

Research Brief: Liquidity Fragility

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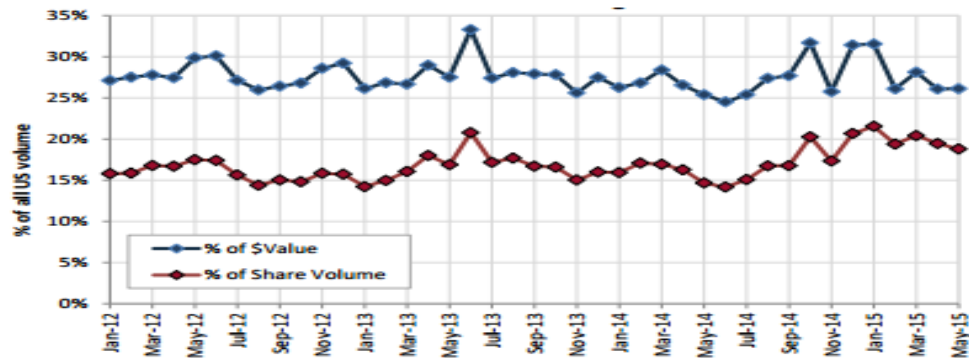
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As liquidity in the bond market becomes increasingly constrained, there has been a growing chorus of concerns raised by Mohamed A. El-Erian, John Paulson, Jamie Dimon, Larry Summers and recently the Federal Reserve. As we learned in the Global Financial Crisis, when liquidity seizes in one market whether it be Puerto Rican Municipals, Greek Sovereigns or China, liquidity needs may be met by raising cash in one of the most liquid markets in the world: the US equity market. How should equity investors be thinking about liquidity in their market?

The causes of changes in market liquidity may be traced to shocks, regulatory changes, the normal cycles of liquidity and structural changes. One of the most significant structural evolutions in the equity market is the growing prominence of Exchange Traded Funds (ETFs). As of Mar. 31, 2015, there are 5,200+ ETFs following global markets with an aggregated \$2.8 trillion in assets under management.¹ Credit Suisse reported that ETFs accounted for 27% of the dollar value traded² in the US equity market in the month of May 2015. ETFs have a meaningful impact on liquidity (either positive, or negative, depending on flows) as those that closely follow an index either purchase or sell indiscriminately all constituents in an index. A structural problem may arise when the liquidity demanded by the ETF exceeds the liquidity available of some of the underlying holdings.

ETF % of US Trading January 2012 – May 2015



Source: Credit Suisse Trading Strategy

In this brief, we examine liquidity in arguably one of the most liquid equity markets in the world: The Standard & Poor's 500 (S&P 500). Whereas the overall index is highly liquid, not all issues within the index are equally liquid. We examine where in the S&P 500 liquidity exists and where it is constrained.

One measure of liquidity is the cost to execute a given trade. When trading in size, the largest component of execution cost is market impact. Market impact of a security is a function of the liquidity demanded and the risk of the security. We utilize a simple transaction cost model to measure which S&P 500 names would potentially have experienced the largest market impact resulting from ETF flows in the last week of June 2015.

As liquidity is consumed by ETFs, or otherwise, certain risks can be magnified. Short-term price reversal is often a risk factor that is controlled for, or managed, by many investors. As a result, we examine the impact of short-term price reversal on the level of liquidity (defined as turnover). We find that illiquid stocks are more subject to a price reversal. Thus, investors should be wary of those stocks with low turnover in periods of high ETF flows or during a liquidity shock.

¹ State Street Global Advisors, "[Global ETF Snapshot](#)", March 2015

² Credit Suisse, "[US Monthly Chartbook](#)", June 2015

Pockets of Liquidity and Illiquidity

Within a diversified index, not all constituents are going to be equally liquid, and liquidity itself is an elusive concept. One simple measure of liquidity is a comparison of the percentage of the index value traded for each security to its weight in the index.

Exhibit 1 compares the percent index value traded to the index weight thereby showing the relatively most and least liquid stocks. We measure the percentage of index value traded for each security (column 3) as the average daily dollar value of the stock divided by the aggregate average daily dollar value of the index. The larger the difference between a stock's index weight and its percentage of index value traded, the higher the market impact ETFs may have when buying or selling shares.

For example, Exxon Mobil Corporation represented 1.91% of the S&P 500 Index but only 0.78% of the index average daily dollar trading value (ADV) in June, meaning that if the market is under stress, ETF selling of the stock may be high relative to value traded. Netflix on the other hand, comprised 0.22% of the index but was 1.73% of the average daily dollar value traded, meaning that liquidity is high relative to potential ETF demand.

Exhibit 1
Top 10 Largest/Smallest Comparison of Index Weight to % ADV
Within the S&P 500 Index as of 6/30/2015

<u>Company</u>	<u>Index Weight</u>	<u>% \$ Avg Daily Value</u>	<u>Difference</u>
EXXON MOBIL CORP	1.91%	0.78%	-1.13%
BERKSHIRE HATHAWAY	1.36%	0.39%	-0.97%
JOHNSON & JOHNSON	1.48%	0.65%	-0.83%
MICROSOFT CORP	1.96%	1.16%	-0.80%
GENERAL ELECTRIC CO	1.47%	0.73%	-0.74%
WELLS FARGO & CO	1.45%	0.80%	-0.64%
PROCTER & GAMBLE CO	1.17%	0.58%	-0.58%
JPMORGAN CHASE & CO	1.38%	0.90%	-0.48%
PFIZER INC	1.13%	0.67%	-0.46%
PEPSICO INC	0.76%	0.34%	-0.42%

<u>Company</u>	<u>Index Weight</u>	<u>% \$ Avg Daily Value</u>	<u>Difference</u>
BROADCOM CORP	0.15%	0.45%	0.30%
AMERICAN AIRLINES	0.15%	0.48%	0.32%
ALTERA CORP	0.08%	0.43%	0.35%
CIGNA CORP	0.23%	0.58%	0.35%
APPLE INC	3.97%	4.35%	0.38%
MICRON TECHNOLOGY	0.11%	0.52%	0.41%
HUMANA INC	0.16%	0.64%	0.49%
WILLIAMS COS INC	0.21%	0.81%	0.60%
FACEBOOK INC	0.99%	1.82%	0.83%
NETFLIX INC	0.22%	1.73%	1.52%

Source: S&P Capital IQ Quantamental Research. Results are as of 06/30/2015.

Liquidity’s Influence on Market Impact Costs

For an investor the true definition of liquidity is the cost for a given trade. In other words, what is the market impact as a result of executing the trade in the market? There are numerous transaction cost models, but we employ a simple transaction model (G&K) proposed by Grinold and Kahn in their book Active Portfolio Management³. The model assumes all trades are executed in a given day. The last term of the equation can be used to express market impact.

$$\text{Cost} = \text{commisson} + \left(\frac{\text{bid} / \text{ask spread}}{\text{price}} \right) + c_{ic} \cdot \sqrt{\frac{V_{\text{trade}}}{V_{\text{daily}}}}$$

Where c_{ic} is a measure of the stocks volatility. V_{trade} and V_{daily} are the size of the trade and the average daily volume.

What the G&K model, and indeed most transaction cost models suggest is that **market impact is a product of a stock’s risk and its relative liquidity demanded**. Exhibit 2 shows for the S&P 500, the stocks with the highest and lowest daily market impact based on the modest US ETF outflow [\$-2,791MM] for the week ending on June 25 using the G&K model. We source the US Equity ETF Flows from etf.com. The market impact results shown below assume the entire net outflow takes place within the S&P 500. Notice that the only name that remains from Exhibit 1 that has a high market impact is MSFT. The volatility of MSFT is relatively low [c_{ic}], but the dollar value demanded by ETFs by virtue of its weight relative to the dollar value traded is very high [$\sqrt{V_{\text{trade}}/V_{\text{daily}}}$]. Though the ETF flows for the week of June 25 were negative, this model can be also useful when flows are positive to quantify the price support that ETF flows are providing.

Exhibit 2
Top 10 Largest/Smallest Market Impact Based on Week Ended June 25 ETF Flows
Within the S&P 500 Index

<u>Company</u>	<u>Average Daily Volatility</u>	<u>\$ETF/\$ADV</u>	<u>G&K Daily Market Impact</u>
KRAFT FOODS GROUP INC	2.56%	0.57%	0.19%
GENWORTH FINANCIAL INC	3.50%	0.29%	0.19%
MONSTER BEVERAGE CORP	2.96%	0.37%	0.18%
HOSPIRA INC	2.49%	0.49%	0.17%
MICRO SOFT CORP	1.90%	0.82%	0.17%
ALLE GHENY TECHNOLOGIES	2.74%	0.37%	0.17%
FREEPORT-MCMORAN INC	3.55%	0.22%	0.17%
NEWMONT MINING CORP	3.55%	0.20%	0.16%
SALESFORCE.COM INC	2.04%	0.56%	0.15%
WALGREENS BOOTS ALLIANCE	1.68%	0.74%	0.14%

³ Active Portfolio Management, Grinold and Kahn, McGraw Hill, Second Edition, 1999

<u>Company</u>	<u>Average Daily Volatility</u>	<u>\$ETF/\$ADV</u>	<u>G&K Daily Market Impact</u>
DIRECTV	0.60%	0.06%	0.04%
HUNTINGTON BANCSHARES	0.76%	0.05%	0.04%
PITNEY BOWES INC	0.55%	0.05%	0.04%
XL GROUP PLC	0.66%	0.05%	0.04%
GOOGLE INC	0.50%	0.06%	0.04%
GOOGLE INC	0.52%	0.06%	0.04%
SYSCO CORP	0.65%	0.05%	0.04%
REPUBLIC SERVICES INC	0.45%	0.06%	0.04%
SCRIPPS NETWORKS	0.62%	0.04%	0.03%
BAXTER INTERNATIONAL INC	0.66%	0.04%	0.03%

Source: S&P Capital IQ Quantamental Research and etf.com. Results are as of 06/25/2015.

Illiquidity and Price Reversal

It has been well documented that illiquid stocks may be more subject to short term price reversal. Price reversal is important for investors as it may be a risk factor that investors look to control. For our purposes we define short term reversal as the price return of a stock in the past calendar month. In the following analysis we define liquidity as turnover, or average daily shares traded over the prior 30 calendar days divided by shares outstanding. In Exhibit 3, we explore the joint relationship between short term reversal and turnover. We construct an analysis that is a two-way tertile sort with monthly rebalancing on each portfolio and observe the average cap-weighted returns with monthly rebalancing for each over our observation period (January 1995 – June 2015). The results are clear and stand up to statistical significance; Short term reversal is most pronounced among stocks with the lowest turnover. The return to price reversal among low turnover stocks was 70 bps per month, significant at the 1% level. The effect of liquidity on reversal is evenly split between the long and the short side (shown on following page). In the appendix, we show that this effect remains even after controlling for market capitalization.

Exhibit 3

Backtest of Short-Term Reversal x Turnover – S&P 500
Average Cap-Weighted Returns with Monthly Rebalancing Jan. 1995 – Jun. 2015

	<u>Lowest Past Month Return</u>	<u>Middle Tertile Past Month Return</u>	<u>Highest Past Month Return</u>	<u>Low Past Month Return - Highest Past Month Return</u>	<u>Monthly Hit Rate</u>
Low Turnover	1.25%	0.94%	0.56%	0.70%***	57%**
Middle Tertile Turnover	1.16%	1.00%	0.62%	0.54%**	58%***
High Turnover	1.03%	1.36%	1.02%	0.00%	51%
Low Turnover - High Turnover	0.23%	-0.42%	-0.47%		
Monthly Hit Rate	49%	45%	47%		

	Average Monthly Long-Short Returns	Monthly Hit Rate
Long - Short	0.70%***	57%**
Long - S&P 500	0.36%**	53%
Short -S&P 500	-0.34%**	44% *

Long = The Portfolio Bin That is Low Turnover and Lowest Past Month Returns
 Short= The Portfolio Bin That is Low Turnover and Highest Past Month Returns

***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively

Source: S&P Capital IQ Quantamental Research. Results are as of 06/30/2015. Backtested returns do not represent actual trading results and were constructed with the benefit of hindsight. Returns do not include payments of any sales charges or fees. Such costs would lower performance. Indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Past performance is not a guarantee of future results.

Conclusion

As ETFs grow in prominence, their impact on the equity market becomes more significant. This is because ETFs trade baskets of securities. Clearly not all securities have the same level of liquidity. Thus, an ETF’s impact of buying and selling will be most meaningful on those stocks that are most volatile and least liquid. Under normal circumstances, this effect may be muted for investors. In a liquidity crisis, however, either from international equities or other markets the spillover effect into US equities may become magnified.

But even in more “normal” market environments, the relative liquidity of US stocks should be evaluated. Short term price reversal, a common risk factor, is most pronounced [even after controlling for market capitalization] in stocks that have the lowest liquidity. In other words, those stocks that have outperformed the most in the past calendar month, and exhibit low liquidity as defined by turnover, are the most likely to underperform in the subsequent calendar month.

Appendix – Reversal and Turnover Adjusted for Market Capitalization

In the main body of the paper, we explored the interaction between turnover and short term price reversal. In order to show the short-term price reversal effect is not driven by smaller market cap stocks, we neutralized the market cap effect in our signals: turnover and short-term price reversal by de-meaning each signal for market-cap prior to ranking the signals [i.e., analogous to sector-neutralization, we ranked each signal within different market-cap bins]. See median market-capitalizations of different portfolio bins in Exhibit 4. Exhibit 4 demonstrates that the return interaction of turnover and reversal is still intact and the inference is the same as in the main body of the paper.

Exhibit 4

Backtest of Short Term Reversal x Turnover [Capitalization Neutralized]- S&P 500
Monthly Cap-Weighted Returns Jan. 1995 – Jun. 2015

	Lowest Past Month Return	Middle Tertile Past Month Return	Highest Past Month Return	Low Past Month Return - Highest Past Month Return	Monthly Hit Rate
Low Turnover	1.23%	0.88%	0.51%	0.72%***	58%***
Middle Tertile Turnover	1.36%	1.01%	0.69%	0.66%***	60%***
High Turnover	1.12%	1.03%	0.66%	0.47%	55%
Low Turnover - High Turnover	0.10%	-0.15%	-0.15%		
Monthly Hit Rate	48%	50%	48%		

	Average Monthly Long-Short Returns	Monthly Hit Rate
Long - Short	0.72%***	58%***
Long- S&P 500	0.33%**	52%
Short - S&P500	-0.39%**	42%**

Long = The Bin That is Low Turnover and Lowest Past Month Returns
Short = The Bin That is Low Turnover and Highest Past Month Returns

Median Market-Cap [\$MM] after Cap-Neutralization

	Past Month Returns		
	Lowest		Highest
Low Turnover	9954	9510	9579
	9306	9594	10060
High Turnover	9542	9981	10357

***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively

Source: S&P Capital IQ Quantamental Research. Results are as of 06/30/2015. Backtested returns do not represent actual trading results and were constructed with the benefit of hindsight Returns do not include payments of any sales charges or fees. Such costs would lower performance. Indices are unmanaged, statistical composites and their returns do not include payment of any sales charges or fees an investor would pay to purchase the securities they represent. Past performance is not a guarantee of future results.

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Our Recent Research

June 2015: [Equity Market Pulse – Quarterly Equity Market Insights Issue 4](#)

The Q2 issue of Equity Market Pulse features a spotlight on developed Europe, which has the highest estimated growth rates and most attractive valuations among developed markets.

May 2015: [Investing in a World with Increasing Investor Activism](#)

Investor activism has gained mainstream acceptance as activists with larger-than-life personas have waged a string of successful campaigns. Activist hedge funds' assets under management [AUM] have swelled to \$120 billion, an increase of \$30 billion in 2014 alone. It was among the best performing hedge fund strategies in 2014 as well as over the last three- and five-year periods. In this report, we explore an investment strategy that looks to ride the momentum surrounding the announcement of investor activism. We further explore what, if any, changes to targeted companies activists are able to influence.

April 2015: [Drilling for Alpha in the Oil and Gas Industry – Insights from Industry Specific Data & Company Financials](#)

During the recent slide in oil prices, clients frequently asked us which strategies have historically been effective in selecting stocks in declining energy markets. This report answers this question, along with its corollary: which strategies work in rising energy markets? We also explore the value of oil & gas reserve data used by fundamental analysts/investors, but not used in a majority of systematic investment strategies. The analysis in this report should help both fundamental and quantitatively-oriented investors determine how to best use industry-specific and generic investment metrics when selecting securities from a pool of global oil & gas companies.

March 2015: [Equity Market Pulse – Quarterly Equity Market Insights Issue 3](#)

Driven by proprietary data and analytics from S&P Capital IQ™, Equity Market Pulse provides professional investors with insights into global equity market fundamentals and performance at a glance. Spanning developed and emerging markets in the Americas, Europe, and Asia, it provides perspective on fundamentals, valuations and investment strategy effectiveness.

February 2015: [U.S. Stock Selection Model Performance Review – The most effective investment strategies in 2014](#)

Since the launch of the four S&P Capital IQ™ U.S. stock selection models in January 2011, the performance of all four models [Growth Benchmark Model, Value Benchmark Model, Quality Model, and Price Momentum Model] has been positive and 2014 was no exception. Our models' key differentiators - distinct formulation for large cap and small cap stocks, special treatment for the financial sector, sector neutrality to target stock specific alpha, and factor diversity - enabled the models to outperform across various market environments. In this report, we review the underlying drivers of each model's performance over the 12 months ended December 31, 2014, document performance from January 2011 when the models went live, and provide full model performance history from January 1987.

January 2015: [Research Brief: Global Pension Plans – Are Fully Funded Plans a Relic of the Past?](#)

With strong equity and bond market performances over the past few years, one might assume that pension shortfalls have declined sharply. Since our [last research brief \[September 2013\]](#), funding

statuses have indeed improved in the U.S. and Asia, though not in Europe [Exhibit 1]. However, while the S&P 500 Index has been making higher highs [Exhibit 2, red line], the number of S&P 500 plans with a funding status of 90% or higher has been in a sharp decline [blue bars].

January 2015: [Profitability: Growth-Like Strategy, Value-Like Returns – Profiting from Companies with Large Economic Moats](#)

Value-based strategies have been the favorite weapons in many investors' arsenals, historically yielding large returns and consistently outperforming. Most value investors focus on the price side of the equation – i.e., buying assets that are priced below their intrinsic values. Yet, there's another dimension to the value equation that has been complementary to value and just as critical in generating excess returns. Enter profitability. Profitability has historically worked as an investment strategy because instead of focusing on the cheapness of an asset it focuses on the productiveness of an asset – i.e., its ability to generate earnings for the investor. Our results from January 1996 to August 2014 show: The S&P 500® continues to be the preeminent regional performer in terms of both financial results and price appreciation Risk and Return: Tracks the dynamics of equity market returns and volatility.

- **Profitability-based strategies have historically produced excess returns on par with those generated by value-based strategies** and have historically produced higher excess returns than those generated by quality and price momentum strategies.
- Profitability-based strategies **have historically produced excess returns even after controlling for quality-, value- and price momentum-based strategies.**
- Profitability-based strategies **have historically consistently produced excess returns across different regions, time periods, and market capitalization categories.**
- **Highly profitable firms have historically consistently shown above average growth** with two-year top- and bottom-line growth rates that are 10% and 31% higher, respectively, than those for least profitable firms.
- Profitability measures that are cleaner [i.e. higher up in the income statement such as gross profit] **have historically shown higher excess returns and lower volatility** than measures that are lower in the income statement [e.g., net profit].
- **Gross profitability ratio has historically been 2.07x, 2.22x and 3.12x times more persistent than quality, value and momentum, respectively, after 5 years.**

November 2014: [Equity Market Pulse – Quarterly Equity Market Insights Issue 2](#)

Driven by S&P Capital IQ's™ proprietary data and analytics, **Equity Market Pulse** provides professional investors with insights into global equity market fundamentals and performance at a glance. Spanning developed and emerging markets in the Americas, Europe, and Asia, it provides perspective on valuations, operating efficiency, and investment strategy effectiveness.

- **The S&P 500® continues to be the preeminent regional performer** in terms of both financial results and price appreciation Risk and Return: Tracks the dynamics of equity market returns and volatility.
- **Investor preference for developed markets continues**, as developed markets show rising P/E multiples versus the emerging markets on much stronger financial performance.
- **Emerging markets appear cheap** on a valuation-to-projected-growth basis, with forward P/E to earnings growth [PEG] ratios of less than half those of the developed market average.

October 2014: [Lenders Lead, Owners Follow - The Relationship between Credit Indicators and Equity Returns](#)

This paper demonstrates a strong link exists between credit events and equity returns, suggesting a potential investment strategy. Whereas previous academic work focused on ratings changes within the U.S., this analysis takes a global perspective and includes the post-financial crisis period. Shareholders should note that even in a benign credit environment Standard & Poor's Ratings Services ("S&P Ratings Services") downgraded 68 U.S. speculative grade companies in the second quarter of 2014, and forecasts the rate of speculative grade defaults to increase next year to 2.2% from 1.6% in 2014. Year to date, there have been 303 instances where credit default swap spreads have widened by more than 50 basis points.

August 2014: [Equity Market Pulse – Quarterly Equity Market Insights Issue 1](#)

Equity Market Pulse provides professional investors with insights into global equity market fundamentals and performance at a glance. Spanning developed and emerging markets in the Americas, Europe, and Asia, it provides perspective on valuations, operating efficiency, and investment strategy effectiveness. The content of the Equity Market Pulse is driven by S&P Capital IQ's fundamental data and analytics including S&P Capital IQ Estimates, Global Point-in-Time Fundamentals, and the Alpha Factor Library. The analysis is broken into four themes:

- Valuation: Analysis of valuation multiples coupled with consensus outlook for earnings and revenue growth.
- Operating Performance: Trends in operating performance with return on equity deconstructed into: net profit margins, asset turnover, and leverage
- Risk and Return: Tracks the dynamics of equity market returns and volatility.

July 2014: [Factor Insight: Reducing the Downside of a Trend Following Strategy](#)

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