



# Option market liquidity: Commonality and other characteristics<sup>☆</sup>

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Available online 10 September 2009

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## Abstract

This study examines option market liquidity using Ivy DB's OptionMetrics data. We establish convincing evidence of commonality for various liquidity measures based on the bid–ask spread, volumes, and price impact. The commonality remains strong even after controlling for the underlying stock market's liquidity and other liquidity determinants such as volatility. Smaller firms and firms with a higher volatility exhibit stronger commonalities in option liquidity. Aside from commonality, we also uncover several other important properties of the option market's liquidity. First, information asymmetry plays a much more dominant role than inventory risk as a fundamental driving force of liquidity. Second, the market-wide option liquidity is closely linked to the underlying stock market's movements. Specifically, the options liquidity responds asymmetrically to upward and downward market movements, with calls reacting more in up markets and puts reacting more in down markets.

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*JEL classification:* G10; G12; D82

*Keywords:* Liquidity; Liquidity commonality; Option market liquidity; Stock market liquidity

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Market liquidity has received much attention lately both in the media and in the academic literature. There are numerous studies that examine the liquidity characteristics and the pricing of illiquidity risk for stocks and bonds. In contrast, such research on the

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<sup>☆</sup>The initial version of this paper was titled “Commonality in Liquidity: Evidence from the Option Market.”

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option market is still lacking or, at best, merely starting. Insofar as the ultimate goal is to determine how much premium illiquidity and illiquidity risk command, the first step is to study the liquidity characteristics and to investigate whether there exists an illiquidity risk. This is the focus of the current paper. We contribute to the literature by demonstrating the existence of illiquidity risk or liquidity commonality in the option market and by unveiling other important liquidity characteristics for options.

Using data from Ivy DB's OptionMetrics for the period from January 1, 1996 to December 31, 2004, we demonstrate strong evidence of liquidity commonality in the option market for such liquidity measures as the bid–ask spread, volume, and price impact. The commonality remains after controlling for the impact of the underlying stock market and the individual determinants of liquidity such as volatility. Moreover, we find a size-effect and a volatility-effect in commonality, especially for the spread measure: Smaller firms and firms with a higher volatility exhibit stronger commonalities in liquidity.

Other than commonality, we also uncover several other important liquidity characteristics for the option market. First, employing various proxies and through different tests, we find that information asymmetry plays a much more important role than inventory risk as a driving force of the option market liquidity. One piece of supporting evidence is the *positive* correlation between changes in the bid–ask spread and the trading volume, in contrast to the more intuitive negative relation for stocks. Our findings are consistent with the notion that informed traders tend to trade in the option market (Black, 1975; Easley et al., 1998; Pan and Poteshman, 2006) and that market-makers infer information from volumes and protect themselves by widening the spread upon seeing an increase in the trading volume (Easley and O'Hara, 1992; Kim and Verrechia, 1994). Second, the market-wide liquidity is closely linked to the movements of the overall underlying stock market. Specifically, the option market liquidity responds asymmetrically to upward and downward market movements. For instance, the proportional bid–ask spread of calls decreases in up markets and increases in down markets; for puts, the spread remains roughly unchanged in up markets but decreases in down markets. More striking is how call and put options respond differently to the same market movement: Call options' liquidity mostly responds to upward market movements while put options' liquidity mostly responds to downward movements. Our results therefore suggest that options are favored by informed traders to realize their information value and are also the investors' choice to trade in response to general market movements.

The literature on liquidity commonality originated from the seminal work of Chordia, Roll, and Subrahmanyam (2000) (CRS hereafter). They examined 1,169 NYSE stocks and found strong evidence of commonality. Independent of CRS (2000) and using different methodologies, Hasbrouck and Seppi (2001) and Huberman and Halka (2001) also showed the existence of common liquidity factors across stocks. Subsequent studies generally confirmed or rationalized the early evidence. For instance, Coughenour and Saad (2004) demonstrated that the covariation in liquidity is induced on the supply side since each NYSE specialist firm provides liquidity for many stocks and the firm's specialists share the same capital pool and relevant information; Brockman and Chung (2002), Fabre and Frino (2004), and Zheng and Zhang (2006) showed that commonality in liquidity also exists in order-driven markets; Brockman et al. (2009) confirmed the existence of liquidity commonality for stocks on 47 exchanges around the world; finally, Domowitz et al. (2005) showed that commonality in liquidity is a manifestation of the co-movements in supply and demand, which, in turn, are caused by the cross-sectional correlation in order types.

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