Journal of Empirical Finance 23 (2013) 1–15

Contents lists available at ScienceDirect

Journal of Empirical Finance

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

Illiquidity shocks and the comovement between stocks: New evidence using smooth transition ☆,☆☆

Patricia Chelley-Steeley [a,1], Neophytos Lambertides [b,*], Christos S. Savva [b,2]

[a] Aston Business School, Aston University, Birmingham, B4 7ET, UK
[b] Cyprus University of Technology, Department of Commerce, Finance and Shipping, 3603 Lemesos, Cyprus

ARTICLE INFO

Article history:
Received 24 January 2012
Received in revised form 2 March 2013
Accepted 5 April 2013
Available online 13 April 2013

JEL classification:
G12
G14

Keywords:
Stock liquidity
Comovements
Smooth transition model

ABSTRACT

This paper extends the smooth transition conditional correlation model by studying for the first time the impact that illiquidity shocks have on stock market return comovement. We show that firms that experience shocks that increase illiquidity are less liquid than firms that experience shocks that decrease illiquidity. Shocks that increase illiquidity have no statistical impact on comovement. However, shocks that reduce illiquidity lead to a fall in comovement, a pattern that becomes stronger as the illiquidity of the firm increases. This discovery is consistent with increased transparency and an improvement in price efficiency. We find that a small number of firms experience a double illiquidity shock. For these firms, at the first shock, a rise in illiquidity reduces comovement while a fall in illiquidity raises comovement. The second shock partly reverses these changes as a rise in illiquidity is associated with a rise in comovement and a fall in illiquidity is associated with a fall in comovement. These results have important implications for portfolio construction and also for the measurement and evolution of market beta and the cost of capital as it suggests that investors can achieve higher returns for the same amount of market risk because of the greater diversification benefits that exist. We also find that illiquidity, friction, firm size and the pre-shock correlation are all associated with the magnitude of the correlation change.

1. Introduction

The aim of this paper is to examine the effects of illiquidity shocks on the comovements between stock and market returns. The study of illiquidity shocks is important because although prior studies have examined the impact of illiquidity on the illiquidity risk premium, the issue of whether variations in liquidity can have an impact on comovement or the market risk premium has not been considered previously. We are motivated to undertake this study as we anticipate that liquidity shocks influence the relative recognition by investors of market-wide and firm specific information which is captured by the measurement of comovement.

The study of comovement and its causes is important because covariation plays a vital role in determining portfolio selection strategies; see for example Markowitz, 1959, 1991. Moreover, comovement is important because as a component of market beta

☆ We are grateful for the helpful comments and suggestions from Panayiotis Andreou, Philip Gharghori, Nikos Koushis, Christodoulos Louca, Lenos Trigiorgis, and the participants of the 2011 Multinational Financial Management Conference and the 2011 Applied Financial Economics Conference for useful comments. We are particularly grateful to Ilias Tzavalis for many helpful suggestions.
☆☆ The authors are grateful for the helpful comments of an anonymous referee that have enhanced the paper.
* Corresponding author. Tel.: +357 25 002591.
E-mail addresses: p.l.chelley-steeley@aston.ac.uk (P. Chelley-Steeley), n.lambertides@cut.ac.cy (N. Lambertides), christos.savva@cut.ac.cy (C.S. Savva).
[1] Tel.: +44 121 204 3060.
[2] Tel.: +357 25 002349.

0927-5398/$ – see front matter © 2013 Elsevier B.V. All rights reserved.
http://dx.doi.org/10.1016/j.jempfin.2013.04.001

in the form of covariance it has an important influence over diversification opportunities and therefore portfolio performance, the market risk premium and the cost of capital.[3] Furthermore, as shown by Wurgler (2000) and Durnev et al (2004) return comovement is important because it is inversely associated with the efficient allocation of resources. Our study will therefore highlight whether liquidity shocks have a wider impact beyond the cost of trading on an important criteria for portfolio selection. Our paper makes an important contribution because we show for the first time that illiquidity shocks that reduce illiquidity lead to a fall in comovement suggesting a possible interdependency between liquidity changes and the measurement of market risk. In order to capture the effects of illiquidity shocks on return comovement we utilize the framework of a GARCH smooth transition conditional correlation model. The illiquidity change is the transition variable in this model and proxies for illiquidity shocks. The main advantage of the model is that illiquidity shocks are determined endogenously overcoming the problems associated with exogenously determined changes noted by Boyer et al (2008) and Forbes and Rigobon (2002).[4] Another advantage of the model is its ability to capture non-linearities which give rise to asymmetric responses to exogenous information. For example, investors seem to overreact after negative news, and are more conservative after positive news (see, e.g., Chan, 2003; Hong and Stein, 1999; Kothari et al., 2006; Vuolteenaho, 2002). Moreover, responses are not constant over time (Hong and Stein, 1999), suggesting the need for a non-linear time-varying model.

Prior studies including Amihud and Mendelson (1986), Amihud (2002), Asparouhova et al (2010) and Hasbrouck (2009), have all shown that illiquidity makes an important contribution to the risk premium of a stock.[5] The potential impact of liquidity on synchronicity is highlighted by Hasbrouck and Seppi (2001) and Korajczyk and Sadka (2008) who show that liquidity and returns contain common factors. Illiquidity is also an important friction driving a wedge between observed prices and fundamentals, see for example, Chelley-Steeley (2008), Huang and Stoll (1996), Stoll (2000) or Knez and Ready (1996) who show that trading costs are inversely related to trading activity. Eleswarapu and Venkataraman (2006) and Lang et al (2011) have shown that greater illiquidity leads to lower transparency which prevents all available information from being observed by investors. The effect of illiquidity frictions on market efficiency have been examined by Chordia et al. (2005) who show that increases in liquidity raise market efficiency.

Almost all prior studies have concentrated on the association between illiquidity (Amihud, 2002; Asparouhova et al., 2010; Hasbrouck, 2009) and returns, or on the association between illiquidity changes and returns (Amihud et al., 1997). However, the presence of an association between illiquidity levels or changes and returns is not sufficient to capture the effects of illiquidity shocks on returns. Changes are not substitutes for shocks because illiquidity shocks represent abnormal events.

Our aim is to study the impact that a liquidity shock might have on comovement, linking for the first time the literature on liquidity and comovement. We augment the Berben and Jansen's (2005) GARCH smooth transition time varying correlation model to allow for illiquidity shocks. This enables us to capture the return correlation between stock returns and the market portfolio, in response to an illiquidity shock. The advantage of this framework is that illiquidity shocks are identified endogenously and characterize the transition path to the new regime in terms of its smoothness. This is important to avoid a self-selection bias when estimating the relationship between illiquidity shocks and comovement. Moreover, the relationship between illiquidity and comovement is estimated without the need to rely on an equilibrium framework.

We use the Amihud (2002) illiquidity ratio to capture illiquidity in the smooth transition model and allow for the possibility of shocks that increase or decrease liquidity. We estimate the smooth transition model for all NYSE/AMEX ordinary common stocks listed on the CRSP/COMPUSTAT merged database between the periods January 1960 to December 2008.

Our results show that firms that experience a shock that reduces liquidity (increases illiquidity) have higher illiquidity ratios than firms that experience shocks that reduce illiquidity (raise liquidity) but have broadly similar market betas, size, HML and SMB factors. This suggests that firms that already have high levels of illiquidity are more likely to experience a liquidity shock that increases illiquidity further than firms with lower levels of illiquidity. Meanwhile, firms with lower illiquidity ratios and therefore higher levels of liquidity, appear less likely to experience shocks that increase illiquidity than their high illiquidity counterparts.

Furthermore, our results suggest that a shock causing a reduction in illiquidity leads to a significant fall in comovement between the security return and the market. We find an important asymmetry between shocks that raise and reduce illiquidity. When firms experience shocks that raise illiquidity there is no significant impact on comovement. We segregate the impact of an illiquidity shock on correlation changes associated with five groups of firms based on their illiquidity. We find that as firms become increasingly illiquid the effect of a shock that reduces illiquidity leads to a greater fall in comovement. This implies that firms with high illiquidity experience a greater fall in comovement, beta, risk and cost of capital following an illiquidity shock that reduces illiquidity.

Our discovery that a fall in illiquidity decreases comovement is consistent with market efficiency increasing for these securities due to a reduction in friction that increases price transparency and therefore the informativeness of prices. In a frictionless market comovement between stocks is influenced by the release of new information and the balance between firm specific and market-wide information. Roll (1988) showed that the higher the ratio of market-wide information to firm specific information the higher the level of comovement between stocks. Moreover, since firm specific information is likely to be more

[3] In a frictionless market the comovement between stocks is influenced by the release of new information and the balance between firm specific and market-wide information. Roll (1988) showed that the higher the ratio of firm specific information to market-wide information, the higher the level of comovement between stocks. The existence of frictions associated with the price setting process and the release of information also appear to influence the synchronicity of prices. Black (1986) noted that noise can drive prices temporarily away from their fundamental value due to errors in the analysis and interpretation of information, frictions in the trading process and other factors, see also Stoll (2000). Roll (1988) also recognized the importance of frictions and their ability to reduce synchronicity if frictions cause prices to deviate from their fundamental value.

[4] These include which sample periods to use in estimation, bias due to heteroscedasticity and selection bias.

[5] A survey of the studies that relate illiquidity to expected stock returns is provided in Amihud et al. (2005).