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Analysts' earnings forecasts and technological conditions in the firm's investment environment

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ABSTRACT

This paper examines the association between sell-side analysts' short and long-term EPS forecasts, growth rates, and forecast errors, and measures of technological conditions in the firm's industry investment environment. Our contention is analysts' industry knowledge includes an understanding of the technological conditions to which the firms' investments are exposed and how these technological conditions within industries map into future earnings. We predict and find as the horizon lengthens that interactions between technological conditions and current EPS are significantly associated with analysts' EPS and growth forecasts. The long horizon EPS growth results align with Jung, Shane and Yang who suggest analysts' growth forecasts reflect efforts to evaluate the firms' long-run prospects. We also present results for analysts' forecast errors that suggest analysts' technological knowledge is associated with optimistically biased long-term forecasts. Our evidence suggests analysts' industry knowledge includes the implications of technological conditions within industries for firms' future earnings.

1. Introduction

A well-established literature provides evidence on the association of sell-side analysts' earnings forecasts and firm specific financial information.[1] However, few studies focus on industry-specific macroeconomic conditions and their associations with analyst's earnings forecasts, despite the potential importance of these associations as highlighted by Dichev et al. (2013). Dichev et al.'s (2013) survey of US listed company CFOs suggests fifty percent of 'earnings quality' defined as sustainable and repeatable earnings comes from industry and macroeconomic conditions. The objective of this study is to provide evidence on the association between sell-side analysts' earnings forecasts and the technological conditions in the firms' investment environment, comprising macroeconomic conditions measured within industries. In this context, a technological condition is not the same as the industry classification of a firm, but encompasses the technological environment associated with the firms' investments, that governs the firms' capital, production, and research and development opportunities.

Our motivation for exploring the analysts' forecast links to technological conditions is threefold. First, a recent study by Brown, Call, Clement and Sharp (2014) provides survey based evidence that sell side analysts have significant expertise in

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[1] Technology is relevant to all types of investments with the investor company operating as either a net user or net producer of technology (Grenadier and Weiss, 1997; Schumpeter, 1934, 1939, 1942). For detailed reviews of the analysts' forecasts literature, see Brown (1993), Kothari (2001) and Ramnath et al. (2008).

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management relations (to check assumptions and obtain qualitative insights into the firm and industry) and gathering industry knowledge, and these skills are valuable because they are a determinant of analysts' compensation. A number of studies suggest the non-financial research gathered by analysts is very important as the context for interpreting financial data (Barker and Imam, 2008; Barker, 1999; Breton and Taffler, 2001; Holland, 1998; Pike et al., 1993). Rogers and Grant (1997) find over half of the information cited in sell side analysts' reports are not from annual reports. We build on this research by conducting tests that provide insights on whether analysts' information as applied includes information about the technological conditions associated with the firms' investments and expected earnings outcomes. Second, Jung et al. (2012) provide evidence consistent with long-term growth forecasts signalling effort by analysts to analyse the firms' long-term prospects. Their evidence is consistent with the view that sell-side analysts are experts in gathering industry knowledge. Our contention is that the analysts' industry knowledge includes an understanding of the technological conditions to which the firms' investments are exposed and how these technological conditions within industries map into future earnings.

Our third motivation is that we have little understanding of how analysts 'analyse' macroeconomic, industry and technological conditions, business strategy, and other factors and how analysts incorporate them into their earnings forecast. Bradshaw (2011) argues that a qualitative approach may illuminate this 'black box' of analysts' behaviour. However, archival data results are also important to explain issues such as why analysts specialise in different sectors of the economy, and why they take actions such as visiting companies, and talking to financial and other personnel of firms, including production managers, engineers and project managers. It is our contention these activities of sell-side analysts help them to understand, among other things, the technological conditions associated with the firms' investment environment, which analysts incorporate into their earnings and growth forecasts.

We conduct empirical tests for a sample of US companies comprising one-year ahead earnings per share (EPS) forecasts, two-year ahead EPS forecasts, and long-term earnings and growth forecasts for 1985–2001.[2] The experimental design is based on panel generalised least squares regressions that regress analysts EPS forecasts, growth rate forecasts, and forecast errors on actual current EPS, measures of the technological conditions within the firms' industries, and other firm specific factors. The empirical analyses anchor on current actual EPS reflecting the mechanical power of current earnings to predict future earnings and growth arising from the relation of accruals in earnings to growth in assets and sales (Allen et al., 2013; Fairfield et al., 2003; Sloan, 1996). Consistent with this intuition, we find analysts' one-year ahead forecasts anchor significantly on current actual EPS. As the forecast horizon increases in length, the coefficient for actual current EPS remains significant and positive in sign, but there is also a notable increase in the incremental explanatory power of the other information included in the analysis.

The first prediction relates to the contention that analysts understand the relevance for forecasting future earnings of technological conditions within the industries in which the firms invest, leading to associations between analysts' forecasts and the proxies for technological conditions conditioned on current earnings (science linkages, technology strength and technology cycle time conditions are explained in depth in Section 2). We expect to observe the latter associations as the forecast horizon lengthens and the firms' current actual financial information becomes less relevant for predicting future earnings. Consistent with this prediction, the interactions between actual EPS and the technological conditions are generally insignificant for the one and two-year ahead forecasts. However, we observe significant coefficients with the predicted signs for all technological condition interactions with current EPS for long run (3–5 year) implied EPS forecasts and the EPS growth forecasts. These long horizon results are consistent with Jung et al.'s (2012) evidence that analysts' long-term growth rate forecasts reflect analysts' efforts to analyse the firms' long term prospects.

The second prediction relates to the association between analysts' forecast errors and the technological conditions within the firms' industries. The analyst literature suggests a tendency for analysts to underweight information under uncertainty, leading to forecast errors (Chan et al., 2003; Harris, 1999; see the review by Ramnath et al., 2008). However, other research suggests that analysts have incentives to issue optimistic forecasts and find long-term earnings growth forecasts are optimistically biased (Barniv et al., 2009; Brown et al., 2014; Chan et al., 2003; Cowen et al., 2006; La Porta, 1996). We examine whether the technological conditions have implications for biased earnings forecast errors. We find virtually no association between the technological conditions interactions with earnings and the forecast errors for one and two-year forecasts. However, for the long run (3–5 years) forecast errors, there are significant associations between the optimistic consensus forecast errors and the actual EPS interactions with the technological conditions variables. This finding is consistent with the prior evidence discussed earlier that analysts' long term growth forecasts are optimistically biased but goes one step further to suggest that analysts are overly optimistic about the future earnings implications of the technological conditions to which the firms' investments are exposed.

Our paper contributes in several ways to the literature. First, our results align with the view that analysts' EPS forecasts anchor on current EPS (Bradshaw et al., 2012). Further, the results align with the evidence that analysts specialise in gathering industry information. Our evidence suggests one component of analysts' research efforts and knowledge is the implications of technological conditions within the industries for future earnings, leading to associations between analysts' forecasts and proxies for technological conditions conditioned on current earnings. Our evidence thus speaks to the call by O'Hanlon (1993)

[2] The 2001 cut-off year arises because the technological conditions database required for our study was available only up until the end of 2001.