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New low-frequency spread measures

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Abstract

I develop new spread proxies that pick up on three attributes of the low-frequency (daily) data: (1) price clustering, (2) serial price covariance accounting for midpoint prices on no-trade days, and (3) the quoted spread that is available on no-trade days. I develop and empirically test two different approaches: an integrated model and combined models. I test both new and existing low-frequency spread measures relative to two high-frequency benchmarks (percent effective spread and percent quoted spread) on three performance dimensions: (1) higher individual firm correlation with the benchmarks, (2) higher portfolio correlation with the benchmarks, and (3) lower distance relative to the benchmarks. I find that on all three performance dimensions the new integrated model and the new combined model do significantly better than existing low-frequency spread proxies.

JEL classification: C15; G12; G20

Keywords: Liquidity; Effective spread; Transaction cost; Asset pricing; Market efficiency

1. Introduction

In a classic and influential paper, Roll (1984) develops a simple proxy for the effective spread using price data only. Lesmond et al. (1999) and Hasbrouck (2004) develop additional proxies for the effective spread using low-frequency (daily) data. Amihud (2002) and Pastor and Stambaugh (2003) develop low-frequency liquidity measures that perhaps might be viewed as proxies for price impact, more than for the effective spread. Collectively, these low-frequency spread proxies allow the study of liquidity over relatively long periods of time and across countries. This is helpful to the asset pricing literature,

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because recent studies suggest that liquidity is a priced risk factor. This is also helpful to recent studies in the market efficiency and corporate finance literatures, which utilize spread proxies for the cost of trade by stock, by time period, and across countries. Is it possible to create new low-frequency spread proxies that perform better than the existing low-frequency spread proxies? In this paper, better performance is primarily evaluated relative to two high-frequency benchmarks (percent effective spread and percent quoted spread) and on three dimensions: (1) higher individual firm correlation with the benchmarks, (2) higher portfolio correlation with the benchmarks, and (3) lower distance (tracking error) relative to the benchmarks. I find that the answer is "yes" on all three dimensions.

Spread proxies can be constructed from daily data going back more than 80 years in the United States and for various time spans in countries around the world. For U.S. equity markets, the Center for Research in Security Prices (CRSP) provides five key daily stock variables: prices, returns adjusted for splits and dividends, volume, high/ask, and low/bid.[1] These five variables are available for all NYSE/AMEX firms from December 31, 1925 to the present and for all NASDAQ firms from December 14, 1972 to the present.

High-performing low-frequency spread measures would be very helpful to the asset pricing literature. Chordia et al. (2000), Sadka (2003), Acharya and Pedersen (2005), Fujimoto (2004), Hasbrouck (2009), and others show that in recent U.S. experience various liquidity measures vary systematically and are priced; Bekaert et al. (2007) provide similar evidence for emerging markets where liquidity concerns may be more pronounced. Spread proxies going back in time and/or across countries are needed to determine whether or not these asset pricing relationships hold up across time and space.

High-performing low-frequency spread measures would be very helpful to the market efficiency and corporate finance literatures. De Bondt and Thaler (1985), Jegadeesh and Titman (1993), Jegadeesh and Titman (2001), Chan et al. (1996), Rouwenhorst (1998), and many others have found trading strategies that appear to generate significant abnormal returns. Correctly scaled spread proxies over time and/or across countries are needed to determine if these trading strategies are truly profitable net of a relatively precise measure of cost of trading. Similarly, Dennis and Strickland (2003), Kalev et al. (2003), Cao et al. (2004), Lipson and Mortal (2004a), Schrand and Verrecchia (2004), Lesmond et al. (2005), and many others examine the impact of corporate finance events on stock liquidity. Helfin and Shaw (2000), Lipson and Mortal (2004b), Lerner and Schoar (2004), and many others examine the influence of liquidity on capital structure, security issuance form, and other corporate finance decisions. Spread proxies over time would expand the potential sample size of this literature. Spread proxies across countries would greatly extend the potential diversity of international corporate finance environments that this literature could analyze.

This paper develops new, low-frequency spread measures that pick up on three attributes of the daily data. One attribute is price clustering—the higher likelihood for trade prices to be on rounder increments. One can directly observe the frequency of various price clusters (odd eighths, odd quarters, etc. on a fractional price grid and off-pennies, off-nickels, off-dimes, etc.[2] on a decimal price grid) and use this information to infer the

[1]High/ask means the highest trade price on a trading day or the closing ask price on a non-trading day. Similarly, low/bid means the lowest trade price on a trading day or the closing bid price on a non-trading day.

[2]Off-pennies are penny price points that are not nickels, dimes, or any higher clusters, namely where the last digit of the price is 1, 2, 3, 4, 6, 7, 8, or 9. Off-nickels are nickel price points that are not dimes, quarters, or any higher clusters, namely where the last two digits of the price are 05, 15, 35, 45, 55, 65, 85, or 95. And so on.