Journal of Accounting and Economics 62 (2016) 65–86

Contents lists available at ScienceDirect

Journal of Accounting and Economics

journal homepage: www.elsevier.com/locate/jae

Understanding the relation between accruals and volatility: A real options-based investment approach ☆

Salman Arif [a], Nathan Marshall [b], Teri Lombardi Yohn [a,*,1]

[a] Indiana University, Kelley School of Business, 1309 E 10th Street, Bloomington, IN 47405, United States
[b] University of Colorado Boulder, Leeds School of Business, 995 Regent Drive, Boulder, CO 80309, United States

ARTICLE INFO

Article history:
Received 11 May 2015
Received in revised form
19 April 2016
Accepted 28 April 2016
Available online 7 May 2016

JEL Classifications:
M41, G31

Keywords:
Accruals
Real options
Investment
Volatility

ABSTRACT

Accruals are fundamental to financial reporting and are the underlying innovation of accounting. Despite this, accounting research has provided little understanding of how economic forces affect a firm's level of accruals and limited guidance for forming expectations of accruals based on *ex ante* firm characteristics. We consider accruals as a form of investment and examine whether theoretical predictions from a real options-based investment framework provide insight into the relation between accruals and the *ex ante* expected volatility faced by the firm. Specifically, the theory predicts that higher volatility dampens investment because firms prefer to 'wait and see' instead of investing immediately. Consistent with this theory, we document a robust negative relation between year-ahead net working capital accruals and expected volatility. We also predict and find that the negative association between year-ahead net working capital accruals and expected volatility is less pronounced for distressed firms and more pronounced for firms with a longer operating cycle, and that current asset accruals are more sensitive to volatility than current liability accruals. Finally, we find that the residuals from an investment-based expected accrual model outperform those from the widely-used performance-adjusted modified Jones model in identifying companies that just meet or beat analysts' earnings forecasts. Collectively, our findings suggest that the investment perspective of accruals, and in particular the real options-based investment framework, provide useful insights for forming expectations of accruals.

1. Introduction

Accruals are fundamental to financial reporting and are the underlying innovation of accounting. While a long line of prior research notes that accruals are likely to be a function of fundamental economic forces, little is known empirically or theoretically

☆ We would like to thank Eric Allen, Mark Bagnoli, Daniel Beneish, Matt Billett, John Core (the editor), Frank Ecker (discussant), Patricia Fairfield, Richard Frankel, Joseph Gerakos (discussant), Max Hewitt, Paul Hribar, Bora Keskin, Chad Larson, Andy Leone, Gerald Lobo, Andrey Malenko, DJ Nanda, Lee Pinkowitz, Paul Pronobis, Scott Richardson, Tom Ruchti, Amy Sun, Lakshmanan Shivakumar, Mark Soliman, Irem Tuna, Peter Wysocki and seminar participants at London Business School, University of Southern California, University of Houston, University of Miami, Georgetown University, Purdue University, the Conference on Financial Economics and Accounting, the 2014 AAA meeting, and the Midwest Accounting Conference for their comments and suggestions. Teri Yohn acknowledges the generous support of the PricewaterhouseCoopers Faculty Fellowship.

* Corresponding author.
E-mail addresses: arifs@indiana.edu (S. Arif), Nathan.Marshall@colorado.edu (N. Marshall), tyohn@indiana.edu (T.L. Yohn).
[1] Tel.: +1 812 855 8966.

http://dx.doi.org/10.1016/j.jacceco.2016.04.005
0165-4101/

about how economic factors impact the level of a firm's accruals (e.g., Dechow et al., 1995; Bernard and Skinner, 1996; Dechow et al., 2010; Gerakos, 2012; Owens et al., 2013). Further, prior research generally disaggregates accruals at time $t+1$ into discretionary and non-discretionary components based on financial information observed at time $t+1$; therefore, the research has provided little guidance for forming expectations of accruals based on *ex ante* firm characteristics. In this study, we consider accruals as a form of investment and examine whether theoretical predictions from a real options-based investment framework provide insights for forming expectations of accruals based on *ex ante* economic factors.

Prior research in accounting suggests that accruals at least partially reflect deliberate investment choices by the firm (Fairfield et al., 2003; Zhang, 2007; Dechow et al., 2008; Wu et al., 2010; Bushman et al., 2011; Allen et al., 2013; Momente et al., 2013; Arif and Lee, 2014). In addition, a large literature in economics and finance adopts a real options approach to investment decision-making and suggests a negative relation between investment and volatility (e.g., Bernanke, 1983; McDonald and Siegel, 1986; Ingersoll and Ross, 1992; Dixit and Pindyck, 1994; Schwartz and Trigeorgis, 2004; Grenadier and Malenko, 2010).[2] The intuition for the expected negative relation between investment and volatility is as follows. Investment is costly, and sunk costs cannot be recovered. Therefore, when firms make investment decisions, they trade off the returns earned from investing today against the benefit from delaying investment to the future, when information or business conditions may be better. Taking into account the benefit of postponing investment – known as the "option to wait" – means that since higher volatility increases the value of the option to wait, higher volatility dampens investment because firms prefer to "wait and see" instead of investing immediately. Thus, higher (lower) volatility is associated with lower (higher) investment. Adopting the investment perspective of accruals, our first hypothesis is that a firm's level of accruals is negatively associated with volatility.

We note, however, that this prediction from the real options framework may not directly apply to accruals. For example, models of optimal inventory suggest that managers have incentives to avoid inventory shortages and therefore *increase* inventory levels as demand volatility rises (e.g., Petruzzi and Dada, 1999; Cachon and Terwiesch, 2013). This research therefore suggests a *positive* relation between investment in finished goods inventory and volatility. Despite this potentially countervailing force, we adopt the investment perspective and rely on the real options framework to predict a negative relation between the level of a firm's net working capital accruals and volatility.

Second, we investigate the role of financial distress in shaping the relation between accruals and volatility. Eisdorfer (2008) models the investment decisions of financially distressed firms using a real options framework and finds that financial distress weakens the negative effect of volatility on investment. This is because shareholders of distressed firms have an incentive to invest when volatility is higher since they enjoy the benefits if things go well, while bondholders bear the costs if things go badly. Accordingly, we predict that the negative association between the level of working capital accruals and volatility is less pronounced for distressed firms.

Third, we exploit the real options framework to form predictions regarding the relation between the length of the operating cycle and the association between accruals and volatility. The operating cycle measures the average time between the disbursement of cash to produce a product and the receipt of cash from the sale of the product (Dechow, 1994); therefore, firms with a longer operating cycle have greater exposure to changing business conditions and a wider range of possible accrual investment outcomes. This suggests that the option to wait is more valuable for firms with a longer operating cycle. Thus, we hypothesize that the sensitivity of net working capital accruals to volatility is stronger for firms with a longer operating cycle.

Fourth, we investigate whether the asset and liability components of net working capital accruals have differing sensitivities to volatility. We predict that volatility not only negatively affects current asset accruals but also current liability accruals, given that liabilities partially finance investments and thus positively co-vary with investment by nature. However, we expect current asset accruals to be more sensitive to volatility than current liability accruals since investment decisions have first-order implications for asset accruals but affect liability accruals only to the extent that managers use liabilities instead of internally generated cash flows or equity issuances to finance the investment.

To empirically test our predictions, we examine the relation between year-ahead working capital accruals and expected volatility. We highlight that our approach is distinct from prior accounting literature that disaggregates accruals into discretionary and non-discretionary components (e.g., Healy, 1985; DeAngelo, 1986; Jones, 1991; Dechow et al., 1995). Specifically, while the prior earnings management literature models total working capital accruals in year $t+1$ as a function of explanatory variables which are also measured in year $t+1$ (e.g. Healy, 1985; DeAngelo, 1986; Jones, 1991; Dechow et al., 1995), we model accruals in year $t+1$ as a function of characteristics in year t. Further, we view accruals as a form of investment, rather than as a component of profitability. As such, our model is grounded in the real options-based investment framework, in which measures of the firm's characteristics and economic environment (such as expected volatility, firm size, market-to-book, leverage, and cash flows) are used as inputs into investment decisions (e.g. Hayashi, 1982; Dixit and Pindyck ,1994; Gilchrist and Himmelberg, 1995; Eisdorfer, 2008).

Our empirical analysis begins by replicating the finding in Eisdorfer (2008) that there is a significant negative relation between year-ahead capital expenditures and expected volatility for a sample of manufacturing firms. We then extend the analysis to net

[2] In fact, the real options approach to investment decision-making is not only studied in academic literature, but is also commonly taught to MBA students, used in practice (Kemna, 1993; Amram et al., 2006; McDonald, 2006), and featured in corporate finance textbooks (e.g. Brealey, Myers and Allen, 2014, Ch. 22).