

Commonality in liquidity: transmission of liquidity shocks across investors and securities

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Abstract

What are the causes and consequences of commonality in liquidity? We examine this issue using a model of liquidity trading in which liquidity shocks are decomposed into common (systematic) and idiosyncratic components. We show that common liquidity shocks do not give rise to commonality in trading volume. Indeed, trading volume is independent of systematic liquidity risk, and this risk is always priced irrespective of market liquidity. In contrast, idiosyncratic liquidity shocks create liquidity demand and volume, and investors can diversify their risk by trading. Hence, pricing of the risk of idiosyncratic liquidity shocks depends on market liquidity, with idiosyncratic liquidity risk being fully priced only in perfectly illiquid markets. While trading volume increases with the variance of idiosyncratic liquidity shocks, price volatility increases with the variance of both idiosyncratic and systematic liquidity shocks. Surprisingly, our results are largely independent of the number of different securities traded in the market. When asset returns are uncorrelated, there is no transmission of liquidity across assets even when investors experience common liquidity shocks, suggesting that such liquidity shocks may not be the source of commonality in liquidity across assets detected in the literature. However, under limited conditions, more liquid securities can act as substitutes for less liquid securities. Overall, our findings suggest that common factors in liquidity may be the outcome of covariation in investor heterogeneity (e.g., as measured by co-movements in the volatility of idiosyncratic liquidity shocks) rather than of common liquidity shocks. Moreover, we find that different liquidity proxies measure different things, which has implications for future empirical analysis.

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1. Introduction

With the proliferation of financial securities and the markets in which they trade, considerable attention has been focused on the role of liquidity in financial markets. While the traditional focus of research in this area has been on the liquidity of individual securities, recent studies have detected common factors in prices, trading volume, and transactions cost measures such as bid–ask spreads.¹ These findings highlight the importance of understanding the mechanics by which liquidity demand and supply is transmitted across investors and securities. Chordia et al. (2000) note that drivers of common factors in liquidity may be related to market crashes and other market incidents, pointing to recent incidents such as the summer 1998 collapse of the global bond market and the October 1987 stock market collapse, which did not seem to be accompanied by any significant news. They also identify as an important area of future research the question of whether and to what extent common factors in liquidity affect asset prices.

What are the fundamental determinants of commonality in liquidity, and how are they reflected in standard liquidity measures and asset valuations? These questions are the focus of this paper. We develop a model that follows the basic intuition provided by Karpoff (1986), who characterizes non-informational trading as the outcome of differences in personal valuation of assets by investors, due to their differential liquidity needs. In our model, liquidity shocks that cause investors to revise their personal valuations can have both systematic (i.e., common across all investors) and idiosyncratic components. This formulation permits us to examine the transmission of liquidity shocks across assets and across the investor base of individual assets. Indeed, our analysis highlights the importance of variations in liquidity demand across investors as a crucial determinant of the liquidity of assets they hold.

Common factors in liquidity seem to imply that liquidity shocks apply systematically across investors, and are transmitted across investors and/or securities causing market-wide effects. We show that systematic and idiosyncratic liquidity shocks have significantly different effects on asset prices, trading volume and volatility. The demand for liquidity arises from investor heterogeneity caused by idiosyncratic liquidity shocks, and is manifested in trading volume. Contingent upon the state of liquidity in the market, trading volume increases with the intensity of idiosyncratic liquidity shocks (measured by their variance). In contrast, systematic liquidity shocks do not give rise to a demand for liquidity or affect trading volume, although they have a significant impact on price volatility. The risk of systematic liquidity shocks is always priced and is independent of the state of liquidity in the secondary market, since investors are unable to diversify this risk by trading.² The price volatility associated with systematic liquidity shocks is also not contingent upon the state of liquidity in the market. Indeed, as in Milgrom and Stokey (1982), systematic liquidity shocks will not induce trading even if the market is liquid. In contrast, the state of liquidity in the market is very important in the case of idiosyncratic liquidity shocks. Since investors

¹ See, for example, Tkac (1999), Chordia et al. (2000), Gibson and Mougeot (2000), Lo and Wang (2000), Huberman and Halka (2001), Hasbrouck and Seppi (2001), and Pástor and Stambaugh (2003).

² Gibson and Mougeot (2000), and Pástor and Stambaugh (2003) confirm that systematic market liquidity is priced in the US stock market.

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