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Liquidity measurement in frontier markets☆

Ben R. Marshall, Nhut H. Nguyen*, Nuttawat Visaltanachoti

Massey University, New Zealand

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ABSTRACT

Frontier markets which are countries that have not yet reached emerging market status, have been shown to provide diversification benefits for international investors. However, many stocks in these markets are thinly traded so liquidity is an important consideration. We investigate which liquidity proxies best measure the actual cost of trading in 19 frontier markets that can be accessed by foreign investors. We find the Gibbs, Amihud, and Amivest proxies have the largest correlation with liquidity benchmarks, while the FHT measure provides the best measure of the magnitude of actual transaction costs.

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1. Introduction

Frontier markets are attracting increased attention from investors and researchers. These markets, which are less developed than emerging markets, have "low integration with the world market, and thereby offer significant diversification benefits." (Berger et al. (2011, p. 227). However, frontier markets are relatively illiquid. Marshall et al. (2012a) show spreads are, on average, over two and a half times larger in frontier markets than in the U.S. Correctly measuring and accounting for liquidity is clearly an important issue in frontier market research.

We adopt a similar approach to Goyenko et al. (2009) and Fong et al. (2011) and run "horse races" between popular liquidity proxies in frontier markets to determine which measures have the largest correlations and lowest root mean squared errors with high frequency liquidity benchmarks.

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* Corresponding author at: School of Economics and Finance (Albany), Massey University, Private Bag 102904, North Shore, Auckland 0745, New Zealand. Tel.: +64 9 414 0800x43179; fax: +64 9 441 8177.
E-mail addresses: b.marshall@massey.ac.nz (B.R. Marshall), n.h.nguyen@massey.ac.nz (N.H. Nguyen), n.visaltanachoti@massey.ac.nz (N. Visaltanachoti).

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As Goyenko et al. (2009) note, studies often consider issues like the link between liquidity and returns using a particular liquidity proxy, without first verifying that the proxy in question is an accurate measure of liquidity. These authors note that tick data availability is a contributing factor. They state (p. 153) "in many countries transaction data are not available at all."

Frontier market research is in its infancy compared to developed and emerging market work. Most research to date has concentrated on the integration of frontier markets, on their correlations with other markets, and on the diversification benefits that these markets provide. Berger et al. (2013) document diversification benefits from frontier market ETFs for US and international investors. Cheng et al. (2009) show investment in nine North African and Middle Eastern markets result in diversification gains to investors with global market exposure. Jayasuriya and Shambora (2009) find that U.S. investors would have earned higher risk-adjusted returns if they had invested in five frontier markets, while Speidell and Krohne (2007) show frontier markets have lower correlations with the U.S. equity market (S&P 500) than emerging markets. Frontier market research in other areas includes de Groot et al. (2010) who show value and momentum effects prevail in frontier markets. Frontier Benić and Franić (2008) who document the liquidity of the Bulgarian, Croatian, Serbian, and Slovenian stock markets, and Minović and Živcović (2010, p. 33) who find "illiquidity and liquidity risk significantly impact price formation" in Serbia. Other papers touch on various aspects of liquidity in international countries including a subset of the frontier markets we consider. The authors of these papers include in their emerging markets studies countries, such as Argentina, Pakistan, and Sri Lanka, which are now classed as frontier markets.[1] Jun et al. (2003) find stock returns in a group of countries including Argentina, Pakistan, and Sri Lanka are influenced by market liquidity, while Bekaert et al. (2007) also show there is a link between liquidity and returns in countries including the frontier markets of Argentina and Pakistan. Brockman et al. (2009) find evidence of liquidity commonality in many international markets but little evidence of liquidity commonality in Argentina. Lee (2011) tests the liquidity-adjusted CAPM in 50 countries including Argentina and Pakistan, while Lang et al. (2012) find, in a sample that includes firms from Argentina and Pakistan, that companies are more liquid when there is more firm-level transparency.

Our analysis is based on tick and low-frequency data for 19 frontier market countries for the period 2002–2011. We use two approaches to determine the extent to which the liquidity proxies represent the liquidity benchmarks. The first involves correlation analysis and the second uses root mean squared errors. As Goyenko et al. (2009) point out, the correlation results are likely to be of most interest to researchers in asset pricing who are seeking to answer questions such as the impact of liquidity on stock returns, while the root mean square error results should be most relevant to researchers who require a proxy with an accurate scale in areas like market efficiency.

The transaction cost benchmarks are effective spread, quoted spread, and price impact. Each of these is calculated using tick data for all stocks within each frontier market. This data is sourced from the Thomson Reuters Tick History (TRTH) database. The liquidity proxies that we test include "Roll" from Roll (1984), "Gibbs" from Hasbrouck (2004, 2009), "Zeros" and "Zeros2" from Lesmond et al. (1999), "FHT" from Fong et al. (2011), "Amihud" from Amihud (2002), "Amivest" from Amihud et al. (1997), and "Pást Stam" from Pástor and Stambaugh (2003). We also follow Goyenko et al. (2009) and convert the spread proxies, such as "Roll" to price impact proxies by dividing by average daily dollar volume. This list of liquidity proxies is not exhaustive. We discuss the reasons behind our proxy choice in more detail later in the paper.

We find the Amihud and Gibbs measures have the largest average correlations across the 19 frontier markets and the largest number of statistically significant country correlations with the effective spread and quoted spread benchmarks. Amivest, Roll, FHT, and Zeros also perform well. However, the Zeros2 measure does not appear to be an effective proxy for either of the spread benchmarks. Amihud is the best performing proxy for price impact. However, the Roll Impact, FHT Impact, Gibbs Impact, Amivest, and Zeros Impact proxies also perform adequately. Neither the "Pást Stam" nor Zeros2 Impact proxies correlate well with the price impact benchmark. The FHT proxy performs the best in the root mean square error analysis. Its scale is, on average, the closest to the scale of both the effective and

[1] The papers we include are representative of other work in this area.

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