1 Arbitrage crashes and speed of capital

If arbitrageurs lose access to debt capital, and if they are unable to replace the lost debt capital with new equity capital, they would be unable to force prices of similar assets to the same level i.e. mispricings would result (not creating an arbitrage opportunity). Arbitrage opportunities can disappear when link between two related securities is severed.

Mitchell, Pedersen, and Pulvino show that major market dislocations can constrain arbitrage capital and force arbitrageurs, who are generally rewarded for providing liquidity, to in turn demand liquidity. In 2008, the forced deleveraging was particularly problematic in 2008, when unlike during the 2005 convertible crisis - which was confined to the convertible market - the capital constraints affected investors across multiple asset classes. Multi-asset strategies were severely affected.

The paper of arbitrage crashes and speed of capital shows that a combination of the following factors can violate the one-price law:

1. Duration mismatch between long-term arbitrage investments on the left-hand side of arbitrageurs' balance sheets and overnight debt financing on the right-hand side

2. An asymmetry in the speed of capital, i.e. abrupt and immediate withdrawal of debt capital used to finance arbitrage portfolios

Clearly, leverage is used a lot in hedge funds - who obtain their debt financing from prime brokerage operations of large investment banks such as Goldman Sachs and Morgan Stanley. The prime brokerage charge margin fees (20-30bp in excess of federal funds rate). The haircut/margin (or collateral) is higher for riskier securities.

In a typical prime brokerage agreement, the terms are subject to daily adjustment. Longer-term financing is available at higher financing rate with less duration (<6 months) and contains numerous covenants providing outs for the lender. A negative covenant may allow the lender to force a hedge fund to liquidate even when investment opportunities are attractive. The hedge-funds grant lien on all their assets to maintain low borrowing rates. Rule 15c3-2 of the 1934 Securities Exchange Act allows the prime broker to rehypothecate up to 140% of a margin customer's loan balance.

LBIE's had unrestricted rehypothecation rights and it could offer clients higher levels of leverage than a US broker–dealer subject to Rule 15c3-2. At the fall of Lehman, its rehypothecation lenders started selling the collateral provided by Lehman's hedge fund clients. Portfolios managed by HFs had far lower risk than the actual securities which Lehman had rehypothecated.

The hedge fund portfolios had low fundamental risk because of the hedges of linked securities, but the hedged portfolios did not transfer to Lehman's rehypothecation lenders upon the bankruptcy filing. Because of the delinking of the portfolio positions, previously hedged positions became unhedged and rehypothecation lenders received portfolios several times riskier than the underlying hedge fund portfolios. Given the resulting increase in risk, previously small haircuts became extraordinarily large.

The 4.7% decline in the S&P 500 would generally not have a noticeable effect on the risk of hedge funds' arbitrage portfolios, but because of the separation of the short and long positions, the market decline had an adverse effect on the performance of the collateral.

Less levered hedge funds began to sweep excess cash out of the prime brokerage accounts and into third-party custodial accounts, further restricting prime brokers' access to capital and contributing to the forced deleveraging of hedge funds by their prime brokers.