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Measuring liquidity in emerging markets ☆

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ABSTRACT

We propose a modified version of the Amihud illiquidity measure, *AdjILLIQ*, which performs well in different types of emerging markets. Our *AdjILLIQ* measure combines the virtues of the original Amihud ratio and the non-trading-frequency measure. It exhibits higher correlation with spread and price impact than other existing low-frequency liquidity measures in most of our sample markets. The improvement gained from using our *AdjILLIQ* measure is particularly significant in inactively-traded markets and low-turnover stocks. We find that the liquidity in emerging markets, as measured by *AdjILLIQ*, can be improved by better disclosure and less information asymmetry. Furthermore, the liquidity dry-up during market downturns can also be alleviated by better information environment.

1. Introduction

The importance of liquidity in financial markets has been examined by a growing number of studies (e.g. Amihud, Mendelson and Pedersen (2005), Brennan and Subrahmanyam (1996), Liu (2006), and Hasbrouck (2009), etc.) In an influential paper, Amihud (2002) introduces a liquidity measure that can be estimated as the stock's absolute daily return divided by its trading volume, and finds that the positive illiquidity-return relationship holds for a long sample period from 1964 to 1997. The Amihud illiquidity ratio measure receives high popularity because of its easiness to construct and effectiveness in measuring liquidity. For example, Acharya and Pedersen (2005) use the Amihud ratio to show that the covariance between stock liquidity and market return or market liquidity has a considerable impact on the stock's

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expected return. Using the Amihud illiquidity ratio as a liquidity proxy, Amihud, Hameed, Kang and Zhang (2013) examine the illiquidity premium in global equity markets.

However, there is an important assumption that must hold in order for the Amihud ratio to be a valid liquidity measure—the stock should have non-zero trading volume most of the time. In other words, if there is no trading and the volume is zero, the Amihud ratio will become undefined. In the U.S. market, this is less of a concern since most stocks are actively traded and non-trading days are rare. But in emerging markets, where liquidity could be low and non-trading days occur more frequently, this concern becomes much more relevant and may affect the validity of adopting Amihud ratio as the liquidity measure. In fact, the mean (median) value of the percentage of trading days with zero volume in the emerging markets is 14.56% (11.58%), substantially higher than its mean (median) value in the G7 markets, which is only 6.10% (3.09%). At the same time, having an appropriate liquidity measure in such less liquid markets is particularly important to develop a better understanding of the role of transaction cost and liquidity in the pricing of risky asset and market efficiency for these markets. Lee (2011) shows that liquidity risk is more significant in emerging markets. Lang, Lins and Maffett (2012) find that transaction costs are higher and liquidity is lower for firms in emerging markets. Hence, given the rapid growth of emerging markets in recent years and their increasing popularity among investors, in this study we explore the possibility of modifying the original Amihud ratio so that it can be applied more appropriately to less actively-traded emerging equity markets.

In this paper, we propose a modified Amihud measure, *AdjILLIQ,* which includes both the original Amihud ratio and the frequency of non-trading days. The modified Amihud measure, *AdjILLIQ,* is defined as the log transformation of the original Amihud ratio multiplied by the sum of one and the proportion of non-trading days in the given month, which is actually another low-frequency liquidity measure (ZeroVol). Using the bid-ask spread and the price impact measure constructed from the transaction-level data as the liquidity benchmarks, our empirical analysis shows that the modified Amihud measure (*AdjILLIQ*) delivers good performance in all types of emerging markets, including both actively and inactively-traded ones.

There is a substantial cross-market difference in trading activity across emerging markets. At one extreme of the spectrum, some emerging markets are highly actively traded. For example, the daily turnover rate can be as high as 1.3% and there are few non-trading days in China stock market. At the opposite end, some other emerging markets have low trading activity and are flooded with a large number of non-trading-day observations. For example, in Argentina market, the daily turnover rate is less than 0.1%, and the proportion of zero-volume or non-trading-day observations is as high as 24%. As mentioned above, the original Amihud ratio performs better in actively-traded markets, but its effectiveness declines as the number of non-trading days increases. On the other hand, ZeroVol shows a high correlation with high-frequency liquidity measures when there are a large number of non-trading-day observations, but its value distribution is truncated at zero for actively-traded markets or stocks. Thus, ZeroVol can serve as a complementary liquidity measure when the effectiveness of the original Amihud ratio is weakened by the existence of non-trading days. Our modified Amihud measure (*AdjILLIQ*), as a combination of the original Amihud ratio and non-trading-days frequency (ZeroVol), outperforms both of those two individual measures in terms of the effectiveness at measuring liquidity.

Furthermore, our analysis suggests that, among the existing low-frequency liquidity measures, the original Amihud ratio is the best proxy for price impact, while ZeroVol correlates well with the bid-ask spread. Hence, when we use these two measures to produce our *AdjILLIQ* measure, it combines the virtues of both measures and exhibits higher correlation with both the price impact and the bid-ask spread than all other existing low-frequency liquidity measures, including Roll's measure, Hasbrouck's Gibbs measure, Liu's measure, and others, in most of our sample emerging markets.

We noticed that there is a booming literature about constructing new liquidity measures. Liu (2006) and Holden (2009) propose new liquidity proxies and compare them with the existing liquidity measures in the U.S. market. Goyenko, Holden and Trzcinka (2009) run a horserace of various liquidity proxies in the U.S. market and conclude that Amihud measure is one of the best performers. Florackis, Gregorious and Kostakis (2011) propose a new price impact measure defined as return-to-turnover ratio and compare it with the Amihud illiquidity ratio using data from the London Stock Exchange. Lesmond (2005) examines the liquidity proxies using quarterly firm-level quoted bid-ask spread in the emerging markets. Our study differentiates itself from the above studies by combining the following attributes: (1) we propose a modified Amihud measure, which has the appealing features for the inactively-traded emerging markets