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The forecast dispersion anomaly revisited: Time-series forecast dispersion and the cross-section of stock returns[☆,☆☆]

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ABSTRACT

Previous studies use cross-sectional forecast dispersion in examining the relation between forecast dispersion and future stock returns and report an anomalous negative dispersion-return relation. This paper examines how time-series forecast dispersion is distinct in the relation to stock returns from the negative dispersion-return relation. We find that contrary to the previously-known negative dispersion-return relation, there is a strong positive relation between time-series forecast dispersion and stock returns. We also find that time-series forecast dispersion apparently contains systematic risk components and that such risk is priced in stock returns.

1. Introduction

It is controversial whether analysts' earnings forecast dispersion contains non-diversifiable risk components and is thus informative in terms of pricing ability. It is critical, therefore, how we measure dispersion in analysts' forecasts. Recent studies measure dispersion from observing cross-sectional dispersion in forecasts among individual analysts at a given time. Among many, the most representative study using cross-sectional forecast dispersion is that of Diether et al. (2002) who examine the relation between this dispersion and future stock returns. They report that there is a negative relationship between cross-sectional dispersion in analysts' forecasts and future stock returns. In other words, firms with high forecast dispersion earn lower future stock returns. This negative relationship is counter-intuitive, since, conceptually, dispersion is a measure of uncertainty (Merton, 1980) and thus, if priced, should be positively related with subsequent returns[2]. This negative relation can also be used as evidence to strongly reject

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2 Many researchers attempt to suggest explanations for the anomalous negative dispersion-return relation. For example, Diether et al. (2002) attribute this negative dispersion-return relation to mispricing due to agents' different beliefs and market frictions such as short-sales constraints. These authors interpret forecast dispersion as a proxy for differences of opinion about a stock due to asymmetric information. Johnson (2004) argues that dispersion in analysts' forecasts reflects idiosyncratic risk about cash flows which increases the option value of equity and that expected returns should decrease with idiosyncratic risk. Barron et al. (2009) separate forecast dispersion into its two components, uncertainty and information asymmetry, by using the Barron et al. (1998) model, and they report that the negative dispersion-return relation is explained by the uncertainty components of dispersion. Avramov et al. (2009) argue that forecast dispersion may be related to financial distress by linking the negative dispersion-return relation to the negative distress-return relation.

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the notion that cross-sectional forecast dispersion can be viewed as a proxy for (non-diversifiable) risk. In other words, analysts' forecasts are not informative in terms of pricing ability. This casts some doubt on the role of analysts as information agents[3].

Cross-sectional dispersion, however, may be an inappropriate proxy to investigate the issue on whether forecast dispersion contains (non-diversifiable) risk components and such risk is priced, since it could contain inherently diversifiable risk components in the following sense. Each analyst observes two signals about a firm's future earnings: one public which is common across all analysts and one private which is idiosyncratic and unique to a particular analyst. Specifically, at a given time, the idiosyncratic private information of analyst k about a firm's future earnings is represented by a signal y_k=Q+ε_k, where Q represents the common public signal, and ε_k represents a deviation of analyst k's idiosyncratic private signal from the common public signal and is independently distributed across analysts with mean zero. Assuming that the common public signal (Q) at a time can be measured by the mean forecast (i.e., $\widehat{Q} = \overline{y} = (1/K)\sum_{k=1}^{K} y_k$, where K is the number of analysts), we argue that cross-sectional forecast dispersion is the measure of deviation of idiosyncratic signals around the common public signal Q at a given time. It is more appropriate, therefore, to use dispersion in common public signals over time rather than dispersion in idiosyncratic private signals at a given time as the proxy in examining the above issue.

The purpose of this paper is therefore twofold: First, we use a measure of dispersion in public signals to examine whether analysts' forecast dispersion contains non-diversifiable risk components. We use time-series dispersion of mean forecasts over past periods as a measure of dispersion in common public signals. Second, we examine whether time-series dispersion can be used as a proxy for risk. In other words, we examine whether time-series dispersion contains non-diversifiable risk components and such risk is priced. In addition, we also examine whether cross-sectional dispersion contains idiosyncratic risk components. This is an important issue to both investors and analysts. The reason we focus on the time-series behavior of analysts' earnings forecasts, rather than that of actual earnings, is that the primary purpose of the paper is to examine whether analysts' forecasts are informative in terms of pricing ability and they play a role of information agents in capital markets.

To address the above-mentioned issue, we perform several tests. First, we examine how stock prices react to earnings signals conditionally on (cross-sectional or time-series) forecast dispersion. Since for a given level of earnings signal, stock price reaction differs according to whether earnings information uncertainty is attributable to noise in the earnings signal or to the fundamental uncertainty of the firm's future cash flows due to the business environment, it may be determined, by examining the pattern of returns across forecast dispersion, whether forecast dispersion is caused by idiosyncratic noise or by fundamental uncertainty. Second, we re-examine the relation between (cross-sectional or time-series) forecast dispersion and stock return after adjusting for some systematic risk components. If a particular dispersion-return relation is caused by systematic risk components of stock returns, the particular relation should disappear after adjusting appropriately for the systematic risk. Otherwise, the relation will still remain unchanged. We use firm size, book-to-market ratio, and market beta as appropriate systematic risk components according to Fama and French (1992, 1993). Third, we relate payoffs to time-series forecast dispersion-based factors to macroeconomic conditions. As a final test, we conduct the Fama and MacBeth (1973) cross-sectional regression tests to examine whether risk components contained in time-series forecast dispersion are priced in stock returns.

Based on these tests, we find that there is a strong positive relation between time-series forecast dispersion and subsequent stock returns. Further, we find that time-series forecast dispersion apparently contains systematic risk components and that such risk is priced in stock returns. Meanwhile, cross-sectional dispersion is unrelated to systematic risk components but closely related to idiosyncratic volatility. We interpret these results as follows. Time-series forecast dispersion is informative in terms of pricing ability, but cross-sectional dispersion is not. Again, cross-sectional forecast dispersion is the measure of deviation of idiosyncratic signals around the common public signal at a given time, while time-series forecast dispersion is the measure of deviation of common public signals over time. Specifically, cross-sectional dispersion is the standard deviation of individual forecasts at a specific given time, while time-series dispersion is the standard deviation of collective forecasts over time. In this sense, analysts are individually non-informative, but collectively informative over time in terms of pricing ability. This may be the reason that time-series forecast dispersion contains systematic risk components, while cross-sectional forecast dispersion does not such components.

The remainder of this paper proceeds as follows. Section 2 describes the data and methodology for computing time-series forecast dispersion. Section 3 presents the characteristics of portfolios sorted by the forecast dispersion. Section 4 presents empirical evidence showing that time-series forecast dispersion contains systematic risk components. Section 5 set forth our conclusions.

2. Data and methodology

2.1. Computing cross-sectional and time-series forecast dispersions

We obtain analysts' quarterly earnings forecasts data for all NYSE, AMEX, and NASDAQ stocks from the Institutional Brokers Estimate System (I/B/E/S) for the period 1984–2014. According to Diether et al. (2002) and Payne and Thomas (2003), since the standard deviation of analysts' earnings forecasts computed from the adjusted file in I/B/E/S is subject to the rounding error issue and the rounding problem becomes more severe in the summary file, we use the Unadjusted Detailed History File[4].

[3] Altinkiliç et al. (2013) report evidence that analysts' forecast revisions are not informative in intraday returns and, further, revisions are virtually information free in the cross-section of returns around announcements. Meanwhile, Qu et al. (2003) argue that analyst forecast dispersion embodies a measure of information risk and find that a risk factor constructed according to this risk measure exhibits characteristics of a systematic risk factor and has a significant explanatory power of return variations.

[4] In the case of firms that have gone through multiple stock splits, rounding the stock split-adjusted forecasts to the nearest penny causes this problem.