

# RUSSIA/LTCM AND MARKET LIQUIDITY RISK<sup>1</sup>

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## **Introduction**

As recounted by Stefan Walter in the last issue of "The Financial Regulator" (Walter 1999), whereas the Russia/LTCM crisis of 1998 raised a number of significant regulatory concerns (see also Basel Committee 1999), the real danger arose from the market liquidity failure in what are traditionally the most liquid markets in the world, namely those in the US. This article seeks to complement that earlier analysis by focusing on the phenomenon of market liquidity risk. Accordingly, it illustrates the way liquidity failure arose during the crisis, it outlines an economic approach to understanding the genesis of such events, and sets out the main regulatory concerns that such market liquidity failures can occasion. It is important before commencing to note that abrupt declines in debt securities market liquidity are not unusual. As discussed in Davis (1994), amongst parallel episodes are the collapse of the FRN market in 1987, the junk bond crisis of 1990, the collapse of the Swedish commercial paper market also in 1990 and the difficulties of the ECU bond market in 1992. Admittedly, most of these comparable patterns in the past affected rather minor and segmented markets, with a concentrated structure of market makers, investors and/or issuers. The most similar episode was perhaps that in the US CP market at the time of the Penn Central bankruptcy in 1970, which was considered of sufficiently systemic dimensions to warrant a policy response. Nevertheless, the growing importance of capital market financing suggests that the regulatory implications of market liquidity failure must be taken very seriously. It may be added that the rapid securitisation of the eurozone in the wake of EMU (Davis 1999b) makes the issue of considerable relevance there.

Before starting, a useful preliminary is to seek to define market liquidity. Kyle (1985) notes that it encompasses "tightness" (the cost of turning around a position over a short period of time), "Depth" (the size of an order flow innovation required to change prices by a given amount), and "resiliency" (the speed with which prices recover from a random, uninformative shock).

## **1 The recent liquidity crisis in the US securities market**

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We commence with a brief account of the Russia/LTCM crisis (source: IMF (1998)). The crisis followed a long bull period, where equity prices had risen sharply and credit quality spreads on bonds had contracted. Issuance even of low grade bonds was very high. The Asian crisis had had little effect on this pattern, although bid-offer widening was apparent in the mortgage backed securities market - where LTCM was active - in April 1998. The trigger for serious turbulence was the moratorium on sovereign debt and effective devaluation of the rouble by Russia in August. It led to a sharp fall in equity prices, a *rise* in core government bond prices (in the context of a “flight to quality”) and a rise in spreads, most markedly on low grade corporate bonds (although the rise in yields was cushioned by an overall fall in bond yields). Issuance collapsed for the US high yield market (to \$2 bn in October compared with \$15 bn per month in the second quarter), and was sharply reduced for all private debt instruments. Crucially, it was apparent at the time that not all of the widening in spreads was linked to credit risk perceptions, but to an extreme liquidity preference and a general unwillingness to deal in corporate bonds. In the words of McDonough (1998), there was an “abrupt and simultaneous widening of credit spreads globally, for both corporate and emerging market sovereign debt, (which) was an extraordinary event beyond the expectations of investors and financial intermediaries”.

Underlying these patterns, a wide variety of institutions had taken long positions in Russia and other emerging markets. The spillover to the US and other mature markets was linked to the financing of these positions in a leveraged manner in those markets. Rapid attempted liquidation by a large number of investors in the context of high leveraging led to sharp price changes. The overall widening of spreads in turn inflicted heavy losses on the significant number of large investors which had purchased other higher-risk and/or lower-liquidity assets (e.g. junk bonds or mortgage backed securities – and off-the run<sup>2</sup> Treasuries) while going short in high-quality debt on the assumption that the existing widening that had occurred after the initial Asian crisis would be unwound (i.e. spreads would “mean revert”). Such losses led to further margin calls, liquidation and hedging, putting further demands on liquidity.

LTCM was one such investor, an unregulated hedge fund with large and (50:1) leveraged positions across what were thought to be a diversified range of financial markets. US and European banks had major credit exposures to it. Simultaneous price shifts in previously uncorrelated markets in the wake of Russia wiped out its capital and threatened insolvency. A rescue was undertaken by private-sector banks to preserve orderly market conditions (McDonough 1998). Notably, there was concern if LTCM had suddenly been put into default, its 75 counterparties would have rushed to “close out” hundreds of billions of dollars of positions, causing massive illiquidity and price shifts, harming both the counterparties and other market participants. Such a move might generate further uncertainty in a vicious circle, which would ultimately impact sharply on the cost of capital.

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<sup>2</sup> On the run securities are the most recently issued stocks and heavily traded; off the run are earlier issues of the same maturity which lack liquidity, being largely in the hands of long term investors.

Despite the rescue, LTCM heightened uncertainty by leading to fear of the unknown regarding unwinding of its positions and similar hedge fund or bank failures which would entail the unloading of assets into illiquid markets at distressed prices. There was a sharp increase in price volatility and departures from normal pricing relationships (spreads between long term on-the-run and off-the-run Treasuries widened from a norm of under 10 bp to 35 bp, despite similar duration and the same credit risk) implying a major premium was placed on liquidity. Further widenings were seen in the yield spreads on eurodollar bonds and on private sector instruments over US treasury bills, as well as on swaps of fixed for floating rates, showing also heightened concern about counterparty risk. Even in currency markets such as the dollar-yen, there was a sharp rise in bid-offer spreads – and, separately, a one-day move of 15 yen as the so-called yen carry trade was rapidly unwound.

Much larger institutions than LTCM had similar if not greater positions with comparable leverage i.e. the markets lacked “macro portfolio diversification”. LTCM had \$ 80 bn in US Treasury arbitrage positions while commercial banks had \$ 3000 bn. Direct creditors and counterparties of LTCM were hence not the only ones likely to be hit by losses from an enforced unwinding of LTCM’s positions. In such circumstances, market makers were naturally reluctant to take the opposite side of the market<sup>3</sup>. According to the Wall Street Journal, they “cut back on the size of trades, quoted wider bid-offer spreads or did not quote at all”. Consequently, liquidity plunged and market prices moved to levels which were at times wholly unjustified by fundamentals. Markets that were traditionally uncorrelated became highly correlated, and VaR models were interpreted as prompting further sales. There was paralysis among long term investors who could have corrected pricing anomalies, due to risk aversion and/or lack of credit. Trading techniques such as dynamic hedging and portfolio insurance apparently worsened such tendencies, and exacerbated market price movements once they began. The result was intensified focus on paper that could be liquidated quickly, regardless of its quality in other respects.

## 2 Financial instability - banks and securities markets

The above account raises the issue of how to interpret market liquidity failures, *and Russia/LTCM in particular* from a theoretical point of view. There are two aspects of the theory of financial instability, the theories which show how systems may become vulnerable (financial fragility), and those which show how crises actually occur (financial instability). Here we focus on the latter, while noting that the vulnerability that developed prior to the crisis, in terms of leveraged investments in a context of rapid asset price growth, are typical of both banking and securities market crises, and are well -described by extant theories (see Davis 1994, 1995a, 1999a).

The core of financial instability analysis has traditionally been the banking liquidity crisis, as outlined in the context of the theory of banking as **liquidity insurance**, originated by Diamond and Dybvig (1983). Given maturity transformation, the risk that others may withdraw can cause a depositor panic and may

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<sup>3</sup> The institutions making markets had themselves been financially weakened in the crisis.

impinge externally both on other banks (via direct financial exposures and contagion) and on borrowers unable to access other sources of funds. *If LTCM had not been rescued, a process similar to a contagious bank run could have ensued, with first the institution itself and then the most exposed creditors being starved of liquidity and forced to sell assets in a “fire sale” manner. Given underlying weakness of market liquidity, this would have exacerbated effects of the simultaneous closure of positions and prompted severe market disruption.*

Securities markets offer liquidity insurance in a different way, by increasing the ease with which assets may be transformed into cash prior to maturity. Yields are generally lower in highly liquid securities markets, and hence the cost of funds tends to be lower for a given maturity, as investors are more willing to hold a claim if they are confident of its liquidity. *One example is the above-mentioned distinction between on the run and off the run US Treasury securities.* Unlike sight deposits at banks, there is no guarantee of a fixed rate at which securities can be liquidated immediately, but short-term high-quality debt securities approximate to this. Meanwhile, so long as markets remain liquid, the investor benefits from a shorter effective maturity than the issuer has to offer, thus there is again maturity transformation. Alternatively, the holder has an option to exercise (sell) early, which can be invalidated by illiquidity (and insolvency). Market liquidity depends on all other holders not seeking to realise their assets at the same time. *Liquidity is likely to be higher in markets which are broad (a diversity of investors and market makers) and deep (with sufficient two-way volume to ensure ability to sell in volume without moving the price), as is normally the case for US securities markets.*

As is the case for banks, if doubt arises over the future liquidity of the securities market it is rational to sell first before the disequilibrium between buyers and sellers becomes too great, and market failure occurs (i.e. prices are driven down sharply, and selling in quantity becomes extremely difficult). *This appears to have been precisely what happened in the US markets after Russia and LTCM, hitting relatively less liquid markets disproportionately.* Such collapses of liquidity in debt markets may have externalities similar to bank failures, particularly if there are *leveraged investors who are constrained to sell despite such illiquidity* and there is contagion between markets, as well as if illiquidity makes investors unwilling to accept new issues, and if there are debtors who do not have an alternative source of rollover finance.

The parallels of banks and securities markets are not exact, since investors who are not constrained to sell and where there is no credit risk do not make a loss by “sitting tight” and unconstrained investors should be able to profit. Markets, unlike banks, may become illiquid but cannot become insolvent. Equally, the difficulties for issuers arise only in the case that an existing securities issue needs rolling over – or there is a pressing need for a further issue - when the liquidity problem arises.

The nature of securities market liquidity failure is further clarified by analysis of the role of **market makers**. The response of market makers to "one way selling" where the new equilibrium price is uncertain is often simply to refuse to quote firm prices, for fear of accumulating stocks of depreciating securities, which generates a collapse of liquidity. Uncertainty is crucial; if there is a clear new market-clearing price at which buyers re-emerge, the market-makers will adjust their prices accordingly. Bingham (1992) argues that liquidity collapses are particularly likely when returns to market making are low, and hence institutions are unwilling to devote large amounts of capital to it. *It was noted above that pervasive uncertainty was a feature of the situation in 1998, which was exacerbated inter alia by lack of transparency and disclosure on institutions' portfolios*<sup>4</sup>. *Market makers adopted defensive approaches as a consequence.*

There are structural reasons why one-way selling is becoming common, such as increasing concentration of portfolios in the hands of institutional investors, that may react similarly and simultaneously to news (these may reduce breadth as defined above). A further set of explanation may be based on work on herding by institutional investors (Davis 1995b) which may be warranted e.g. by desire to show quality in the presence of imperfect information (Scharfstein and Stein 1990), or regular performance checks relative to peers, which may lead to mimetic behaviour. The herding literature also suggests some institutions such as hedge funds may play a "leader" role with others following suit (De Long et al 1990). *We have seen in 1998 that there was indeed herding in the sense that banks and institutional investors adopted similar leveraged positions in the expectation of "mean reversion" of spreads. Meanwhile, attempted one way selling was inspired by desire to unwind leveraged positions, but was possibly exacerbated by program trading.*

Market collapse in dealer markets, even in the absence of generalised uncertainty, may result from perceptions of asymmetric information (Glosten and Milgrom (1985), Kyle (1985)). The dealer needs to charge spread high enough to offset losses made on dealings with "insider" traders whose orders reflect private information. Meanwhile, there are sizeable fixed costs in organising markets, and volumes of "liquidity" trading usually respond inversely to costs of transacting. The costs of trading depend in turn on the bid-ask spread, itself related to the volume of "liquidity" trades. This can lead to a virtuous circle of narrowing spreads, new entry of market participants or even market makers, and increased trading. But in the presence of asymmetric information, markets may also enter adverse spirals leading to market failure. A relative increase in insiders leads market makers to widen spreads to avoid losses. This discourages liquidity traders, who withdraw, increasing adverse selection. Some dealers may cease to operate. Once the insiders are too numerous and if their information is too good, bid and ask prices may be too far apart to allow any trade.<sup>5</sup> *In the case of LTCM, there is some evidence of asymmetric information at play (albeit not "insider trading" in a legal sense), as the unwinding of its portfolio and that of similar hedge funds and other investors was a constant fear in the*

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<sup>4</sup> Note that liquidity could also be hindered by excessive transparency.

<sup>5</sup> This assumes liquidity trade is endogenous; if not, there will remain a small number of trades.

*market. This may have been a major cause of reductions in liquidity by market makers, compounding the effects of the losses they had made on their inventories as a consequence of unexpected price changes per se.*

In both cases (of one way selling and of acute asymmetric information), the secondary market, in effect, ceases to function. The associated decline in liquidity of claims is likely to increase sharply the cost of raising primary debt in such a market (i.e. there will effectively be heightened price rationing of credit), or it may even be impossible to gain investor interest at any price (quantity rationing). *This appears to have been notably the case in 1998 for lower-quality US corporate borrowers, who fortunately were able to access backup lines of credit with banks, albeit at higher prices.*

### **3 Implications of market liquidity crises for systemic financial stability**

As noted by Bingham (1991), one reason why securities market liquidity is of greater concern than in the past is that banks are more actively engaged in securities business, including not only issuance but also trading, underwriting and providing backup facilities. Hence a securities market collapse could lead to a liquidity crisis for a bank, either directly (if it relies on the relevant market for funding, or is unable to meet commitments to provide backup facilities due to "contagious" illiquidity in its own wholesale markets) but also indirectly (if suspected losses from underwriting or market making lead to doubts on the part of depositors regarding its solvency). *Certainly, in 1998 rising bank bond spreads and disproportionate falls in share prices for banks indicate market concerns in this respect.*

Equally, failure of a major securities house could occur during a market liquidity crisis. There could be withdrawal of bank credit lines as a consequence of perceptions of exposure to the market concerned, loss of liquidity in the wholesale money markets where such firms obtain much of their funding, or demands by banks for greater collateral at a time when its asset value is falling sharply. Sale of assets to cover funding needs may itself depress the value of other holdings, or be impossible due to the market liquidity crisis. Note also that net liquidity requirements imposed on such institutions by regulators to ensure investment banks survive such crises assume a reasonable amount of market liquidity is maintained. Failure could in turn lead to further defaults, given the varied and sizeable exposures of firms to each other in several markets, also affecting banks and the payments system. *Similar concerns were present in 1998, with concerns over investment banks being particularly acute, as reflected in greater falls in share prices than for commercial banks* This was the fear that led the Fed to offer liquidity to the markets in the wake of the 1987 stock market crash (Davis (1995a)) *and again in 1998.*

A further reason for concern is that securities markets are increasingly relied on as repositories for liquidity. Such liquidity may be sold to provide funding, or instead used as collateral for loans. Sharp declines in liquidity may lead to cash-flow difficulties due to inability to sell, or increased difficulties

obtaining credit due to the lower value of collateral. Bankruptcies and defaults may ensue. *Again, falling liquidity of assets and the risk of having to sell at “distress prices” was a key aspect of concerns during the 1998 episode.*

Moreover, the process of securitisation has entailed a much greater reliance on securities markets by a range of institutions. Banks may to some extent rely on their ability to securitise assets in order to realise liquidity as well as holding larger securities portfolios themselves. Money-market mutual funds find liquidity of money markets essential in order to maintain an ability to offer fixed-price liabilities. There are a wide range of non-bank financial institutions such as finance houses, whose funding relies mainly on securities markets, and whose default following a securities market collapse may lead to wider difficulties in the financial sector. And, there is the increasing reliance on securities markets by non-financial companies, which may have reduced the scope of their links with banks and hence find it difficult to obtain alternative forms of credit. *As noted, although there were some fears of a “credit crunch” in 1998, US non-financial firms were apparently able to switch between markets and backup lines of credit with banks, on tighter terms. Money market funds were apparently not badly affected. But banks, investment banks and hedge funds were all heavily involved.*

Fourth, the difficulties outlined in this paper may arise just as readily in derivatives markets as in underlying securities markets. As noted by IMF (1993), of credit, market and liquidity risk in derivatives markets "the most difficult to counter is liquidity risk". They note that demands made on derivatives for hedging, for example by market makers in derivatives themselves can easily make liquidity disappear. Moreover, banks are tending to use markets in derivative products, notably forward rate agreements and swaps, to manage their own interest rate risk, instead of the traditional interbank markets. Besides exposing banks to interest rate risk, the collapse of liquidity in derivatives markets may entail heightened uncertainty over banks' exposures (given that derivative exposures are in any case off-balance sheet) and thus heighten the potential for runs. *Derivatives, notably swaps and repos, were heavily affected by concern over counterparty risk - and the contagion spread even more widely to include the forex market itself.*

## **Conclusions**

The recent market liquidity crisis centred in US financial markets highlights a number of factors, related to phenomena identified by theories of financial instability that were mainly devised to describe banking crises. This was not an isolated occurrence but rather one of a series – although each had some special features. Given the increasing role of securities markets for funding, liquidity management and asset sales by banks and non-banks, such events are of considerable potential concern to the authorities. This analysis poses a number of questions for policy makers and raises certain topics for further investigation. In particular, can these events be predicted? Can overhangs of positions which lead to instability be better detected? In the case where crises nonetheless occur, are there any circumstances

in which central banks should intervene directly in the market concerned or more generally by cutting interest rates, despite potential for moral hazard? Can commercial banks always be relied on to maintain credit lines to companies, as they did in 1998? Are regulatory changes needed? What forms of stress testing can be devised to ensure institutions' robustness? What market features can ensure robustness? How can the authorities best judge the likely systemic consequences of closure of a given securities market? How can one assess linkages between credit, market<sup>6</sup> and liquidity risks? How can one assess the contribution of liquidity risk to widening of spreads, when credit risk is also involved?

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<sup>6</sup> Note that most credit risk models assume that market risk is hedged; extant empirical work seems to find a negative relation between market risk and credit risk.