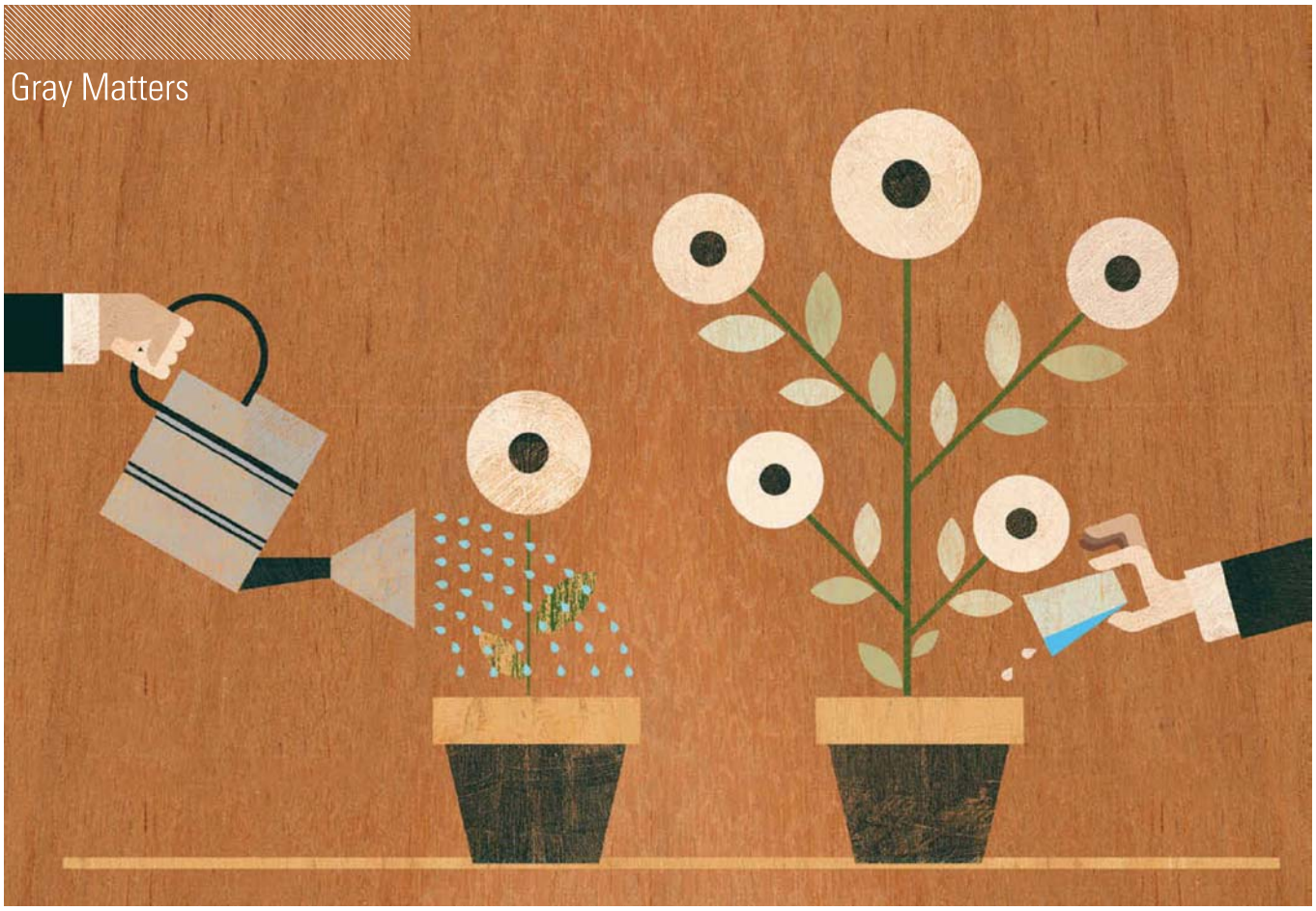

Less-Liquid Holdings Mean More-Solid Results

By Thomas M. Idzorek, James X. Xiong, and Roger G. Ibbotson

The liquidity investment style is present in mutual funds and leads to dramatic differences in performance.

It is well known that less-liquid investments tend to outperform more-liquid investments. The same holds true within the universe of publicly traded stocks. The generally accepted rationale for a liquidity premium is that all else equal, investors prefer greater liquidity; thus, in order to induce investors to hold less-liquid assets, they must have the expectation (but not the guarantee) of a return premium.

Recent literature indicates that the liquidity investment style—the process of investing in less-liquid stocks within the liquid universe of publicly traded stocks—produces risk-adjusted returns that rival or exceed those of the three best-known market anomalies: size, value, and momentum (see Carhart, 1997). For example, Amihud and Mendelson (1986) used the quoted bid-ask spread as a measure of liquidity and tested the relationship between stock returns and liquidity during the period of 1961–1980. They found evidence consistent with the notion of a liquidity premium. Datar, Naik, and Radcliffe (1998) used the turnover rate (number of shares traded as a fraction of the number of shares outstanding) as a proxy for liquidity and found that stock returns were strongly negatively related to their turnover rates, confirming the notion that less liquid stocks provided higher average returns. Overall, the results supported the relationship between less liquidity and higher stock returns.

While stock-level liquidity has been explored by academics as an important "risk factor" and as an ongoing concern for portfolios that need immediate liquidity, it is only recently that it has been explored as an investment style similar to how an investor might prefer funds with a small-cap or value bias. To that end, and perhaps most importantly for our purposes, using monthly data for the largest 3,500 U.S. stocks by capitalization, starting in 1972, Ibbotson, Chen, and Hu (2012) sorted stocks into equally weighted quartiles based on liquidity. The results clearly showed that annually rebalanced composites of relatively less-liquid stocks significantly outperformed composites of more-liquid stocks after controlling for size, valuation, and momentum. Ibbotson et al. attempted to distinguish between risk factors and an investment style, ultimately characterizing liquidity as the missing style.[1]

Despite these powerful stock-level liquidity findings, we are practically unaware of any mutual fund managers who actively seek less-liquid stocks. Might this emerging investment style and risk factor be present and economically significant among mutual funds? If so, methods of constructing portfolios of less-liquid stocks might be beneficial for not only creating mutual funds but also for selecting mutual funds that are more likely to outperform their peers.

Data and Methodology

Combining data from Morningstar's individual stock database with Morningstar's mutual fund holding database, we built composites of mutual funds based on the weighted average liquidity of the individual stocks held by the mutual funds. Morningstar's U.S. open-end equity mutual fund universe contains 5,198 funds (including funds now defunct).

There are a number of measures of liquidity for an individual stock. For simplicity and consistency, we focused on the basic stock level "turnover" measure used in Ibbotson, Chen, and Hu (2012): average daily shares traded over the past year divided by the number of shares outstanding. No attempt was made to adjust the number of shares outstanding for free-float.

Armed with each mutual fund's weighted average stock level liquidity within any given category, we rank-ordered the mutual funds based on their weighted average liquidity and used this information to form monthly rebalanced, equally weighted composites (in our case, quintiles) of mutual funds with similar-weighted average stock-level liquidity scores. Funds with the lowest weighted average liquidity were assigned to the "L1" quintile and funds with the highest weighted average liquidity were assigned to the "L5" quintile. The constituent mutual funds in the composite evolve each month, as the weighted average stock level liquidity of the mutual funds evolves.

Results

Exhibit 1 summarizes the striking results for our universe of U.S. equity funds. The table displays total return statistics: annual geometric return, annual arithmetic return, standard deviation, and Sharpe ratio. In addition, we also report alphas and t-statistics from two different regressions: a single-factor regression of the total returns of each composite against the total returns of the appropriate category-average composite, and a multifactor regression of each composite's excess returns (over T-bills) against the three traditional Fama-French factors (excess market return, small-minus-big, and high-minus-low, which most practitioners know as value-minus-growth). The category-average composite is simply a composite representing the equally weighted return of all of the funds in a particular category through time. The final row of each category's section shows the difference in performance statistics from the lowest liquidity composite (L1) and the highest liquidity composite (L5), the t-statistic obtained by regressing L1 minus L5 on the category average, and the annualized alpha and t-statistic obtained by regressing L1 minus L5 on the three Fama-French factors.

For each of the seven groupings, the lowest liquidity composite (L1) had a superior annual geometric return, annual arithmetic return, standard deviation, Sharpe ratio, annualized alpha versus the category's composite average, and annualized alpha versus the three Fama-French factors.

We highlight the performance of the "All" composites at the bottom of Table 1, representing our entire universe of U.S. equity funds. Comparing "All L1" to "All L5," the annual geometric return was 2.65 percentage points higher, the standard deviation was much lower (15.25% versus 24.83%), and the Sharpe ratio was nearly twice as high (0.43 versus 0.23). Both of the annualized alphas for the low liquidity (L1) composite were quite large and statistically significant at 2.95% and 2.18% versus the category average composite and the three Fama-French factors, respectively. The alphas for the L1 minus L5 regressions were even larger at 5.62% and 3.65%.

Exhibit 2 reports upside and downside return capture statistics for our All composites. The superior overall performance of the low liquidity quintiles has primarily come from superior performance in down markets, as indicated by the down-market capture. Lower down-market capture means a lower average loss in down markets. In particular, the

1 The results of Ibbotson, Chen, and Hu (2012) as well as earlier versions are so compelling that results are documented and updated each year in *Ibbotson's Stocks, Bonds, Bills and Inflation Annual Year Book*. In our opinion, the results of Ibbotson, Chen, and Hu (2012) coupled with the results reported in this paper suggest the ubiquitous four-factor model—market, size, valuation, and momentum—should be expanded to include liquidity as a fifth factor. We leave direct testing of this five-factor model for further research.

Exhibit 1 Mutual Fund Liquidity Quintiles—U.S. Equity Universe

Annualized Results From Monthly-Rebalanced Composites, February 1995–December 2009

		Geometric Mean (%)	Arithmetic Mean (%)	Standard Deviation (%)	Sharpe Ratio	Annualized Alpha Relative to Category Average (%)	T-Statistic of Alpha Relative to Category Average	Annualized Alpha Relative to Fama-French Factors (%)	T-Statistic of Alpha Relative to Fama-French Factors
Small	L1 (Low Liquidity)	11.12	12.61	18.19	0.50	4.17	2.45	2.66	1.87
	L2	9.36	11.19	20.06	0.38	1.45	1.25	0.74	0.54
	L3	8.40	10.72	22.74	0.32	–0.53	–1.42	–0.23	–0.19
	L4	7.76	10.59	25.28	0.28	–1.67	–1.68	–0.59	–0.47
	L5 (High Liquidity)	6.75	9.91	26.62	0.24	–2.90	–2.48	–1.63	–1.24
	Avg	8.82	11.00	22.01	0.34	—	—	0.19	0.18
	L1–L5	4.37	2.70	–8.42	0.26	7.27	2.84	4.36	2.51
Mid	L1 (Low Liquidity)	10.24	11.42	16.08	0.49	3.90	2.13	2.75	2.30
	L2	10.00	11.58	18.70	0.43	2.06	1.91	2.14	2.04
	L3	9.25	11.28	21.29	0.36	0.25	0.54	1.33	1.10
	L4	7.75	10.34	24.07	0.28	–1.97	–2.63	–0.01	–0.01
	L5 (High Liquidity)	6.91	10.08	26.70	0.25	–3.23	–2.24	–0.63	–0.37
	Avg	9.01	10.94	20.69	0.36	—	—	1.05	0.99
	L1–L5	3.33	1.34	–10.62	0.25	7.34	2.62	3.40	1.53
Large	L1 (Low Liquidity)	8.34	9.35	14.81	0.39	2.42	2.10	1.90	1.71
	L2	7.49	8.66	15.92	0.32	0.94	1.46	2.10	1.33
	L3	6.41	7.71	16.72	0.25	–0.45	–1.29	1.58	0.96
	L4	6.01	7.44	17.46	0.22	–1.07	–2.84	0.84	0.52
	L5 (High Liquidity)	6.03	8.11	21.23	0.22	–1.76	–1.21	–0.86	–0.67
	Avg	6.93	8.25	16.83	0.28	—	—	1.26	0.90
	L1–L5	2.30	1.24	–6.42	0.18	4.24	2.23	3.39	2.98
Growth	L1 (Low Liquidity)	8.10	9.38	16.67	0.35	2.38	1.72	1.26	1.84
	L2	7.18	8.78	18.61	0.28	0.65	0.80	0.04	0.05
	L3	7.34	9.36	21.02	0.28	0.09	0.30	–0.13	–0.15
	L4	7.83	10.50	24.46	0.28	–0.13	–0.18	0.19	0.16
	L5 (High Liquidity)	5.85	9.18	27.34	0.21	–2.44	–1.88	–1.68	–1.09
	Avg	7.40	9.44	21.17	0.28	—	—	–0.14	–0.17
	L1–L5	2.26	0.20	–10.67	0.14	4.93	2.12	2.99	1.74
Core	L1 (Low Liquidity)	9.12	10.15	15.04	0.44	2.14	2.86	2.14	2.68
	L2	7.84	9.10	16.54	0.34	0.25	0.42	0.79	1.40
	L3	7.21	8.57	17.09	0.29	–0.61	–1.28	0.06	0.11
	L4	7.43	8.90	17.81	0.30	–0.65	–1.44	–0.21	–0.29
	L5 (High Liquidity)	7.48	9.39	20.37	0.29	–1.14	–0.89	–0.72	–0.79
	Avg	7.87	9.22	17.08	0.33	—	—	0.40	0.69
	L1–L5	1.63	0.76	–5.33	0.15	3.32	2.38	2.88	2.98
Value	L1 (Low Liquidity)	9.29	10.30	14.86	0.46	1.76	3.28	2.49	2.48
	L2	8.40	9.56	15.87	0.38	0.42	1.09	1.40	1.37
	L3	8.27	9.55	16.68	0.36	–0.06	–0.22	1.06	0.96
	L4	7.92	9.26	17.03	0.34	–0.54	–1.91	0.53	0.49
	L5 (High Liquidity)	7.01	8.59	18.39	0.27	–1.76	–1.96	–0.99	–0.97
	Avg	8.20	9.45	16.43	0.36	—	—	0.92	0.94
	L1–L5	2.28	1.71	–3.53	0.18	3.58	3.08	3.52	4.20
	Avg	7.80	9.33	18.20	0.32	—	—	0.16	0.29
	L1–L5	2.65	0.94	–9.58	0.21	5.62	2.36	3.65	2.16

Exhibit 2 Monthly Upside and Downside Capture Statistics—U.S. Equity Mutual Fund Universe

February 1995–December 2009, Mutual Fund Quintiles, where L1 = Lowest Liquidity and L5 = Highest Liquidity

	Up Periods	Down Periods	Average Up Market Return	Average Down Market Return	Up-Market Capture	Down-Market Capture	Up-Market Down-Market Ratio	Loss From April 2000 to Dec. 2001 (%)	Loss From Sept. 2008 to Feb. 2009 (%)
Average	109	70	3.61	–4.28	102.78	104.85	0.98	–17.70	–42.80

Up Periods and Down Periods simply report the total number of up and down monthly returns in the sample of 179 months. The Average Up Market Return and Average Down Market Return report similar statistics based on the performance of the "market," which in this case is defined as the Russell 3000. The Up-Market Capture and Down-Market Capture identify the percentage of the market's up and down movements that are captured, respectively, where numbers greater than 100 indicate more sensitivity than the Russell 3000. The Up-Market Down-Market Ratio divides Up-Market Capture by Down-Market Capture.

losses for L1 in the two crisis periods (the 2000 tech crash and the 2008 financial crisis) are significantly lower than the losses for L5.

We repeated the monthly upside and downside capture analysis for other categories. The results paint a similar picture; in all cases, the low liquidity composite had superior up-market and down-market capture ratios relative to the corresponding high liquidity composite.

Many people might find these results counterintuitive. Their intuition tells them that in down markets, less-liquid stocks (and the funds that hold them) should suffer the steepest declines. We posit that one cause of the superior downside performance of the low-liquidity quintile relates to the type of strategies typically used by low liquidity managers versus high liquidity managers. We suspect that, on average, the funds that find themselves in L1 have less "holdings-turnover" than those in L5, reflecting a general preference for a longer holding period strategy. In contrast, L5 managers likely have higher holdings-turnover and, on average, use strategies that involve more-frequent trading. Funds that trade frequently pay greater attention to trading costs and are more likely to use liquidity-based measures, such as bid-ask spreads, to screen out relatively less-liquid stocks. Furthermore, during periods of turmoil, L5 managers may be more likely to trade; thus, the most liquid stocks may, in fact, suffer the steepest declines because there is a greater propensity for their owners to trade them.

Presence of Liquidity Style

This study analyzed the presence, impact, and significance of the liquidity investment style in mutual funds. We show that mutual funds that hold less-liquid stocks from within the liquid universe of publicly traded stocks outperform mutual funds that hold relatively more liquid stocks by 2.65% (annualized geometric mean over nearly the past 15 years).

The results were confirmed by the monthly rebalanced mutual fund composites for our universe of U.S. equity mutual funds, with different sizes and styles. The lowest liquidity composite (L1) had a superior annual geometric return, annual arithmetic return, standard deviation, Sharpe ratio, annualized alpha versus the category's composite average, and annualized alpha versus the three Fama-French factors.

Surprisingly, the outperformance of the mutual funds that hold less-liquid stocks was primarily due to superior performance in down markets. One possibility is that during periods of turmoil, high-liquidity managers may be more likely to trade; thus, the most liquid stocks may, in fact, suffer the steepest declines because there is a greater propensity for their owners to trade them.

Overall, the liquidity investment style is clearly present in mutual funds and leads to dramatic differences in performance. MI

Thomas M. Idzorek, CFA, is president and global chief investment officer of Morningstar Investment Management. James X. Xiong, Ph.D., CFA, is a senior research consultant with Morningstar Investment Management. Roger G. Ibbotson, Ph.D., is chairman and CIO of Zebra Capital Management.

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