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The elusive nature of motives to trade: Evidence from international stock markets

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ABSTRACT

We analyse investors' motives for trading on stock markets in G-7 countries and investigate whether evidence for these motives is robust when time-varying market volatility, changes between calm and turbulent periods, and existence of international financial spillovers are controlled for. By applying the Markov-switching GARCH specification to a model of the dynamic return–volume relationship, we find that trades conducted due to liquidity needs or driven by private information cannot be identified unequivocally in any market, and positive feedback trading becomes predominant when return spillovers from the US market are taken into account.

1. Introduction

A series of heterogeneous agent models have been proposed to explain how price changes in financial markets are driven by arrivals of private information and by changes in liquidity or hedging needs of investors. Predominant motives underlying trading decisions have often been studied by analysing the interaction between return autocorrelation and trading volume. Several theoretical models (e.g. Campbell, Grossman, & Wang, 1993; Llorente, Michaely, Saar, & Wang, 2002; Wang, 1994) demonstrate that following periods of intensive trading, stock returns tend to reverse (continue) if the majority of trades were conducted due to liquidity needs or changes in hedging demand (due to private information). In addition, positive (negative) return autocorrelation has been shown to be indicative of negative (positive) feedback trading (e.g., Sentana & Wadhwani, 1992).

The question investigated in this paper is whether the predominant trading motives on large and established stock exchanges in G-7 countries, found using standard linear regression models, are still present after taking into account international information spillovers, time-varying return volatility, and changes between calm and turbulent regimes in these financial markets. This question is based on three presumptions. First, information from international markets is an important determinant of stock returns on local markets (see, e.g., Gagnon & Karolyi, 2006, for a review of the literature on financial spillovers) and may affect the observed links between trading volume and consecutive returns. Second, existing empirical studies on trading motives (which use a common theoretical framework also employed in this study) yield inconclusive results, as some authors find no evidence of informativeness of trades (Campbell et al., 1993; Conrad, Hameed, & Niden, 1994; Gebka, 2005), whereas others argue that transactions are mainly driven by private information (Bajo, 2010; Ciner & Karagozoglu, 2008; Cooper, 1999; Llorente et al., 2002). Finally, a substantial body of research shows that investors' risk preferences, investment strategies, inclination to panic, herding behaviour, contagion effects, sentiment, relevance of margin requirements, and heterogeneous interpretation of information all differ between calm and crisis periods (Chau, Deesomsak, & Lau, 2011; Coudert & Gex, 2008; Kaminsky, Lyons, & Schmukler, 2004; Salm & Schuppli, 2010; Shalen, 1993).

We anticipate that empirical results on predominant motives for trading may change, or even become insignificant, when time-varying return volatility or changes between different states of the market are

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explicitly taken into account. Additionally, financial spillovers from the US market have been shown to affect returns on other international stock exchanges (e.g., Asgharian & Nossman, 2011; Gagnon & Karolyi, 2006; Ibrahim & Brzeszczynski, 2009), but are usually unaccounted for in the studies of feedback and liquidity/informed trading, potentially leading to biased conclusions about the nature and relative importance of these phenomena.

We test for the validity of these premises by constructing a two-regime Markov switching regression model where the parameters of conditional and unconditional return autocorrelation and financial spillovers are allowed to change depending on the current state of the market. The GARCH specification in each regime is responsible for accurate modelling of residual volatility (e.g., Haas, Mittnik, & Paolella, 2004). Results from older and more recent studies confirm the soundness of our approach (cf., Guidolin, 2011, for an excellent review of this literature). For example, Baele and Inghelbrecht (2010) find regime switching effects of regional and global factors on local stock returns, and in the study of Amira, Taamouti, and Tsafack (2011) volatility of stock returns has a stronger impact on inter-market return correlation during down-turn periods than in more bullish times.

The contributions of this paper are as follows. First, we extend the standard empirical approach to investigate different motives to trade by introducing multiple regimes to the empirical models proposed by Campbell et al. (1993), Llorente et al. (2002), and Gagnon and Karolyi (2003, 2009). In contrast, the existing literature closely related to our study (where empirical work is conducted based on theoretical models by Campbell et al., 1993; Wang, 1994; Llorente et al., 2002) does not allow for the parameter capturing liquidity/informed trading to change with the volatility at all, and allows the parameter capturing feedback trading to change only in a pre-imposed, linear fashion.[1]

Further, we combine investigation of feedback trading with motives of liquidity and private information-driven trading in a single empirical model. We also control for international financial spillovers to local markets, caused by international feedback traders, and by liquidity and information-driven trades of international investors. Our results demonstrate potential advantages of our empirical framework over the one introduced by Campbell et al. (1993) to identify prevailing motives to trade when using daily information on stock indices and market-wide volume data.

Lastly, empirical evidence reported in this paper highlights the importance of positive feedback trading and international spillovers as important determinants of stock return behaviour. The predominance of a particular motive to trade (private information or liquidity/hedging needs) cannot be identified for any of the analysed markets, however.

In the next section we present a simple theoretical model explaining the returns on a stock market with heterogeneous types of investors. Section 3 describes econometric methodology and model specifications used in our investigation. Section 4 presents empirical results and the final section concludes.

2. Theoretical and empirical models of different motives to trade

In this section, we discuss main results in the theoretical model of feedback trading by Sentana and Wadhwani (1992) (SW for short), the model of liquidity trading introduced by Campbell et al. (1993) (hereafter CGW), and the model of trading on private information developed by Llorente et al. (2002) (hereafter LMSW). Subsequently, we apply these results in our empirical specifications of the models of index returns on different markets. We present a series of extensions to the empirical specifications of the models presented in the studies of SW, CGW, and LMSW. By including liquidity and informed trading as well as financial spillovers from abroad, we show empirically how autocorrelation in stock returns depends on the existence of calm and volatile regimes, past trading volume, and on events on the global market.

2.1. The SW model of feedback trading

In the model proposed by SW two types of traders are assumed to act on the market, i.e., fundamental traders (smart money) and non-informed traders, also called feedback traders. Fundamental traders' demand is proportional to expected excess return and inversely proportional to the risk premium:

$$Q_t = \frac{E_{t-1}(R_t) - R_t^0}{\mu(\sigma_t^2)}, \tag{1}$$

where Q_t is their asset demand, i.e., the fraction of shares held by fundamental traders, $E_{t-1}(R_t)$ is the return at time t expected at time $t-1$, R_t^0 is the risk-free interest rate, and $\mu(\sigma_t^2)$ denotes the risk premium, the latter being a function of the volatility risk, σ_t^2. The demand of feedback traders, Y_t, on the other hand, is a function of past returns:

$$Y_t = \gamma \cdot R_{t-1}. \tag{2}$$

For $\gamma > 0$ ($\gamma < 0$), the traders will be involved in the positive (negative) feedback trading strategy, implying buying at time t after an observed price increase (decline) at $t-1$.

The market equilibrium requires that the aggregate demand equals aggregate supply normalized to 1, i.e., $Q_t + Y_t = 1$. After substitution of Eqs. (1) and (2) and rearrangement, this yields:

$$E_{t-1}(R_t) - R_t^0 = \mu\left(\sigma_t^2\right) - \left[\gamma \cdot \mu\left(\sigma_t^2\right)\right] \cdot R_{t-1}. \tag{3}$$

Hence, autocorrelation in returns is a function of feedback trading: positive (negative) feedback trading results in negative (positive) autocorrelation, as $-\gamma < 0$ ($-\gamma > 0$). With no feedback trading present ($\gamma = 0$), the formula collapses to the CAPM equation, i.e., the expected excess return on an asset is solely a function of risk: $E_{t-1}(R_t) - R_t^0 = \mu(\sigma_t^2)$ (e.g. Merton, 1980).

2.2. The models of liquidity- and information-motivated trades

Several authors have presented theoretical models where liquidity-driven or informed trading affects asset prices and trading volume, resulting in a dynamic return–volume relationship (e.g., CGW, Wang, 1994, LMSW). They show that in equilibrium, if trading driven by non-informational movies (liquidity or hedging needs) prevails, periods with intense trading are characterised by large price movements, as the market is trying to absorb the buying/selling pressure of liquidity trades. However, on subsequent days, prices tend to return to their fundamental values, thereby exhibiting a pattern of reversals and generating negative autocorrelation in stock returns. Should most trades be driven by private information, however, price movements induced by agents capitalizing on their information and accompanied by high trading volume will tend to continue on subsequent days, as the information becomes more widely available and generates further trades by broader masses of traders. These price continuations following high-volume days will induce positive autocorrelation in returns.

In the CGW model, which focuses on the non-informational motive to trade, there are two types of stock market participants, namely rational investors with a constant risk aversion (a) and (rational) liquidity (non-informed) traders with a time-varying risk aversion (b_t). Their respective demand functions are the following:

$$X_t^a = \frac{E_t(R_{t+1}) - R_{t+1}^0}{a \cdot Var_t(R_{t+1} - R_{t+1}^0)}, \tag{4}$$

[1] Informational spillovers and motives to trade are modelled in the time-varying parameter framework in other branches of the finance literature not directly related to our study, however (e.g., Hasbrouck, 1999, 2004).