Liquidity Risk

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Defining Liquidity

**Portfolio Liquidity Risk**

the risk that available liquid assets will be insufficient to meet changing market and business conditions including:

- liabilities (for example margin calls for derivatives),
- funding of asset purchases,
- increases in client demands for cash in Funds providing redemption options to investors.

**Market Liquidity Risk**

which refers to the ability to purchase or sell securities in the market.

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Portfolio Liquidity Risk Program

Designed to ensure that portfolios are well-positioned to withstand stress scenarios, and allow portfolios to potentially take advantage of opportunities provided by market dislocations.

- **Daily Stress testing** to estimate worst-case cash needs related to forward settling or derivative positions on a forward looking horizon.
- **Redemption Analysis** of historical fund flows by strategy with a focus on the tail of the distribution of realized flows.
- **Minimum True Cash Buffers** established for each portfolio which are met with holdings in assets which can be sold or financed via the repo market for same day settlement.
- **Tier and Monitor strategic holdings by Volatility.** Security volatility estimated utilizing multiple approaches including ex-ante risk models (PROTEUS), market implied risk (spread/OAS) and historical simulation (CVAR).
  - **Concentration limits** framework applied to single-name (issuers) and asset classes. Limits scale with an assessment of the credit risk of the issuer with higher risk issuers subject to lower percent market value limits.
  - **Early warning credit process** to escalate and review changes in price or spread (OAS).

**Highly liquid, high quality assets**
- US Treasuries bonds, AAA-rated Agency mortgage pass-through, Cash and overnight investing Repo which may be converted to cash in stress market conditions.

**Liquidity Profile**

- Increasing Ex-Ante Vol

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Quantitative Research: Liquidity in Corporate Credit Markets

Liquidity cost has a strong relationship to volatility (VIX) and spread (OAS). Higher cost bonds tend to have higher beta to liquidity shocks (for example Energy in early 2016).

Impact of Oil shock on Energy Sector. Correlation between liquidity cost and liquidity beta increase in turbulent periods.

Positive long-term Correlation of liquidity innovation to Change in Spreads and VIX

<table>
<thead>
<tr>
<th>Table 3: Summary statistics of liquidity innovation</th>
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<tbody>
<tr>
<td>2007 to 2017</td>
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<tr>
<td>2010 to 2017</td>
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<tr>
<td>Volatility</td>
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<tr>
<td>Kurtosis (excess)</td>
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<td>Skewness</td>
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<td>Corr to VIX</td>
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<td>Corr to BarC A OAS</td>
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