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Volume and skewness in international equity markets ☆,☆☆

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Abstract

We examine the relation between trading volume and skewness in 11 international stock markets using daily and monthly data from January 1980 to August 2004. We construct single equation and VAR models of the relation between the first three moments of market returns and trading volumes. Our results show hitherto unrecognised channels of influence, and support the investor heterogeneity approach to explaining return asymmetries.

JEL classification: C14; F31; G12; G15

Keywords: Stock markets; Skewness; Turnover; Volume and volatility; VAR

1. Introduction

There is increasing recognition in theoretical and empirical finance that the returns to individual stocks and aggregate equity markets exhibit asymmetric behavior. Two main explanations have been advanced to explain this asymmetry. *Representative investor* theories explain return asymmetries by leverage effects, whereby a decline in price leads to volatility in subsequent returns because of increased operating and financial leverage (Black, 1976; Christie, 1982); by volatility feedback mechanisms whereby volatility raises the risk premium and reduces the impact of good news relative to bad (French et al., 1987; Campbell and Hentschel, 1992); and by stochastic bubble models in which the asymmetry is caused by the bursting of the bubble (Blanchard and Watson, 1982). An alternative explanation is to be found in the *investor heterogeneity* theory of Hong and Stein (2003), who suggest that high trading volumes lead to greater negatively skewed returns because some investors are short sales-constrained so that previously hidden information comes out during market declines. This follows the volume–volatility literature, in which the level of trading volumes proxies for the extent of heterogeneity of investor opinions concerning the fundamental values of stocks (Clark, 1973; Epps and Epps, 1976; Tauchen and Pitts, 1983; Harris and Raviv, 1993; Shalen, 1993).

Although many studies have investigated the nature and extent of return asymmetries (Harvey and Siddique, 1999, 2000) and the relation between trading volumes and price volatility (Fong, 2003), little attention has been paid to the relation between trading volumes and the third moment of price changes, that is, to skewness. The exceptions are Chen et al. (2001) (hereafter CHS), Hueng and Brooks (2003) and Charoenrook and Daouk (2004). CHS test the theory of Hong and Stein (2003) by examining whether increases in trading volumes lead to greater negative

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skewness in returns. Using firm-level data for the United States from July 1962 to December 1998, they estimate cross-sectional models in which the skewness estimated from daily data over 6-month periods is regressed on lagged returns and lagged detrended volumes. Consistent with the prediction of Hong and Stein (2003), they show that increased volumes tend to be associated with future negative skewness at the individual stock level. When CHS examine market-level data, however, the relation between volume and skewness disappears. Building on the work of CHS, Hueng and Brooks (2003) use an asymmetric generalised *t*-distribution approach to obtain conditional estimates of sample skewness. Contrary to CHS, they find that although lagged returns and volumes are significant determinants of future skewness, the coefficients are rarely negative, implying that higher volumes are not generally associated with future negative skewness. Charoenrook and Daouk (2004) use daily market data for 57 markets from January 1973 to December 2002 to estimate individual market and pooled cross-section time-series models, and they find weak evidence that lagged volumes lead to greater negative skewness. More recently, Hueng and McDonald (2005) use an autoregressive conditional density model with a skewed *t*-distribution on daily AMEX and NYSE data from 1962 to 2000 to show that the negative relation between trading volumes and return skewness found by CHS in their cross-sectional study is not supported by the time-series evidence from the United States stock market. Overall, the existing studies provide mixed cross-section and time-series evidence of the relation between volumes and skewness that is incompletely supportive of the investor heterogeneity explanation of asymmetric market returns.

In this paper, we add to the literature on the relation between trading volumes and market return skewness by showing that it is more complex than has previously been recognised. We generalise prior specifications in three ways: by including a wider set of variables in our models, by allowing more interactions between them, and by allowing more sophisticated adjustment dynamics to explain the evolution of market return skewness in response to variations in trading volumes. Using daily data from January 1980 to August 2004, we construct unconditional monthly measures of the first, second and third moments of market returns and trading volumes for 11 international stock markets. We present single equation estimates, panel estimates and vector autoregressive (VAR) estimates of the interactions between the three moments of returns and volumes that are supportive of Hong and Stein's (2003) investor heterogeneity explanation of asymmetric market returns, and that are consistent with CHS's (2001) firm-level findings that higher trading volumes lead to subsequently greater negative return skewness.

Our expansion of the set of explanatory variables is motivated by the work of Chordia et al. (2001) (hereafter CSA) who were first to examine the impact of the variability in trading activity on expected returns. Interpreting the level of trading volumes as a measure of market liquidity and the variability of trading volumes as the risk associated with fluctuations in liquidity, CSA hypothesised that higher levels of trading volumes should lead to lower expected returns (because investors require a smaller liquidity premium), and that higher variability of trading volumes should lead to higher expected returns (because investors require a higher liquidity risk premium). Contrary to their priors, however, CSA found a strong statistically and economically significant negative relation between average returns and both the level and variability of trading volumes, and this remains significant after controlling for the size effect, the book-to-market ratio, momentum effects, and the price level and dividend yield. In seeking an explanation for their apparently anomalous finding that the variability of trading volumes is negatively related to expected returns, CSA suggest that volatile trading volumes might reflect a more heterogeneous group of investors who trade the stock. They test and dismiss this explanation using the number of analysts and the proportion of institutional shareholdings as proxies for the heterogeneity of the clientele. We build upon CSA's finding that average returns are negatively related to the level and the variability of trading volumes by inferring that the latter two variables may be positively related. If this is the case, an alternative explanation for CSA's finding can be found in the theories of heterogeneity of investor opinion, rather than in the heterogeneity of investor clienteles. Although this relation has not previously been examined in the literature on volume and skewness, we show that the level of trading volumes is strongly positively correlated with the volatility of volumes in all 11 markets in our sample. We also show that there are strong interactions between the first three moments of trading volumes in our VAR models, and that these interactions drive the volume–skewness relation in a way that has not been previously recognised.

The remainder of our paper is organised as follows: We begin in Section 2 by describing the data set and discussing our measures of trading volumes and market return skewness. In Section 3 we present our single equation specifications. We first replicate CHS and Charoenrook and Daouk's (2004) models for each of our 11 markets. Consistent with CHS' market-level findings and with Charoenrook and Daouk (2004), we find little evidence that higher trading volumes lead to greater subsequent negative skewness. When we estimate our generalised single equation model as a panel on all markets in our sample, however, we find that trading volumes do impact significantly on subsequent return skewness. In order to allow for the possibility of different trading norms and market structures, we then estimate our generalised single equation model separately for each market. We find that lagged trading volumes influence future return skewness in 8 of the 11 markets. This includes the United States, for which we find that all three moments of trading volumes impact on subsequent return skewness. We thus provide stronger evidence that trading volumes are associated with subse-