analysts' research reports typically contain a "target price"—an estimate of future equity value which should incorporate and communicate the analyst's beliefs about both the security's return potential and its riskiness. However, existing research has so far produced mixed and incomplete evidence on the usefulness of target prices. Tar-

get prices do appear to convey information, as reflected in the market reaction to target price updates (e.g., Brav and Lehavy, 2003; Asquith, Mikhail, and Au, 2005). Yet they also seem to be optimistic, inaccurate, and of little long-run investment value (e.g., Asquith, Mikhail, and Au, 2005; Bradshaw, Brown, and Huang, 2013). Importantly, the existing evidence pertains primarily to the *first-moment* properties of the valuation forecasts—namely, the analyst's point estimate of the firm's future stock price. There is little evidence on how analysts assess and communicate expected risks and uncertainty affecting a firm's long-term value.¹ We address this gap in the literature by

[☆] The authors would like to thank Paul Asquith (the referee), Pawel Bilinski, Trevor Harris, Charles Lee, Maria Ogneva, Peter Pope, Eric So, Guy Weyns, the editor Bill Schwert, and workshop participants at Singapore Management University, Cass Business School, INSEAD, Stanford University, and the Harvard Business School IMO Conference for useful comments.

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¹ Exceptions to the research focus on *expected* value are Lui et al. (2007, 2012). These papers show how analysts' assessments of equity securities' riskiness predict daily excess price movements and convey information about the firms' sensitivity to Fama-French risk factors.

examining a unique data set of scenario-based valuations issued by sell-side analysts from 2007 to 2010 and by exploring those analysts' response to the financial crisis.

Since January 1, 2007, Morgan Stanley has required its analysts to supplement their forecasts of a firm's *expected* valuation (the *base-case* valuation) with scenario-based forecasts that capture the most likely upside and downside valuations. These three scenario-based forecasts reflect different outcomes of such *state-contingent* factors as competition, new product launches, regulatory changes, changes in market demand, and macroeconomic conditions. By creating a parsimonious, state-contingent distribution of valuation forecasts for each firm, Morgan Stanley's forecasting framework allows analysts to systematically inform clients about the covered firm's return potential and its jointly determined risk factors.

We use a data set of these scenario-based reports to measure analysts' valuation risk forecasts. Our key variable of interest, *spread*, is the width of the valuation range; that is, the difference between a report's upside and downside valuation forecasts.² Using this metric, we carry out three primary analyses. First, we show which firm characteristics are associated with the spread in scenario-based valuations. We find that the spread's magnitude is significantly associated with characteristics that capture the fundamental riskiness of operations and shareholders' equity (e.g., beta, small size, financial distress, losses, and idiosyncratic risk). We also find that the magnitude is increasing in the degree of price appreciation embedded in base-case valuation forecasts; that is, the valuation forecasts reflect a risk-return tradeoff. Finally, we show that the spread is decreasing in the degree of analysts' *conviction* about the likelihood of strong expected performance; that is, the extent to which the base case is tilted toward the upside valuation forecast.

Second, we focus on the predictive ability of the analysts' valuation risk forecasts. If analysts are correctly assessing state-contingent valuation risk, then the spread of forecasted valuations (narrow versus wide) will be associated with the absolute magnitude of ex post valuation errors. Indeed, we find that the spread is positively related to the absolute magnitude of base-case valuation errors. This relation holds after controlling for analyst forecast dispersion, volatility indicators, analyst target price optimism, firm characteristics, and individual-analyst fixed effects.

Third, we examine analyst forecasting around the recent financial crisis and find that the crisis brought state-contingent valuation risk to the forefront, improving analysts' calibration of risk forecasts.³ Little is known about how analysts respond to macroeconomic shocks or how they assess and respond to dramatic changes in firm performance. In our setting, the financial crisis serves both as

an exogenous shock to firm fundamentals and a shift in the nature of the risk affecting firm performance. Our analysis shows that the crisis affected analysts' risk assessments in three ways. First, it affected the *magnitude* of valuation risk forecasts: the spreads increased during the crisis and remained higher after the crisis than they had been before. Second, the crisis led analysts to *recalibrate* their risk assessments: the post-crisis spreads display a significantly stronger relation with the firm's systematic risk exposure (beta) and a significantly weaker relation with optimistic return implied by their base-case valuations than before. Third, the crisis improved the forecast's *predictive ability*: the absolute magnitude of post-crisis valuation errors is significantly smaller and more strongly correlated with the spreads than before.

In additional analyses, we find that spreads relate positively to ex post changes in the firm's financial performance (absolute changes in return on equity, operating margin, and revenue growth). This positive relation suggests that analysts' ability to predict economic shocks to firm operating fundamentals underlies their assessment of spreads and determines the absolute magnitude of ex post valuation errors. We also find that the financial crisis generally did *not* affect the magnitude of the relation between spread and shocks to future firm fundamentals. This lack of change suggests that the stronger relation between spread and valuation errors after the crisis came from analysts becoming better at *mapping* the distribution of possible fundamental outcomes into state-contingent valuations and not from analysts improving their ability to forecast shocks to firm fundamentals.

This paper contributes to the literature in three significant ways. First, we contribute to research on analysts' ability to assess the riskiness of equity securities (e.g., Lui, Markov, and Tamayo, 2007, 2012) by identifying and using a new scenario-based risk measure. We provide the first evidence on how analysts calibrate state-contingent risk and outcome uncertainty in deriving valuation estimates. We find that scenario-based valuation risk forecasts both reflect and convey information about the long-term risks affecting firm value.

Second, by using the second-moment of analysts' 1-year-ahead valuation estimates, we show how analysts complement their first-moment optimistic forecast bias with considerations of risk. Essentially, even though analysts maintain an optimistic first-moment bias throughout our study period, they seem to incorporate informative assessments of state-contingent valuation risks into their scenario-based valuation distributions.

Third, by making use of the financial crisis, we show *how* analysts respond to the revelation of risk and uncertainty created by a large macroeconomic shock. Our finding that analysts placed more emphasis on fundamental risk factors and less emphasis on base-case optimism post-crisis provides evidence on how such shocks influence analysts' judgment.

Taken together, our evidence on the interplay of the first and second moments of analyst valuation estimates provides a fuller picture of analysts' forecasting activities.

The paper proceeds as follows: Section 2 discusses the empirical setting and motivation for our study.

² We normalize our measure of spread as a percentage of the midpoint of the analyst's valuation range.

³ We take the collapse of Lehman Brothers on September 15, 2008 as the start of the financial crisis. To capture the effects of the crisis consistently during our sampling period, we define two subsample periods based on the Lehman shock: the pre-crisis period is Q1 2007 through Q3 2008 and the post-crisis period starts with Q4 2008. We also identify the three quarters from Q4 2008 through Q2 2009 as the "height of the crisis" when market uncertainty was at its peak following the Lehman shock.

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