Determinants of ETF Liquidity in the Secondary Market:
A Five-Factor Ranking Algorithm

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Exchange-traded funds have been in existence only since the early 1990s, and as a result there is relatively scant research on them in the academic literature. However, the market demand for these products has rapidly increased over the last five years. Today there are hundreds of specialty ETFs that have a much narrower focus. In fact, roughly 75% of the ETFs traded today have existed for less than five years. As of January 2009, there were 884 ETFs with about $480 billion in total assets (Kosnett [2008] and Investment Company Institute [2009]). We think that an "ETF redundancy" problem may be germinating in what is already a crowded asset-type space. As a first step towards establishing this, we develop a liquidity scoring algorithm that enables us to rank these derivative securities on an ordinal scale. To accomplish this we first identify the determinants of liquidity in the secondary ETF market and then optimize the loadings on each of the determining factors to generate a scalar liquidity score for each ETF. The ETFs are then ranked, based on the liquidity score, and top 50 and bottom 50 liquidity lists are generated and presented in the article.

A large number of the current ETFs are duplicative (in design and coverage) and possibly serve as a tool for issuing firms to gain market share. We suspect that many of the newer funds tend to be smaller with lower average trading volumes, higher expense ratios,

asynchronous trading, and wider bid–ask spreads. This lack of liquidity could be a signal from the market that some of these ETFs could underperform the aggregate of their underlying assets once all trading costs and management fees are factored in. Additionally, if an ETF continues to have lower liquidity it may be a signal from the market that the security does not serve as a tool for market completion. We also suspect that the larger funds will have lower bid–ask spreads and lower expenses, which should make them more attractive, particularly for large trades. If these suspicions are true, these results have significant implications for the ETF market, suggesting that bigger is better and perhaps consolidations are in order. If not, then it can be concluded that smaller ETFs are more nimble and investors should focus their investments into smaller ETFs; this would possibly support the rapid growth in both number and types of ETFs in the last two years.

As ETFs become more popular for both individual and institutional investors, it is important to understand the determinants of liquidity. Previous research on ETF liquidity has suggested that there are no liquidity issues due to the creation/redemption activities of the market makers (McNally [2001]). Ryan and Follet [2001] link ETF liquidity to the liquidity of the underlying index. Kittsley and Edrosolan [2008] take a more recent look at liquidity and find that in the secondary market,

bid-ask spread and trading volume are important determinants of liquidity as well.

This article represents the first academic analysis of the determinants of liquidity for ETFs in the secondary market, and it also develops a liquidity scoring algorithm for ranking funds based on five readily available factors. The results of this study should be of interest to firms crafting new ETF products as well as investors, both institutional and retail. Following Chordia, Roll, and Subrahmanyam [2008], a study of liquidity is also a study of market efficiency; this article attempts to determine the components of liquidity in the ETF market and calibrate them based on their liquidity, with the ultimate goal of making the ETF market more efficient.

DETERMINANTS OF LIQUIDITY

To develop our ranking mechanism we utilize five well-known factors that are discussed in the literature as liquidity measures. These are the bid-ask spread, asset size, expense ratios, annual turnover, and trading volume. Amihud and Mendelson [1980] suggest using bid-ask spread as a measure of liquidity. Generally speaking, securities with lower bid-ask spreads tend to be more liquid than those with large bid-ask spreads. Kyle [1985] refers to this as a measure of "tightness." Stoll and Whaley [1983] find that stocks of large firms tend to be more liquid than small firms, so we use size as a liquidity variable to proxy the depth of the market. In the ETF universe, we hypothesize that funds with lower expense ratios will be more liquid, since the large ETFs are advantaged by economies of scale and have the ability to spread management costs over more investment units. Expense ratios represent an additional transaction cost that could impact liquidity. Chordia, Roll, and Subrahmanyam [2008] find that liquidity stimulates arbitrage activity, and thus lower-transaction-cost markets tend to be more efficient. Yan [2008] recognizes that funds with high turnover have high demands for immediacy and tend to adversely impact performance. Since high turnover funds would tend to have higher transaction costs as well as adverse tax impacts on taxable investors, we expect turnover to be inversely related to liquidity. Garbade and Silber [1982] find that assets with higher trading volumes tend to be more liquid, so we expect average

trading volume to be a determinant of liquidity. Kyle [1985] refers to this as a measure of "depth."

Following the techniques of Agrrawal [2009], the data, including the bid-ask spreads, are drawn from several Internet-based sources including Morningstar and the CSI data that is provided for web applications such as Yahoo! Finance and Google Finance. The sample is limited to ETFs with a minimum of one year of return data, which by itself led to a reduction in the ETF count from 884 to 624. Of these, there were 418 ETFs that had complete information for all of the following five variables: total assets under management, average trading volume, average bid-ask spread, annual turnover, and management fees. To approximate a Gaussian distribution and minimize outlier impact, all variables were subjected to the natural log transformation.

RESULTS

Exhibit 1 provides descriptive statistics for each variable. The large differences between the mean and median for each of these variables, as well as the minimum and maximum values, are indicative of dispersion and major differences between the largest and smallest funds in the ETF market.

Exhibit 2 looks at the correlation between our liquidity factors. Consistent with expectations, we find that there is a negative relationship between the bid-ask spread and both the size and trading volume variables, which tells us that the low bid-ask spread ETFs are typically larger and have higher trading volumes. Annual turnover is negatively correlated with size and trading volume, and positively correlated with expense ratio; this suggests that

E X H I B I T 1
Descriptive Statistics of Liquidity Variables

Statistics are presented for the bid-ask spread measured in basis points, the market capitalization, the Morningstar expense ratio, the annual turnover as reported by Morningstar, and the three-month average trading volume.

	Mean	Median	Minimum	Maximum	Std. Dev.
Bid-Ask Spread (in BP)	29.78	15.31	0.91	545.07	48.33
Size ($)	776.30 M	91 M	1.20 M	31.90 B	2378.88 M
Expense Ratio (%)	0.56	0.50	0.07	4.33	0.48
Annual Turnover	0.39	0.23	0.00	5.83	0.51
Avg. Volume (3 mo.)	2.85 M	58,737	222	167.36 M	15.09 M

E X H I B I T 2
Correlation Matrix of Liquidity Determinants

	ln-BidAsk-Spread	ln-Size	ln-Mstar-Expense	ln-Annual Turnover	ln-Vol-3 mo
ln-BidAsk-Spread					
ln-Size	**−0.6584** p = 0.00				
ln-Mstar-Expense	**0.3645** p = 0.00	−0.5666 p = 0.00			
ln-Ann-Turnover	0.0539 p = 0.253	−0.2735 p = 0.00	0.3417 p = 0.00		
ln-Vol-3 mo	**−0.6679** p = 0.00	0.8684 p = 0.00	−0.3404 p = 0.00	−0.2467 p = 0.00	

Note: ln stands for the natural logarithm, Mstar stands for Morningstar, Vol stands for daily volume. Except for turnover, the correlations of the factors with the bid-ask spread are strong and have the sign that could be considered intuitive. ETFs with large bid-ask spreads typically seem to have smaller market capitalizations, higher expense ratios, and much lower investor interest as proxied by the trailing 3-month daily volume.

large ETFs have lower turnover and that high turnover ETFs have higher expenses. We also find a positive correlation between the bid–ask spread and the expense ratio, which suggests that bid–ask spreads tends to rise as expenses rise, indicating that investors have lower interest levels in the more-expensive ETFs, which perhaps drives their volumes and liquidity to even lower levels. Our ranking criterion easily identifies such securities. The negative correlation also implies that low–expense ETFs have lower bid–ask spreads. Size (market capitalization) is positively correlated with volume and negatively correlated with expense ratio, suggesting larger ETFs tend to have higher trading volume and lower expenses.

Exhibit 3 provides a brief graphical depiction of the distribution of each of our liquidity variables as well as a matrix-scatterplot representing the relationship between the bid-ask spread (X-axis) and the other liquidity variables (Y-axis). As expected, there is a strong downward-sloping relationship between the bid-ask spread and both the ETF size and average trading volume variables. The relationship between bid-ask spread and expenses is positive, though less pronounced (correlation = 0.36, p-value = 0.00, Exhibit 2). Also, there appears to be a relatively flat relationship between the bid-ask spread and annual turnover. This effect appears more pronounced due to the fact that the vast majority of ETFs have low annual turnover, which is by design and an attribute of most ETFs. The last scatterplot in the panel shows the positive relationship between the liquidity score developed later in this article and the bid–ask spread (correlation = 0.66), suggesting that funds with low bid–ask spreads will typically be highly liquid.[1]

LIQUIDITY RANKING METHODOLOGY

Our ranking algorithm determines a liquidity score, and eventually a rank, for each of the 418 ETFs that have complete data for all five factors. An iterative optimization approach is utilized to obtain the factor loadings on each factor that contributes to a unified liquidity scalar score. The liquidity score vector is then transformed to an ordinal ranking for the full set of ETFs in our study.

$$\text{Max}\,\rho\left\langle \sum_{i=1}^{5} \omega_i^v \phi_i^j, \phi_{A \in \{1,..5\,\text{factors}\}} \right\rangle \quad \forall\, j \in \left\{ \text{set of all ETFs} \right\}$$

$$\text{and} \quad \forall\, \omega^v \in \left\{ -\infty, +\infty \right\} \text{ and all } v \text{ iterations}$$

$$\xrightarrow{\text{for optimal } \omega^*} \sum_{i=1}^{5} \omega_i^v \phi_i^j \equiv eLS, \text{the liquidity score}$$

$$\Rightarrow \Theta, \text{the liquidity rank} \qquad (1)$$

where ω are the weights on the ranked factors ϕ, Θ is the resulting rank of the liquidity score vector for the optimal ω^*, ρ is the correlation between the score array and the factor array, and the first factor ϕ_1 is the bid-ask spread.

EXHIBIT 3
Individual Liquidity Determinant Distributions and Scatterplots Relative to the Bid-Ask Spread

This exhibit provides a brief graphical view of the distribution of each of our liquidity variables as well as a matrix-scatterplot representing the relationship between the bid-ask spread (X-axis) and the other liquidity variables (Y-axis).
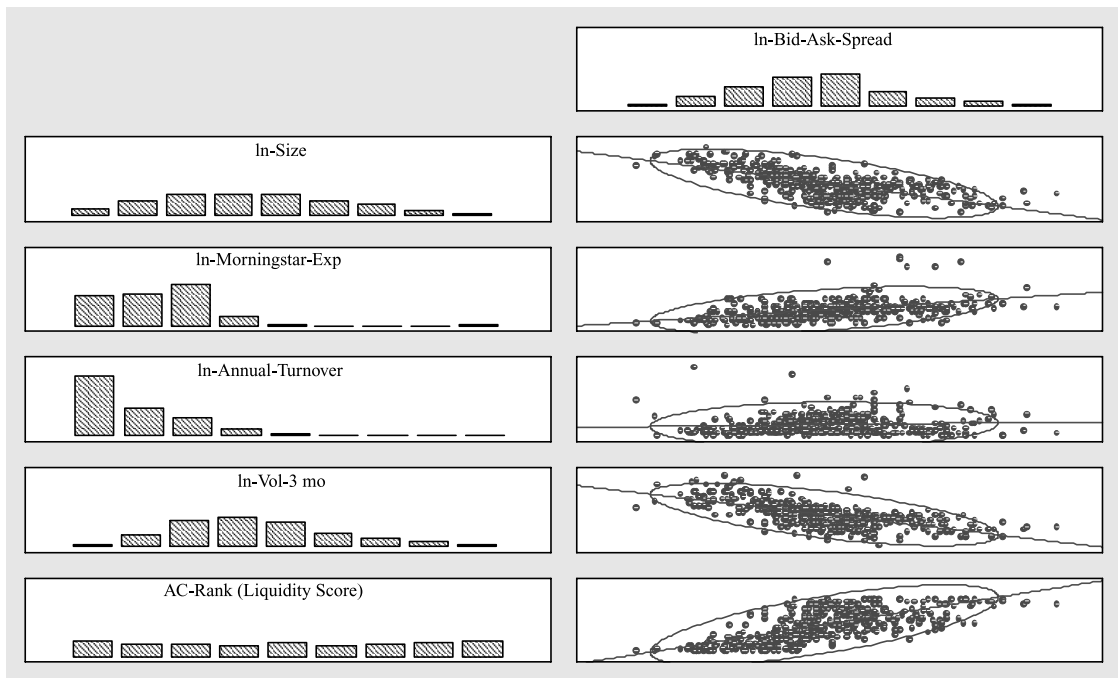
To understand the impact that each variable has on the liquidity score, we also estimated the following OLS regression model:

$$eLS_i = a + b_1 \ln(BA_i) + b_2 \ln(S_i) + B_3 \ln(ER_i) \\ + B_4 \ln(AT_i) + B_5 \ln(V_i) \\ \forall i = 1, 2, \ldots 418 \qquad (2)$$

where the ETF liquidity score (*eLS*) is the dependent variable and the factor variables are bid-ask spread (*BA*), size (*S*), expense ratio (*ER*), annual turnover (*AT*), and three-month average trading volume (V)—each with the natural logarithm transformation, for each ETF *i* in our sample. The results of this regression had an R^2 of 0.89 and an adjusted R^2 of 0.79, suggesting that our *eLS* value was reflecting well the unified influence of the five explanatory factors. A low R^2 would have indicated a lack of monotonicity and an inability to aggregate the independent factors into an easily usable one-dimensional ranking score. Equation (3) provides the coefficient estimation results[2] along with the associated p-values.

$$eLS_i = 1005.8 + 6.5 \ln(BA_i) - 39.9 \ln(S_i) + 172.4 \ln(ER_i)$$
$$(0.00) \qquad (0.03) \qquad (0.00) \qquad (0.00)$$
$$- 86.9 \ln(AT_i) - 7.5 \ln(V_i) \qquad (3)$$
$$(0.00) \qquad (0.0002)$$

These results indicate that the ETFs with low bid-ask spreads, high market capitalizations, low expense ratios, high annual turnover, and high average trading volume produce the lowest numerical values that are indicative of the highest liquidity levels. All of these interactions are as expected, with the exception of the annual turnover variable. This is likely skewed by the significantly higher annual turnover found in the top-liquidity-decile ETFs relative to the next decile.

LIQUIDITY RANKING RESULTS

Once the ranking was established, we deciled the liquidity vector, and the decile averages of the associated factors are presented in Exhibit 4. These results show that the most liquid funds typically have a lower bid-ask

spread, higher market capitalization, lower expense ratio, and higher average trading volume. The top-decile ETFs have more than twice the average daily trading volume of the next decile and more than four times the market capitalization. This suggests that institutional traders should focus on these top-decile ETFs if they require large positions, in order to minimize liquidity risk and have minimal market impact. We do not see a discernable pattern between the liquidity ranking and annual turnover (Exhibit 3). However, most of the lower-liquidity deciles have higher-than-average turnover, with the exception of decile 1.

Exhibit 5 presents the top 50 liquid ETFs based on our ranking methodology. It can be seen that many of the well-known ETFs are ranked very highly by our liquidity scoring algorithm and are represented in the top 50 list. SPY comes in at number 6, QQQQ at number 17, and DIA at number 16. It can also be seen that many of the most-liquid ETFs have at least a 5-year trading history. In fact 35 of the top 50 most liquid ETFs were started prior to 2003. It is also interesting to note that 45 of these top ETFs have at least $1 billion in market capitalization, and 17 have more than $5 billion in market capitalization. The top-50 list also represents

25 different style categories. Of particular interest is the liquidity ranking of fixed-income-based ETFs. Eleven of the top 50 most-liquid ETFs focus on fixed-income securities, including the top three most liquid funds. This could be somewhat of a revelation to even the most seasoned ETF trader, and it may be due to the fact that bond ETFs typically get less media exposure, possibly due to a certain indifference toward non-equity securities. Alternatively, this increase in interest could be in response to the market crash in 2008, which resulted in increased flows into fixed income securities.

In Exhibit 6 we show the bottom 50 ETFs as ranked by our liquidity algorithm. It is clear that these ETFs appear to be targeting very specialized market segments and are relatively newer, with most of them being issued after 2005. These also have high bid–ask spreads, low market capitalization, low daily trading volumes, and expense ratios that are about six times higher than the average of the 50 most-liquid ETFs. This suggests that the market is efficient enough to recognize these undesirable features, and trades tend to be thin with these ETFs. The negative impact of these factors on liquidity also seems to be well captured by our ranking algorithm.

E x h i b i t   4

Average Values for Each of the Determinants of Liquidity by Decile

This exhibit shows that the most-liquid funds typically have a lower bid-ask spread, a higher market capitalization, lower expense ratio, and higher average trading volume. This suggests that large institutional traders should focus on larger ETF products if they require large positions, so that they minimize liquidity risk and have minimal market impact.

Decile	Liquidity	Bid-Ask Spread in BP	Market Capitalization	Morningstar Total Expense Ratio %	Annual Turnover	Avg. Volume (3 month trailing)
1	Most Liquid	4.87	4,525,100,000	0.20	0.485	13,874,525
2	–	6.65	1,067,892,157	0.37	0.281	6,152,350
3	–	13.88	544,472,549	0.50	0.326	5,952,633
4	–	19.76	226,886,275	0.48	0.245	625,760
5	–	29.00	127,390,196	0.53	0.320	94,002
6	–	38.22	61,382,353	0.53	0.349	50,430
7	–	37.79	38,211,765	0.61	0.453	29,390
8	–	37.45	23,766,667	0.68	0.364	31,166
9	–	52.24	11,015,686	0.69	0.559	12,222
10	Least Liquid	74.66	5,810,000	1.21	0.478	5,617

EXHIBIT 5
Top 50 Most-Liquid ETFs (out of 418)

Liquidity Rank	Ticker	Fund Name	Inception Date	Category	Market Cap	BA Spread (Basis Points)	Avg Vol (3 m):
1	SHY	iShares Barclays 1−3 Year Treasury Bond	7/22/2002	Short Government	7.69B	1.19	1,138,670
2	SHV	iShares Barclays Short Treasury Bond	1/5/2007	Short Government	1.57B	0.91	280,846
3	LQD	iShares iBoxx $ Invest Grade Corp Bond	7/22/2002	Long-Term Bond	6.96B	6.01	1,339,730
4	IVW	iShares S&P 500 Growth Index	5/22/2000	Large Growth	4.96B	2.32	3,067,360
5	BIL	SPDR Lehman 1−3 Month T-Bill	5/25/2007	Ultrashort Bond	742.88M	2.18	512,503
6	SPY	SPDRs	1/29/1993	Large Blend	93.92B	1.21	373,458,000
7	IWM	iShares Russell 2000 Index	5/22/2000	Small Blend	10.69B	2.23	79,079,400
8	IVE	iShares S&P 500 Value Index	5/22/2000	Large Value	3.07B	2.49	2,743,400
9	TLT	iShares Barclays 20+ Year Treas Bond	7/22/2002	Long Government	1.89B	2.89	2,514,610
10	MDY	MidCap SPDRs	5/4/1995	Mid-Cap Blend	6.78B	2.38	9,261,680
11	IWF	iShares Russell 1000 Growth Index	5/22/2000	Large Growth	10.69B	2.82	8,383,430
12	IWD	iShares Russell 1000 Value Index	5/22/2000	Large Value	9.24B	2.25	7,333,340
13	VTV	Vanguard Value ETF	1/26/2004	Large Value	2.17B	2.70	1,328,240
14	IWR	iShares Russell Midcap Index	7/17/2001	Mid-Cap Blend	3.77B	1.78	4,644,450
15	IWB	iShares Russell 1000 Index	5/15/2000	Large Blend	5.72B	2.20	8,751,100
16	DIA	DIAMONDS Trust, Series 1	1/13/1998	Large Value	8.97B	1.24	33,088,500
17	QQQQ	PowerShares QQQ	3/10/1999	Large Growth	12.54B	3.41	164,659,000
18	EFA	iShares MSCI EAFE Index	8/14/2001	Foreign Large Blend	31.91B	2.57	36,217,400
19	IVV	iShares S&P 500 Index	5/15/2000	Large Blend	15.65B	3.58	7,998,460
20	XLE	Energy Select Sector SPDR	12/16/1998	Specialty-Natural Res	4.45B	2.10	41,585,500
21	IJH	iShares S&P MidCap 400 Index	5/22/2000	Mid-Cap Blend	3.76B	1.99	1,762,050
22	VUG	Vanguard Growth ETF	1/26/2004	Large Growth	2.74B	5.28	1,083,550
23	IJR	iShares S&P SmallCap 600 Index	5/22/2000	Small Blend	3.74B	2.55	2,549,860
24	AGG	iShares Barclays Aggregate Bond	9/22/2003	Intermediate-Term Bond	9.52B	9.82	751,041
25	IWN	iShares Russell 2000 Value Index	7/24/2000	Small Value	3.53B	4.65	3,079,930
26	IWP	iShares Russell Midcap Growth Index	7/17/2001	Mid-Cap Growth	1.99B	3.31	2,143,670
27	VTI	Vanguard Total Stock Market ETF	5/24/2001	Large Blend	9.20B	4.82	12,580,100
28	SDS	UltraShort S&P500 ProShares	7/11/2006	Bear Market	2.25B	1.26	52,719,900
29	IWS	iShares Russell Midcap Value Index	7/17/2001	Mid-Cap Value	2.35B	3.89	2,875,180
30	TIP	iShares Barclays TIPS Bond	12/4/2003	Specialty-Bond	8.68B	2.02	768,514
31	BND	Vanguard Total Bond Market ETF	4/3/2007	Intermediate-Term Bond	2.95B	7.77	306,998
32	IWV	iShares Russell 3000 Index	5/22/2000	Large Blend	3.15B	2.07	2,061,660
33	IWO	iShares Russell 2000 Growth Index	7/24/2000	Small Growth	2.49B	6.30	3,068,440
34	IEF	iShares Barclays 7−10 Year Treasury	7/22/2002	Long Government	3.01B	7.39	446,457
35	OEF	iShares S&P 100 Index	10/23/2000	Large Blend	2.66B	2.52	3,601,850
36	VNQ	Vanguard REIT Index ETF	9/23/2004	Specialty-Real Estate	1.83B	6.49	3,587,790
37	VWO	Vanguard Emerging Markets Stock ETF	3/4/2005	Diversified Emerging Mkts	5.04B	4.61	5,108,570
38	IJT	iShares S&P SmallCap 600 Growth	7/24/2000	Small Growth	1.06B	2.48	535,351
39	VEA	Vanguard Europe Pacific ETF	7/20/2007	Foreign Large Blend	2.29B	4.20	2,014,110
40	IJS	iShares S&P SmallCap 600 Value Index	7/24/2000	Small Value	1.29B	2.36	457,211
41	XLF	Financial Select Sector SPDR	12/16/1998	Specialty-Financial	7.79B	10.50	167,364,000
42	XLU	Utilities Select Sector SPDR	12/16/1998	Specialty-Utilities	1.96B	3.42	8,000,740
43	TFI	SPDR Lehman Municipal Bond	9/11/2007	Muni National Long	348.60M	4.55	200,389
44	KRE	SPDR KBW Regional Banking	6/19/2006	Specialty-Financial	748.42M	4.66	3,240,010
45	VV	Vanguard Large Cap ETF	1/27/2004	Large Blend	1.96B	5.30	1,067,740
46	XLB	Materials Select Sector SPDR	12/16/1998	Specialty-Natural Res	946.90M	4.70	10,467,200
47	CSJ	iShares Barclays 1−3 Year Credit Bond	1/5/2007	Short-Term Bond	792.91M	2.95	103,005
48	XLV	Health Care Select Sector SPDR	12/16/1998	Specialty-Health	2.06B	3.80	5,985,460
49	IJJ	iShares S&P MidCap 400 Value Index	7/24/2000	Mid-Cap Value	1.53B	4.27	364,548
50	VO	Vanguard Mid Cap ETF	1/26/2004	Mid-Cap Blend	1.11B	7.39	816,708

Note: The median market capitalization of the 418 ETFs (initial set of 884 ETFs, of which only 418 had data for over a year and for all factors) in our sample is $91 million, the median bid-ask spread is 17 basis points, and the median trading volume (trailing 3 months) is about 58,000 shares/day. Our liquidity scoring criteria optimize on these factors (only 3 of the 5 are shown here, for space considerations) and enable us to produce an ordinal ranking that is indicative of the liquidity for an ETF in the secondary market. Notice how the top 50 score much better than the median values for their respective factors. Also, a number of these are Treasury bond-based ETFs that typically do not receive much media coverage, yet appear to have very high market interest and depth. Contrast the characteristics of these with the least-liquid ETFs shown in Exhibit 6.

Exhibit 6
The 50 Least-Liquid ETFs (out of 418)

Liquidity Rank	Ticker	Fund Name	Inception Date	Category	Market Cap	BA Spread (Basis Points)	Avg Vol (3 m):
369	DND	WisdomTree Pacific ex-Japan Total Div	6/16/2006	Pacific/Asia ex-Japan Stk	43.13M	127.91	10,621
370	FCG	First Trust ISE-Revere Natural Gas	5/8/2007	Specialty-Natural Res	37.18M	25.33	42,044
371	RYT	Rydex S&P Equal Weight Technology	11/1/2006	Specialty-Technology	6.79M	14.94	3,094
372	DGT	SPDR DJ Global Titans	9/25/2000	World Stock	88.04M	58.58	19,057
373	RZG	Rydex S&P Smallcap 600 Pure Growth	3/1/2006	Small Growth	6.80M	20.16	3,276
374	DEB	WisdomTree Europe Total Dividend	6/16/2006	Europe Stock	21.10M	41.75	6,192
375	EEZ	WisdomTree Earnings Top 100	2/23/2007	Large Blend	9.54M	38.90	6,513
376	QQEW	First Trust NASDAQ-100 Equal Weight Idx	4/19/2006	Large Blend	14.85M	16.79	15,868
377	SJF	UltraShort Russell1000 Value ProShares	2/20/2007	Bear Market	23.15M	25.58	19,219
378	GAF	SPDR S&P Emerging Middle East & Africa	3/19/2007	Diversified Emerging Mkts	102.15M	47.87	28,273
379	ONEQ	Fidelity Nasdaq Composite Index Tracking	9/25/2003	Large Growth	80.68M	83.15	16,187
380	PUW	PowerShares WilderHill Prog Energy	10/24/2006	Specialty-Natural Res	34.26M	28.86	23,676
381	DBR	WisdomTree International Health Care	10/13/2006	Specialty-Health	25.14M	76.81	13,543
382	RFV	Rydex S&P Midcap 400 Pure Value	3/1/2006	Mid-Cap Value	9.09M	25.43	4,695
383	PBS	PowerShares Dynamic Media	6/23/2005	Specialty-Communications	9.40M	27.89	20,425
384	RGI	Rydex S&P Equal Weight Industrials	11/1/2006	Large Blend	6.89M	12.65	1,695
385	PBP	Powershares S&P 500 BuyWrite	12/20/2007	N/A	54.31M	35.01	69,835
386	FYX	First Trust Small Cap Core AlphaDEX	5/8/2007	Small Blend	5.21M	12.93	4,422
387	FEX	First Trust Large Cap Core AlphaDEX	5/8/2007	Large Blend	10.26M	18.54	7,497
388	PTJ	PowerShares Dynamic Healthcare Services	10/12/2006	Specialty-Health	16.83M	18.40	3,859
389	DPN	WisdomTree International Cons Staples	10/13/2006	Foreign Large Blend	19.06M	56.51	11,114
390	PEJ	PowerShares Dynamic Leisure & Entertain	6/23/2005	Mid-Cap Blend	8.46M	23.32	14,748
391	RHS	Rydex S&P Equal Weight Consumer Staples	11/1/2006	Large Blend	10.00M	12.54	3,124
392	FXN	First Trust Energy AlphaDEX	5/8/2007	Specialty-Natural Res	4.52M	18.22	14,384
393	CXA	SPDR Lehman California Municipal Bond	10/10/2007	Muni California Long	24.73M	70.29	11,791
394	FXH	First Trust Health Care AlphaDEX	5/8/2007	Specialty-Health	12.13M	20.27	8,544
395	UVG	Ultra Russell1000 Value ProShares	2/20/2007	Large Value	21.98M	34.55	74,583
396	UPW	Ultra Utilities ProShares	1/30/2007	Specialty-Utilities	35.21M	30.10	49,995
397	SKK	UltraShort Russell2000 Growth ProShares	2/20/2007	Bear Market	14.11M	31.50	32,421
398	UKW	Ultra Russell MidCap Growth ProShares	2/20/2007	Mid-Cap Growth	12.38M	33.50	47,497
399	AIA	iShares S&P Asia 50 Index	11/13/2007	Diversified Pacific/Asia	43.08M	68.67	23,791
400	SJH	UltraShort Russell2000 Value ProShares	2/20/2007	Bear Market	9.54M	31.46	42,546
401	PXN	PowerShares Lux Nanotech	10/26/2005	Specialty-Technology	40.20M	43.17	18,979
402	FDM	First Trust Dow Jones Select MicroCap	9/27/2005	Small Blend	14.08M	15.85	13,252
403	PTE	PowerShares Dynamic Telecom & Wireless	12/6/2005	Specialty-Communications	14.48M	29.04	14,981
404	FXL	First Trust Technology AlphaDEX	5/8/2007	Specialty-Technology	5.96M	18.71	8,213
405	DRW	WisdomTree International Real Estate	6/5/2007	N/A	52.84M	102.87	34,432
406	UVT	Ultra Russell2000 Value ProShares	2/20/2007	Small Value	14.87M	52.43	66,041
407	DGG	WisdomTree International Communications	10/13/2006	Specialty-Communications	22.02M	79.89	11,249
408	EXI	iShares S&P Global Industrials	9/12/2006	World Stock	71.50M	63.82	16,165
409	PZT	PowerShares Insured New York Muni Bond	10/11/2007	Muni New York Long	22.74M	23.58	11,191
410	PFI	PowerShares Dynamic Financials	10/12/2006	Specialty-Financial	19.78M	26.95	13,944
411	SBB	Short S&P SmallCap600 ProShares	1/23/2007	Bear Market	16.88M	17.48	13,768
412	FAB	First Trust Multi Cap Value AlphaDEX	5/8/2007	Mid-Cap Value	4.07M	13.61	6,440
413	PVM	PowerShares Dynamic Deep Value	12/20/2006	Mid-Cap Value	8.78M	18.67	6,513
414	WPS	iShares S&P Dvlped ex-US Property Index	7/30/2007	N/A	64.40M	122.08	42,686
415	RMS	Rydex Inverse 2x S&P MidCap 400	11/5/2007	Bear Market	3.96M	23.02	11,642
416	GML	SPDR S&P Emerging Latin America	3/19/2007	Latin America Stock	47.07M	51.28	33,402
417	FTA	First Trust Large Cap Value Opp AlphaDEX	5/8/2007	Large Value	16.30M	33.13	9,770
418	DEF	Claymore/Sabrient Defensive Equity	12/15/2006	Large Value	14.88M	23.45	11,103

Notes: The median market capitalization of the 418 ETFs (initial set of 884 ETFs, of which only 418 had data for over a year and for all factors) in our sample is $91 million, the median bid-ask spread is 17 basis points, and the median trading volume (trailing 3 months) is about 58,000 shares/day. Our liquidity scoring criteria optimize on these factors (only 3 of the 5 are shown here, for space considerations) and enable us to produce an ordinal ranking that is indicative of the liquidity for an ETF in the secondary market. Notice how the bottom 50 ETFs score much lower than the median values for their respective factors. Most of these were created after 2005 and could be considered specialized ETFs that target a very narrow segment of the market. Also, the average expense ratio for these is about 1.2%/year compared to the 0.20%/year for the top 50 most-liquid ETFs (see Exhibits 4 and 5).

CONCLUSION

Using five factors commonly thought to impact liquidity, we develop an ETF liquidity scoring measure that allows us to rank the 418 ETF dataset from most liquid (#1) to least liquid (#418). The most-liquid funds typically have a lower bid–ask spread, a higher market capitalization, lower expense ratio, and higher average trading volume. Based on the liquidity scoring measure, it can also be concluded that low-liquidity ETFs seem to have larger bid–ask spreads, typically smaller market capitalizations, higher expense ratios, and much lower investor interest. While low-liquidity ETFs may provide the investor with exposure to a very narrow market segment (such as nanotechnology or solar power), the costs of trading, market price impact, and ease of entering or exiting a sizable position must be carefully evaluated before initiating holdings in ETFs that exhibit low liquidity. A market efficiency argument can also be invoked, which would support avoiding low-liquidity ETFs, especially when highly liquid, low-cost ETFs are readily available. We also discovered that there is a very active bond ETF market as evidenced by the fact that about 20% of the most-liquid ETFs and four of the top five ETFs in our 418 ETF dataset are based on bond indices.

ENDNOTES

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[1] A liquidity score which has a high numerical value is indicative of poor liquidity.

[2] All factors have been log-normalized.

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