



TD Economics

Special Report

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THE GREY ANATOMY OF THE CURRENT CREDIT CRUNCH

Profit is the mother of invention in financial markets, but fear is the father of destruction. And unfortunately, they do tend to come in tandem. Periods of rapid innovation tend to be followed by some retrenchment when unintended consequences ensue. This is precisely what appears to be under way now. History suggests the fallout from liquidity crises in developed markets tends to be much less than anticipated in the heat of the moment. We do not claim to have all the answers as to how this will end, but there seems to be a lack of liquidity in reasoned and rational discussions at the moment, as well.

This paper outlines the current liquidity crisis from its origins in the U.S. housing market to the broader financial disruptions. The first two sections provide background on U.S. housing and its connection with the collateralized debt obligations (CDO) market. It then looks at the possible avenues for the present shock to further ripple through financial markets and how likely each scenario might be. It then goes on to examine why contagion into the broader economy seems unlikely at present, what possible paths for contagion exist, what indicators to look for, how all of this affects central banks' current and potential responses, and the financial market response to previous U.S. liquidity crises.

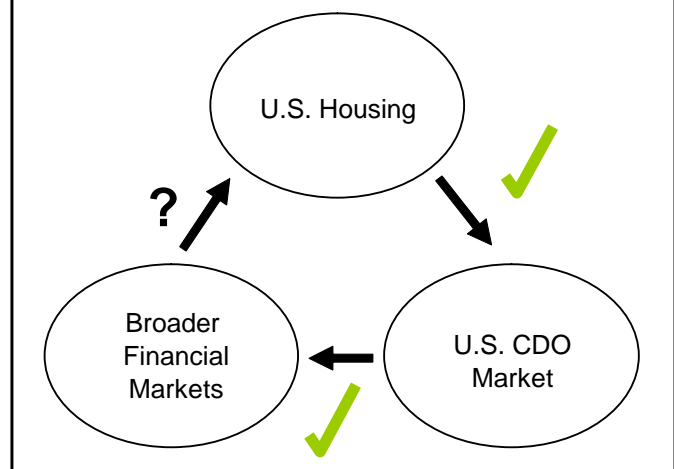
HIGHLIGHTS

- This is the fourth U.S. financial disruption in twenty years that has forced the Federal Reserve and other central banks to inject liquidity.
- In none of these cases did the U.S. slip into recession.
- The noteworthy difference this time is the dichotomy between the relative soundness of economic fundamentals and the sheer terror in financial markets.
- The avenues for contagion within financial markets are larger than the potential for contagion into the broader economy.
- This will need to be reassessed with thoughtful eyes later, but for now, restoring calm and order are key.

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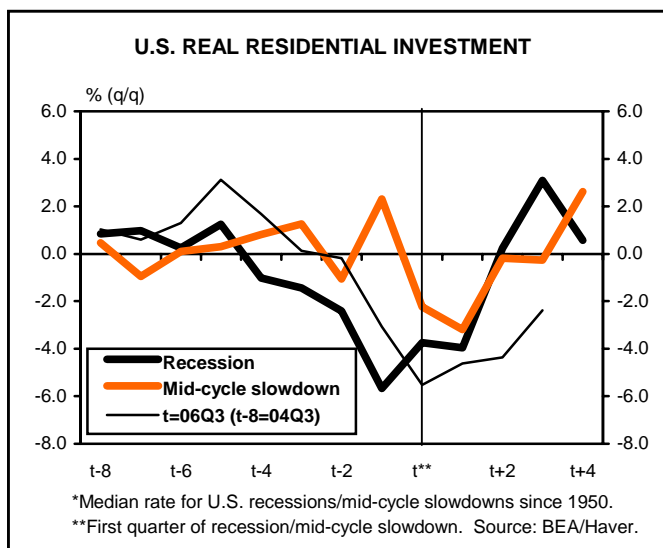
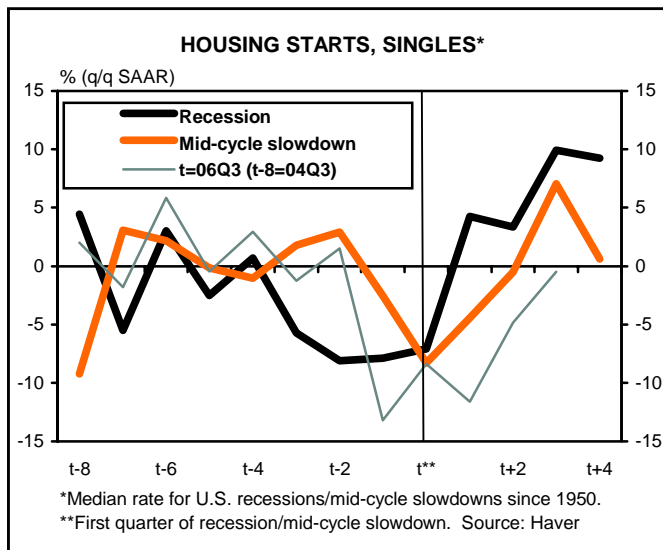
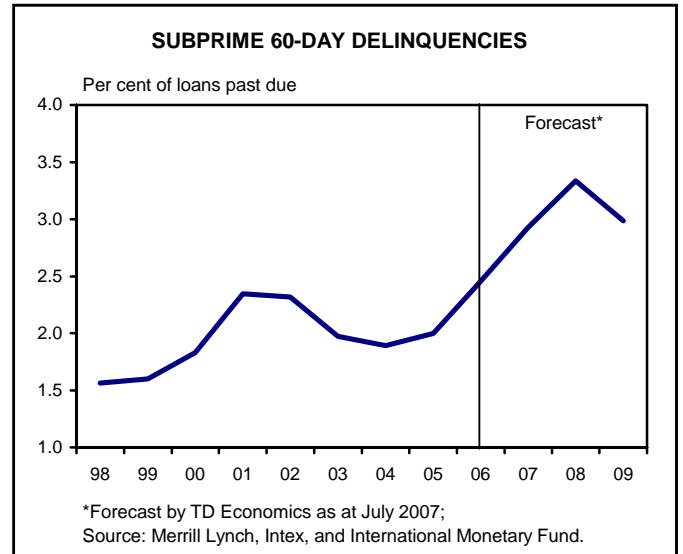
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THE CYCLE OF CONTAGION



HOUSING

Before discussing the role the U.S. housing market played in creating the current crisis of confidence, it is important to have a clear understanding of the state of the sector. While exports – and consumer spending until the second quarter of 2007 – have been outperforming past experiences, the current housing downturn has been more akin to what would be seen in the average U.S. recession in terms of the depth and breadth of contraction. However, in spite of frequent, flippant remarks by some commentators about how the U.S. housing market has yet to hit bottom, the rate of contraction in the U.S. housing sector did “bottom out” in the third quarter of 2006. This is when the contraction in residential investment – the value of all U.S. home construction and renovation – had its worst



quarterly retrenchment. There is still a contraction under way in the stock of new homes built, but it has been occurring at an increasingly slower pace. Before the current credit concerns arose, the sector was on target to contribute positively to U.S. GDP growth in the first half of 2008.

But, the recent financial turmoil is not based on housing’s direct contribution to economic growth. Rather, as has been thoroughly reported, the current troubles in financial markets have their origins in the lending structure. The U.S. mortgage market could broadly be divided into three borrowers:

- Subprime – Those with less than perfect credit scores
- Alt-A – Better credit scores but some shortcoming in their loan application – such as a small down payment
- Prime borrowers – Those with good credit scores.

Subprime and Alt-A both saw a similar deterioration in lending standards (so we will use subprime to refer to both sectors). While mortgage originations in the prime lending market halved from 2003 (\$3tr) to 2006 (\$1.5tr), subprime origination growth accelerated from \$0.4 trillion in 2003 to \$1.4 trillion in 2006. This was driven by such dubious instruments as “ninja” loans, an acronym for the fact they required No verification of INcome, Job status, or Assets. In a small sample examined by Mortgage Asset Research Institute, in 90% of these cases borrowers overstated their income by 5%, and in almost 60% of cases borrowers overstated their income by more than half. So in 2006, almost half of all new U.S. mortgages were to subprime borrowers, with 8 out of 10 of these subprime mortgages requiring little proof of the borrower’s capacity to repay.

FINANCIAL INNOVATION - THE CDO MARKET

Subprime lending was not just driven by lax standards. The evolution of financial markets this decade saw the rapid expansion and acceptance of financial instruments called Asset Backed Securities (ABS) and Collateralized Debt Obligations (CDO) that use the principle of securitization to reduce the liquidity risks financial institutions face and, thereby, increase their capacity to lend (see Boxes 1 and 2). A lot of the benefits from this process depend on creating an instrument that more closely approximates an average return and average default rate for the industry as a whole. This allows for more appropriate financial planning. At least, that was how it was supposed to work.

Unfortunately, the new innovations interacted with previous financial innovations in ways that were not fully appreciated up front. For example, limited documentation loans were actually created to make it easier for self-employed individuals – who may not have paystubs to document their steady income – to get approved for a mortgage. By being able to package off their loans, the incentives and abilities of borrowers and lenders were impaired. The person buying the subprime-backed CDO cannot observe the credit quality of the underlying loans. Their analy-

Box 1 - Liquidity and the Law of Averages

Any lender takes on a risk that the borrower may ultimately default on their loan and charges an appropriate interest rate to cover that potential loss. But, a lender that makes only two loans is in a much riskier position (and would have to charge a higher interest rate) than a lender which makes 100 loans. Should one borrower default, the first firm has lost 50% of their revenue stream, whereas the latter firm has lost just 1%. Over a long period of time, the law of averages would suggest the latter firm might suffer a couple of defaults each year, whereas the smaller one could go several years without a loss. But, for the small firm, if that loss comes at a time when they have not yet had a chance to build adequate reserves, they can become insolvent. So larger operations reduce liquidity constraints and solvency risks by bringing the expected losses each year closer to average and making them easier to plan for. This benefit of scaling up is the principle behind socialized medicine, casino profitability, corporate mergers, and securitization.

Box 2 - Collateralized Debt Obligations (CDOs)

What are they?

- The process of packaging higher-risk, lower-rated assets – such as loans, mortgages, bonds, ABS, etc. – into a new joint security called a CDO.
- Increasingly, assets need not be physically transferred. Instead, the same risks can be traded through derivatives markets using credit default swaps in what are called synthetic CDOs.
- CDOs generally pay out fixed coupon payments to holders, with the underlying assets or derivatives serving as the source of cash.

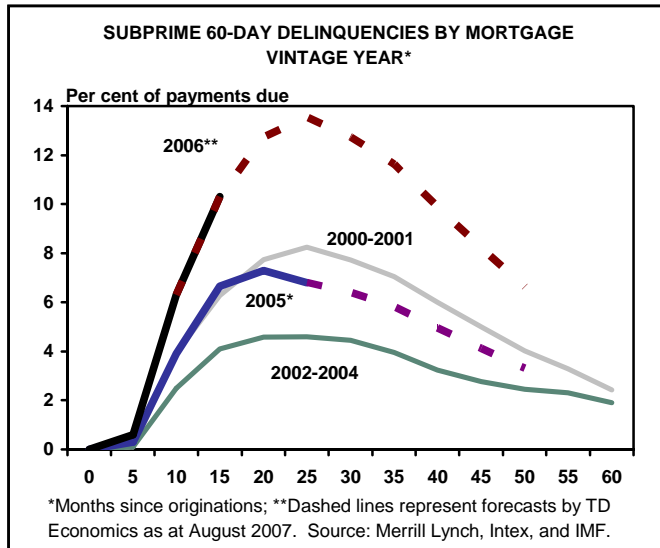
What are the benefits?

- **Balance sheet improvement:** By effectively giving the CDO holder ownership of the assets – in the form of the future revenue stream – this removes the default risk from the originator's balance sheet, freeing up cash they would have had to keep on hand in case of defaults, allowing them to lend more.
- **Diversification:** Any one person could default on their loan at any time. By packaging a large number of these together, the exposure to an abnormally high level of defaulted loans is minimized. The CDO buyer also now has a more diversified portfolio with exposure to credit markets.
- **Credit risk transfer:** CDOs transfer credit risk to other parties more willing or able to hold it.

Why is this profitable?

- In effect, the person issuing the CDO is financing themselves by selling bonds at low interest rates – say 6% – and using that money to buy a large, diversified collection of higher-risk, lower-rated (i.e. higher yielding) assets that earn, say 10%. After repaying bondholders, there is a 4% return.

sis simply assumes that in a large enough quantity, the loans will approximate an average historical default rate. The lender, however, has no incentive to worry about the credit quality of the borrower, since he will effectively “sell” the mortgage and associated risks through the CDO. So products like ninja loans met the goals of lenders to



continue lending, but also increased the risk that future defaults would be higher than in the past.

This loophole will undoubtedly be addressed now through legislation and new regulations. And the lenders that have filed for bankruptcy over the last year have been overwhelmingly less-established and smaller lenders who operated almost exclusively in subprime markets and, in many cases, actually increased their business in riskier markets in recent years rather than scale it back. Quite simply, many larger lenders knew better.

On the borrower side, the overall (prime and subprime) delinquency and default rates have risen through 2006 and will likely not peak until 2008. The good news is that the current trajectory in overall mortgage delinquencies (prime and subprime) implies this peak is likely to remain well below historical levels. This is supported by the current low levels of unemployment and decent wage growth. This is comforting from the perspective of dampening the typical economic passthrough from rising defaults to constrained mortgage lending and reduced consumer spending. The unresolved question remains whether and to what extent there will be a new kind of passthrough into the overall economy from the CDO market, to which we now turn.

The next step then for the current credit crunch was how the unexpected increase in defaults would affect the subprime-backed CDO market. On this account, the exact structure of how CDOs are packaged is key (see Box 3).

The delinquency rate on subprime mortgages originated in 2005 peaked at about twice the rate of those originated over 2002-2004, while the delinquency rate on the 2006

Box 3 - The CDO Tranche

- Viability of CDOs hinge on the ability to earn better returns on the underlying individual risky assets than is paid out in the composite CDO.
- To do this, the CDO must have a higher debt rating than the underlying assets. The higher rating equates to a higher probability the investor will get paid.
- By ordering the CDO into tranches by seniority of who gets paid when losses occur, the designer is able to carve up the underlying assets into a high risk instrument which bears the brunt of eventual defaults and a larger amount of low-risk debt insulated from losses in all but extreme circumstances.
- Typical tranche structure: 3-7% Equity, 6% Mezzanine, 87-91% Senior and Super Senior
 - **Equity Tranche** (Not rated)
 - Least senior.
 - First losses are taken out of this so it is very risky.
 - **Mezzanine Tranche** (BBB – the lowest investment grade)
 - If losses exceed the value of the equity tranche, new losses are taken out of the Mezzanine tranche.
 - If losses never get that high, holders get full promised value.
 - **Senior and Super Senior Tranche** (AAA – the highest investment grade)
 - If losses are less than the equity and mezzanine tranches, then holders get full value.
 - Since this is likely, there is a low probability of loss for this tranche, so it gets the highest investment grade status.
- So if there are 100 loans in the CDO and you hold the equity tranche, rather than holding any 3-7 loans, you actually hold the first 3-7 loans to go bad.
- The typical bondholder will assume they will ultimately get paid but ask for a higher return the larger the perceived risk of default. But when a default happens, all bondholders typically share in the losses.
- A CDO assumes from the start some people won't get paid and effectively builds a real-time restructuring mechanism into the financial instrument by having people line up from the beginning by who will take the first losses, second losses, etc.

vintage of subprime mortgages looks likely to peak at about twice that of the 2005 vintage. Losses among CDO investors who purchased debt backed by 2005 subprime mortgages were higher than the previous three years, but were not historically unprecedented. But those losses were then compounded through the first half of 2007 due to concern surrounding the substantial increase in delinquencies seen in the assets underlying the 2006-backed CDOs.

With their value falling, demand started to naturally decrease as well. JP Morgan reported that sales of all CDOs in July were less than half the \$50 billion sold in June. The revaluing of these securities and softer demand is part of any healthy and functioning market. The current problems arose when these changes were met with sudden uncertainty of whether the complex equations used to value and rate CDOs were even appropriate (see Box 4). Wild speculations about subprime default rates possibly approaching 50% – whereas a more reasonable estimate is much closer to 10% just for those subprime mortgages originated in 2006 – intimated that larger losses may be imminent. The fact that nearly half of all new mortgages in 2006 had a down payment of less than 5% would exacerbate these problems by limiting recovery rates – the cash received from the sale of the defaulted asset that would go to mitigating investor losses.

Box 4 - The CDO Rating Issue

- A rating agency assigns a rating to a financial instrument based on the average risk of default.
- All AAA instruments generally have similar average default rates, as do AA, BBB, etc.
- The attraction to CDOs is that they tend to offer higher returns than other equally rated products.
- With a bond, when a default occurs, negotiations determine how many cents on the dollar investors will get, but rarely will they lose it all.
- With CDOs, default recovery depends on:
 - If you assume little correlation between defaults on underlying assets, then you have a “normal distribution” of expected returns with low probabilities of low or high losses and the highest probability of mild losses.
 - The higher the correlation among defaults of the underlying assets, the more the odds favour one of two outcomes, a high probability of little to no loss or a significant probability of near-total loss, with a negligible probability of anything in between.
- While the average risk is the same, the systemic issues – the risk that weakness in one sector can lead to a downturn in a succession of sectors – are very different
 - The mathematical calculations to determine expected defaults of individual assets, the correlation of defaults between assets, and the expected losses for each tranche can be extremely complicated.
 - Depends on factors such as how the tranches are diced up and the ratings and complexity of the underlying assets being securitized.
 - For this reason, a 2003 Moody's report found that ratings on CDOs issued between 1991 and 2002 had a very high downgrade rate of 10.9% and a very low upgrade rate of 0.6%.

FINANCIAL CONTAGION

And with the seeds of fear and uncertainty sown, the market for subprime-backed CDOs seized up. Buying and selling largely stopped while prices were re-evaluated. From there, the contagion has generally been in three directions:

- First, a **loss of confidence** in a broad array of ABS and CDOs.
- Second, a **reduction in the holdings of all risky assets** and portfolio shifts into safer and more liquid assets.
- Third, the **sale of some liquid assets in order to cover current financial obligations falling due**, including in many cases unforeseen obligations that resulted from covering margin calls on the financial losses that resulted from the first two impacts.

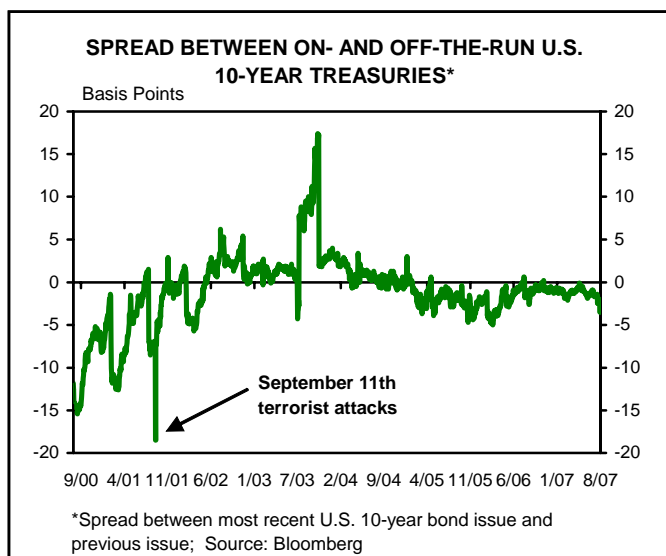
So yields on risky assets are rising to try and provide an adequate reward for investors who chose to hold these assets. Yields on safe and liquid assets – like government bonds – are falling because so many more people want to hold them than before so the reward need not be as attractive (the attraction is their relative safety). And, yields in the inter-bank lending market are rising because of a lack of confidence in fellow financial institutions.

On the issue of the loss of confidence in the broad array of ABS and CDO products, the worry seems overdone given the knowledge we have right now. The concern is that we simply don't have a transparent enough view of where the vulnerabilities currently lie. These shades of grey are what are driving markets right now. There are

certainly **possible avenues for broader contagion** that remain a worry.

The first possible avenue for contagion centers on the **rating process for CDOs**. While the design of CDOs into tranches allows financial instruments to be created that have the same average default rates as in similarly-rated instruments, there is an important difference. A normal bond or loan is just one product tied to one company, government, or individual. CDOs are a collection of a number of underlying assets that each have a default rate. To calculate the average default rate, rating agencies must make an assumption as to the correlation in defaults among these underlying assets. If one loan defaults, do others go with them? In general, the assumptions made are that since these assets are fairly diversified, there is not a strong correlation between individual rates. In other words, there is no systemic contagion that a default by one subprime borrower will drive another borrower to default. If this assumption is not true, the resulting losses in the CDO market come closer to approximating an all-or-nothing game. The highest probability is still that nearly all of the value of the CDO is retained, but the alternative is that nearly all the value is lost. There is little intermediate result. The fact that the defaults are largely being driven by a collective loosening in lending standards in the subprime market does imply that the losses in CDO assets are likely to be higher than initially anticipated. However, we still believe that the overall default rate in the U.S. subprime and prime mortgage markets will be much lower than currently feared.

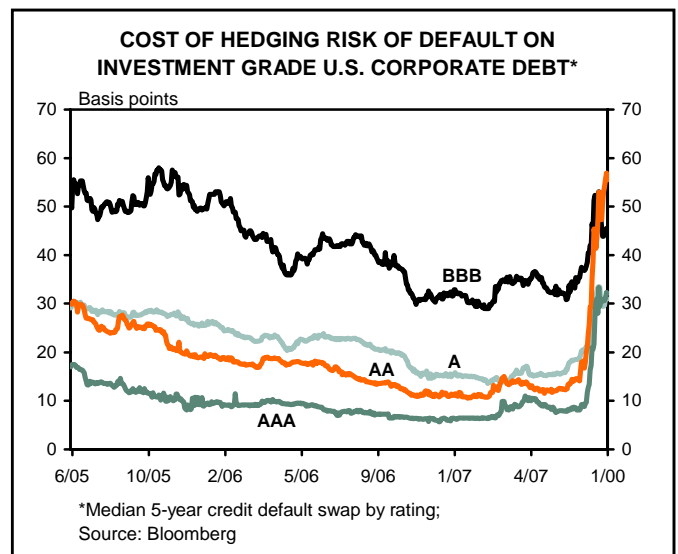
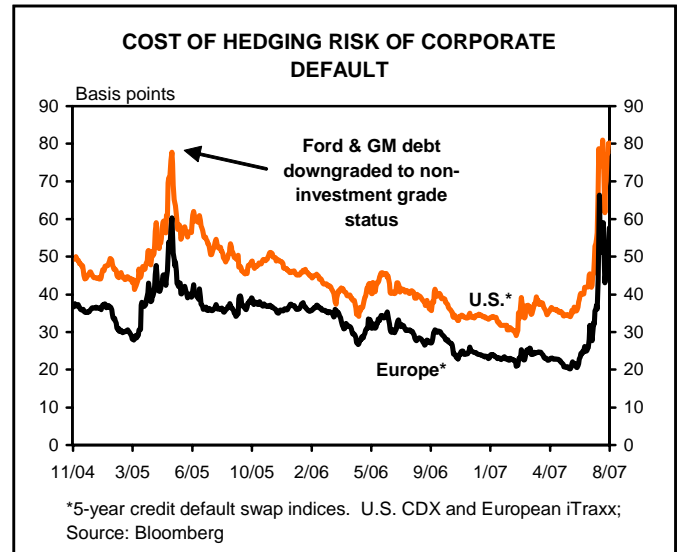
The next concern revolves around the **explosive growth over the last few years in what are called synthetic CDOs**, which have accounted for the majority of new CDO issuance over the last 3-5 years. While the previous discussion has largely assumed that assets are physically backing these products, the growth of the derivatives market – the credit default swap (CDS) market in particular – has allowed the trading of the exact same risks, but without moving any assets. A CDS is an agreement between two parties, where the one that wants to eliminate their risk of default on an asset they are holding pays an annual premium to another party, who agrees to fully compensate the other for any losses they incur as a result of default. This growth was most pronounced in Europe, because regulations prior to 2004 limited European lenders from moving these loans off their balance sheet as easily as American lenders. They still wanted to



hedge the same risks, however, and were able to approximate these through the CDS market and reduce their overall exposure to the default risk inherent in these loans.

Four new risks emerge from this. First, these products require that the CDS market itself remain liquid and open to trading. Otherwise, those who had been using it to reduce their exposure to default risk would need to increase their current provisioning for expected defaults and thereby reduce their cash on hand for other operations. **Second, the party which has agreed to compensate for any default loss could default themselves,** cascading the problem into entirely unrelated corporations and sectors. **Third, the losses for investors in synthetic CDOs could potentially be larger than other CDOs.** While CDOs which involve the transfer of assets have an equity tranche of around 7%, synthetic CDOs typically are closer to 3%. This means for the holder of the next seniority of CDO debt, any loss over 3% would cut into their returns and quickly trickle into the mezzanine tranche, potentially wiping out the investor's entire investment. **The last issue is one of transparency.** Almost all of the synthetic CDOs issued in the last few years have been what are called single-tranche CDOs. This innovation was able to package off just the equivalent of one of the tranches without the need for any of the others. In these cases, each tranche was custom-built. This means it is nearly impossible to tell with any certainty exactly how changing circumstances will affect the asset class as a whole.

The backlash into other asset-backed securities has been pronounced, but these assets share virtually none of the same concerns. ABS markets for products such as credit card debts and automobile loans, for example, have been used by banks for some time to remove default risks from these loans. These products tend to have much higher equity tranches to absorb losses and do not have the current systemic concerns of lax lending standards in U.S. housing markets driving up default rates on the underlying assets. The news on August 13th that a Canadian firm was having problems issuing asset-backed commercial paper is a sign of the uncertainty over exactly where bits and pieces of subprime debt have been repackaged and the spread of the current crisis of confidence. If these markets remain illiquid for any substantial period of time, financial institutions would need to reduce lending to compensate for the increased risk they are carrying. But once confidence is restored that these markets are not materially important conduits for the current problems, they should eventually return to normal operations.



The agreement between Canadian financial institutions on August 16th was a positive development – and one we will likely see more of in the near future – whereby the immediate solvency of those holding these illiquid assets will be able to resolve the issue in an orderly fashion.

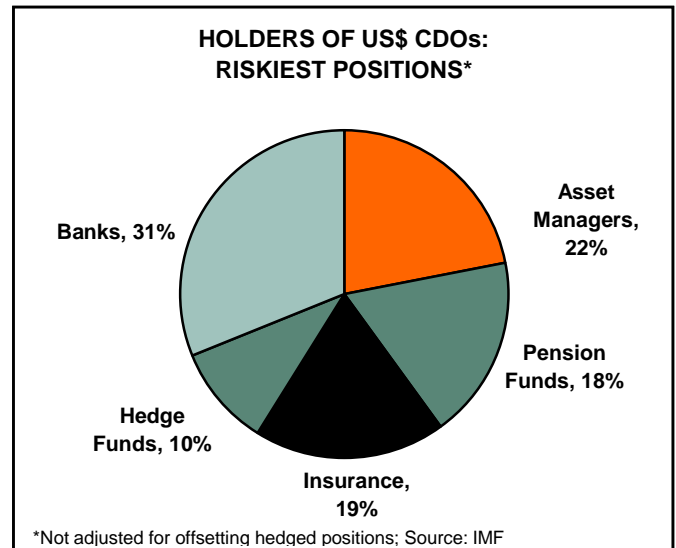
At this point, the flight to safety and leap for liquidity both appear to be symptoms rather than ultimate causes. As such, the sooner confidence and transparency in the markets are restored, the sooner these conditions should subside. In terms of the immediate liquidity issues, even healthy firms can face bankruptcy if they cannot access the cash they have and pay their bills. This contagion to otherwise healthy firms is why an extended liquidity crisis can be harmful. The positive aspect of a liquidity crisis, as opposed to purely a credit crunch, is that

as soon as the dam is lifted, the liquidity constraints are generally immediately rectified.

There are two distinct issues for leveraged buy-outs (LBO) and private equity firms. The more benign concern is that the current increased level of volatility and rising cost of capital has and will diminish the level of deals to come. If an elevated level of volatility, or higher interest rates prevails, then there will be limited market appetite for debt issued through LBOs. Volatility makes planning harder and higher interest rates make the loans typically used to finance these deals more expensive. In and of itself, this may lead to lower productivity and profit growth in the medium-term, but there is limited scope for this to undermine the financial system.

The more significant concern regarding LBOs is related to how the past deals were financed. One of the issues which precipitated the current crisis were reports during the week of July 23-27 that some LBO deals were pulled and that there was insufficient demand for some debt banks had tried to issue to finance these deals. This then left some financial exposure to these deals on the banks' balance sheets. If the current volatility were to remain for several months, this might require these banks to experience lower profits that could bleed into their financing for other activities. Additionally, in a number of these deals, the debts used to finance them were themselves packaged into their own CDOs (Collateralized Loan Obligations or CLOs). This means the current crisis of confidence over the CDO market can be applied to these, as well. It still seems that the most likely scenario is some reduction in activity in this sector, some ensuing loss in corporate profits and productivity due to the inability to scale up corporate operations – with some marginal losses for the affected equities – but again, limited risk of contagion in or out of this sector.

The last important issue is who is holding the CDOs in question? There is certainly little direct exposure of the common investor to CDOs, so their losses are coming generally through the ripple effects through other financial markets. IMF estimates suggest about one-third of the riskiest portion of CDOs are held by banks, 20% each by asset managers, pension funds, and insurance companies, and 10% by hedge funds. Relative to the size of total assets in these sectors, however, these CDO holdings make up a larger share of hedge funds portfolios than the other more diversified investors, suggesting a reason for the relative struggles currently by hedge funds. In terms of systemic issues from this, the fact that hedge funds are also major players in derivatives markets could be a con-



cern given the already stated worries about the need to ensure the CDS and derivatives markets remain liquid. This is also a concern given that hedge funds are generally highly leveraged – meaning a large amount of borrowed capital relative to their assets – making them more susceptible to potential insolvency. This fear is somewhat mitigated by the fact that hedge funds are much less leveraged now than in the past. When the Russian government's debt default led to the bankruptcy by the U.S. hedge fund Long Term Capital Management in 1998, the estimates were that they were leveraged roughly 30 times – meaning for every dollar of assets, they had 30 dollars in debt. This is contrasted with the much smaller Bear Stearns hedge funds that have gone bankrupt recently with leverage ratios estimated at 5 to 15 times. The question this time is whether smaller exposures and lower leverage across a broad array of funds is more systemically risky than very large exposures by one firm. On this account, there is no answer yet, but there is no question the new dynamics have spooked markets.

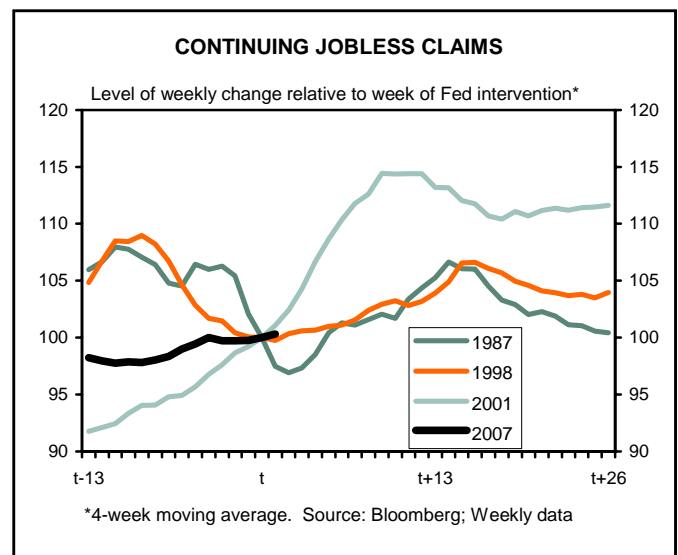
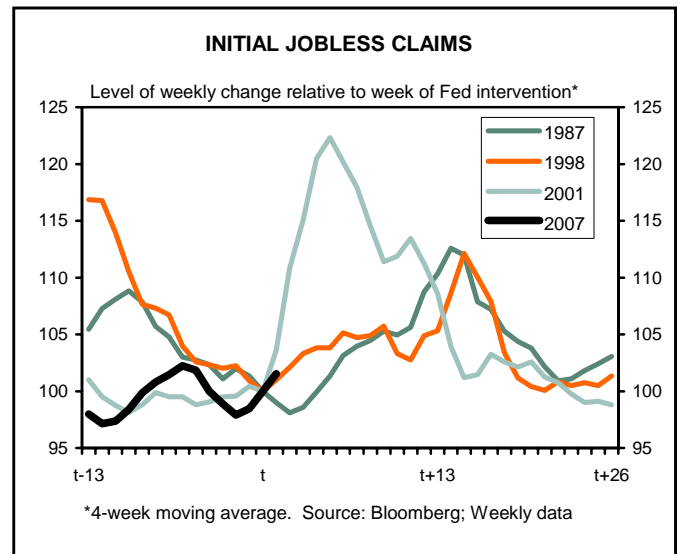
The first rule for investors in a solvency crisis has always been to be the first one out the door with your money and let everyone else fight over the crumbs. This is the reason these episodes are usually very spectacular in their inception, but do not generally last that long. There will still be bad news from other funds, firms, and investors and we have outlined those areas where the further risks would lie were the present situation to worsen. The next question then is whether this financial issue is, or will be, an issue for the broader day-to-day activities of firms and consumers.

ECONOMIC CONTAGION

So will contagion into the general economy be the next shoe to drop? Our previous discussions suggest that mortgage defaults were not going to be nearly as high as some on Wall Street and Bay Street have feared, and that without further contagion through the financial system, they are unlikely to increase substantially beyond our current forecasts. To date, mortgage lenders highly leveraged to subprime markets – including both subprime and the Alt-A markets – have been the ones to file for bankruptcy. The larger financial institutions have much less, if any, exposure to these markets. Substantial bankruptcies by financial institutions would put a further crimp into new borrowing than we have been assuming already. This reduction in lending and borrowing would reduce the turnover in the housing market and the ability of individuals to tap home equity.

But on this account, we had largely already factored these changes in. If there were further reductions to the credit extended through credit cards, auto loans, or other consumer loans, this would be reason to expect a more substantial slowing in the economy. But again, if the current volatility proves short-lived, this should be limited. There may have been some irrational exuberance when it came to past economic forecasts, though. A few days into the current crunch, it was reported that economists on Bloomberg had revised down their economic growth forecasts for the U.S. for the second half of 2007 from 2.8% to 2.6%. However, TD Economics forecast, as published in June, was 2.3% as the housing unwind continued and we saw weaker consumer spending for a few quarters.

To understand how the economy responds to liquidity events, we can examine how the U.S. economy reacted to the financial turmoil in 1987, 1998, and 2001. In 1987, a 27% drop in the value of the U.S. stock market on Black Monday was the immediate precipitant for Fed intervention, but this came in the context of a widespread insolvency for a number of U.S. savings and loans institutions with strong connections to junk bond markets. In August 1998, the Russian government defaulted on their sovereign bonds. The resulting market turmoil led to solvency issues for a U.S. hedge fund, Long Term Capital Management, who in turn had borrowed a large amount of money from a number of large banks. As a result, financial markets seized up on concerns that the default of the hedge fund would spread throughout financial institutions. And lastly, the terrorist attacks on September 11th, 2001, physically damaged

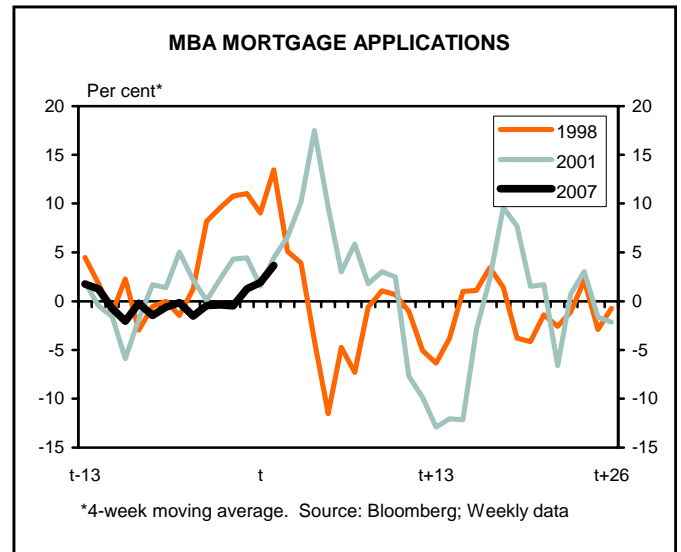


the financial infrastructure used to clear checks, as well as the operations of several investment banks and in some capacity, the entire financial system.

In terms of timely indicators that might help us track whether concerns are leaking into the broader economy, we have weekly indicators for employment and mortgage delinquencies. Looking at the experience in the previous episodes, the level of both initial and continuing jobless claims in the U.S. increased through the first quarter after the Fed intervention relative to where they started. The impact was much sharper in 2001 than the other two, in part due to the fact that the economy was still recovering from a recession. But even in 1987 and 1998, the level of

claims had already been falling for the month prior. In all three instances, however, the level of initial jobless claims two quarters after the Fed's actions were virtually unchanged from where they started. This was also true for continuing claims during the 1987 and 1998 episodes. The ongoing economic recovery in 2001 led continuing claims to be a bit more sluggish.

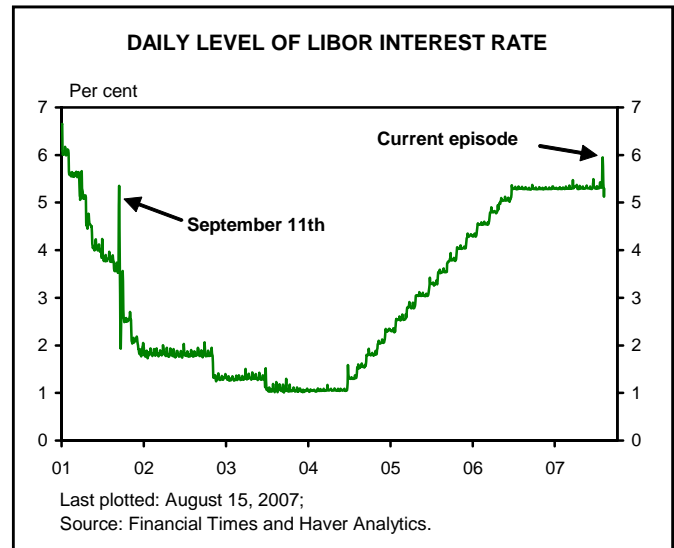
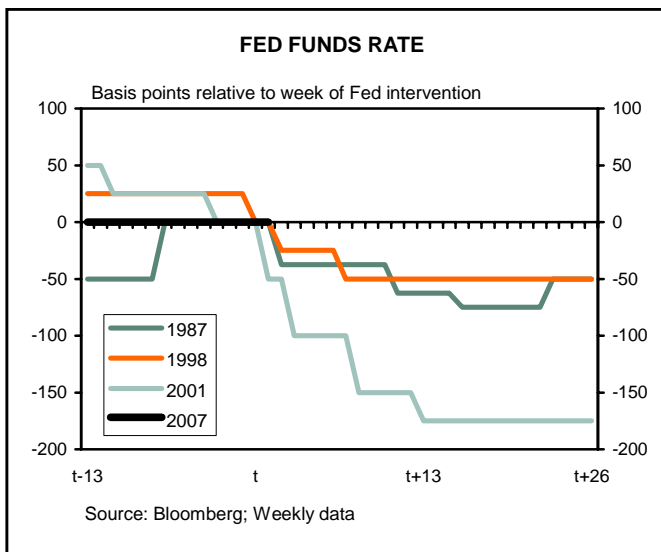
With regards to mortgage applications, the per cent of new loans has been relatively weak coming into this current crisis in 2007. Some have said that because of these woes in the U.S. housing market, economic weakness will be further exacerbated this time. However, in 1998 and 2001 (data for 1987 does not exist), mortgage applications were not terribly strong, either. Applications were lower in both cases one quarter after the crisis with little discernible impact later on. These timely indicators will prove useful in tracking any further contagion into the broader economy. The next important issue is the response of central banks.



CENTRAL BANK RESPONSE

The central bank response began on August 9th after BNP Paribas, the largest French bank, announced it was suspending redemptions from three of its ABS funds because “the complete evaporation of liquidity in certain market segments of the U.S. securitization market has made it impossible to value certain assets fairly, regardless of their quality or credit rating.” With another sign that the financial system was seizing up, short-term interest rates such as the rate of interest on loans extended between banks overnight – very short-term financing – had spiked 30 to 100 basis points in a day. While central banks buy and sell securities in the financial markets every day in order to maintain their targeted policy interest rate, market pressures were driving a wedge between the targeted rate and the market rate. After concerns earlier in the week over a smaller German fund, the ECB dramatically increased their purchases of securities. This increased the cash in the market, and brought interest rates back towards the targeted level. The Bank of Canada, the U.S. Federal Reserve, the Bank of Japan, and many other central banks also increased liquidity and after a week, they had injected around \$300 billion into overnight financial markets.

The question now becomes what to expect from central banks from here? In the last three instances when the U.S. Federal Reserve used similar liquidity injections, they also cut interest rates in short succession. Many in financial markets are clamouring for rate cuts now in the U.S. and they have even crept into interest rate futures in Canada, as well, who just a few weeks ago was expected to raise rates. But will financial markets be correct? As we have



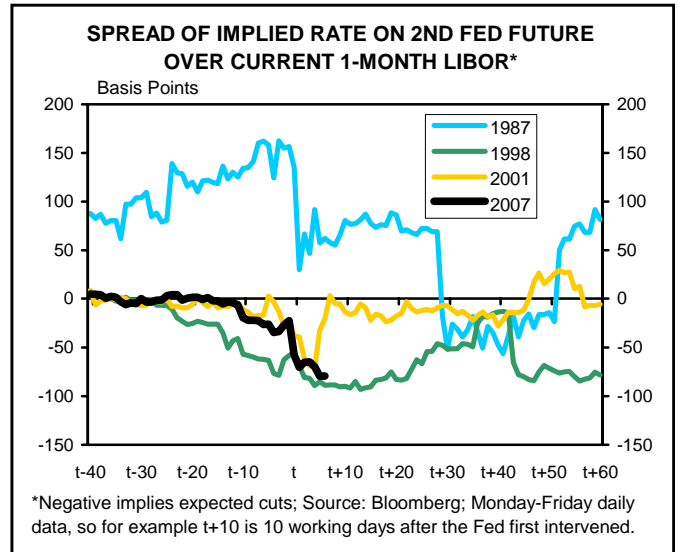
already discussed, past liquidity squeezes in the U.S. have not led to recessions there, even in 1987 when there was arguably a much worse and wide spread solvency issue in the banking system and connection of banks to the broader financial system through the junk bond market. But, in each of those cases, the Fed did cut rates in short order.

In the present environment, while overall confidence and morale has certainly taken a hit, the best thing central banks can do is target those sectors of the financial system which are responsible for the turmoil and in greatest risk. Interest rates are a broad tool for managing monetary policy, but the growing consensus in central bank circles is they may not be the best tool to target specific problems inherent in a financial crisis – especially one with an indeterminate impact on the economy outside of the financial sector. Experience with emerging market financial crises and Long Term Capital Management over the last decade has found that trying to address the convulsions in modern financial markets through the use of interest rate policy tends to solve one problem and create another. Large interest rate cuts are needed to restore immediate confidence and given the long lags with which interest rates impact the economy, these run the risk of creating new asset bubbles. For example, the fact that the Federal Reserve lowered interest rates to just 1.00% in 2003 is generally credited with allowing the U.S. to recover from the liquidity crunch of 2001 and preceding asset bubble in equity markets. It is also credited, however, with leading in part to the recent housing bubble. Interest rate cuts are appropriate for invigorating economic activ-

ity, not necessarily financial activity.

The central bank's injection of liquidity then is to serve as a temporary bridge for financial transactions, assuring those in the market that the assets they are holding will have a buyer at a reasonable price. Because the central banks' operations are very short-term in nature, this is not "bailing out" those that have lost money due to bad investment decisions – something central banks specifically want to avoid. Rather, they are temporarily restoring the financial infrastructure until confidence is restored. The U.S. Federal Reserve announced in the first few days of liquidity operations that they would accept asset-backed securities in their operations and on August 15th, the Bank of Canada also addressed collateral requirements in their short-term lending facilities. The ECB, too, has a broad list of collateral assets which they can accept, although they must be priced in euros and exclude derivative-based products. Additionally, on August 17th, the Fed reduced the rate of interest they charged on short-term borrowings by depository institutions, as well as extended the window they have to repay these funds to 30 days. Central banks continue to focus their tools on the current problems as precisely as possible. The present state of affairs can not be sustained, however. While we do not think we are there yet, interest rates may eventually need to be cut once the liquidity fears have receded to reflect reduced growth expectations. But the damage is done daily, so this could change quickly and central banks may be forced into cutting interest rates before the end of August if the situation does not materially improve.

Assumptions that the higher short-term rates in money markets will drive central banks to cut interest rates to correct this situation also misunderstand the issue. Central bank interventions of the last week were not over concern of the level of interest rates, but rather the spread between where the central bank was setting the interest rate and where market pressures were pushing it. They have not been intervening to push interest rates lower. They have been intervening to keep the spread lower. If central banks believe a change in interest rates up or down would have no impact on the fear-driven spread, then hikes are still possible and cuts are less useful. The spread would simply occur from a different targeted level of the interest rate. As such, interest rates that the central banks believe will control inflation in the medium-term and keep the economy on track are perfectly consistent with the ongoing liquidity injections. In fact, at one point on August 16th, the yield on one-month Treasuries was nearly half that of the actual Fed Funds Rate so the market appears to have



eased rates itself.

Looking at one central bank in particular, there has been a lot of speculation as to whether the Bank of Canada will still raise interest rates by a quarter point on September 5th, as generally expected prior to the financial disruption. In this environment, any increase by the Bank of Canada would need to be well telegraphed and explained, so as not to spook markets which have been pricing out this increase, and even pricing in a cut, as the crisis continues. On this account, the Bank's own blackout rules imply the last day they can communicate with markets will be at a previously announced speech on August 27th. With limited evidence to date that the current liquidity interruptions will have a significant impact on economic activity 12-18 months down the road, they are still likely to raise interest rates this year. However, there is no pressing reason that inflation will get out of hand before their next meeting on October 15th. Therefore, we believe they will postpone the hike until October to give them an opportunity to assess the extent of any economic collateral damage as financial volatility recedes. While the current inflation expectation does warrant an increase, it is not worth exacerbating current market jitters and fear-driven spreads with a September hike.

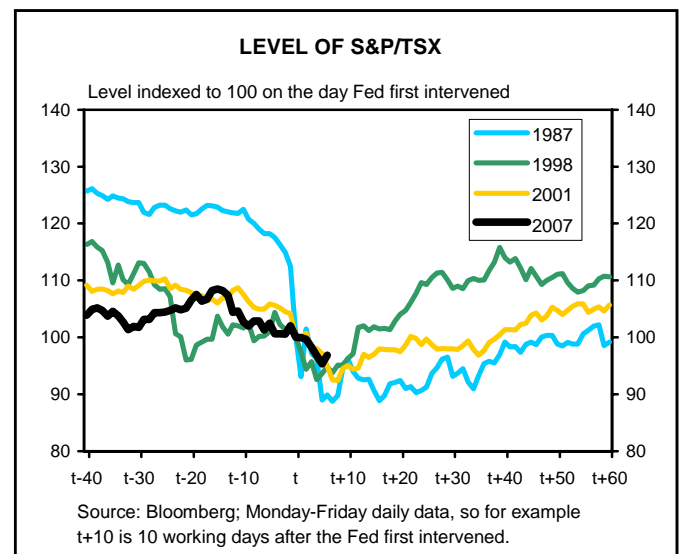
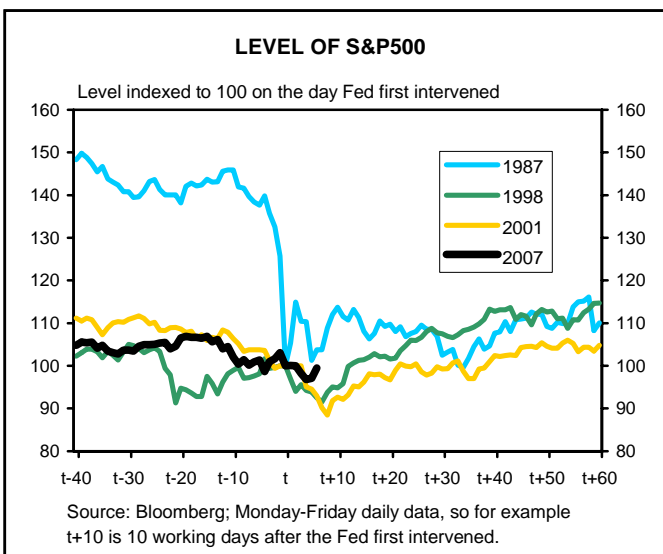
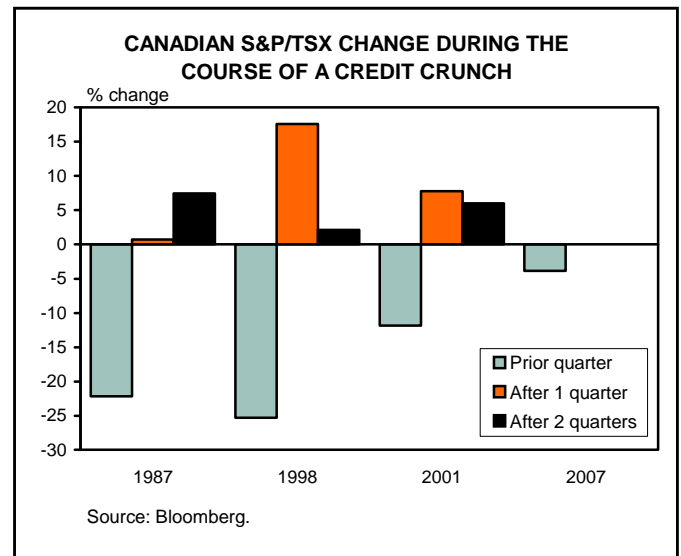
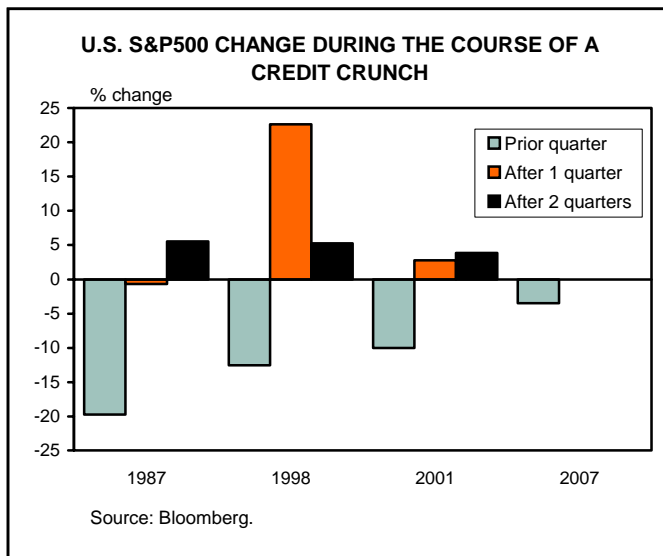
The growing sophistication, liquidity, and complexity of financial products allows central banks like the Bank of Canada to provide additional liquidity to support the short-term while still containing inflation expectations in the medium-term. Central banks do not want to repeat the mistakes of the last decade and do not see the two objectives as mutually exclusive. Nevertheless, if financial market participants are stubborn enough to think that only a cut in interest rates will give them confidence, central banks may be forced to concede the battle to win the current war.

PAST FINANCIAL PATHS - EQUITY MARKETS

While there will undoubtedly be further volatility, the experience of financial markets following past episodes when severe financing constraints led the Fed to inject substantial liquidity is enlightening. The purpose is to provide some historical context, not to suggest this time will be the same. In the previous three episodes, equity markets always lost ground in the 13 weeks prior to the Fed's liquidity operations. But these initial losses have been trending lower. In 1987, the cumulative loss was 20%. In fact, the market had been up nearly 7% before it lost 27% in one day on Black Monday. In 1998, the cumulative loss was around 15%. In 2001, it was around 10%, and this time, the prior loss was around 5%. Further losses in equities

have also typically followed for one to two weeks, but only in the 1987 case did the S&P500 have a cumulative loss in the 13 weeks following the Fed's first intervention. And, in each case, the stock market had a cumulative 26-week gain (again relative to when the Fed started intervening) of around 5%.

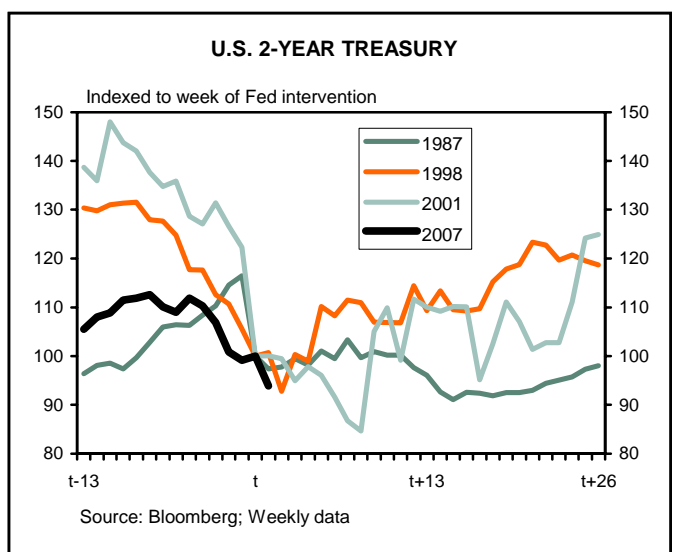
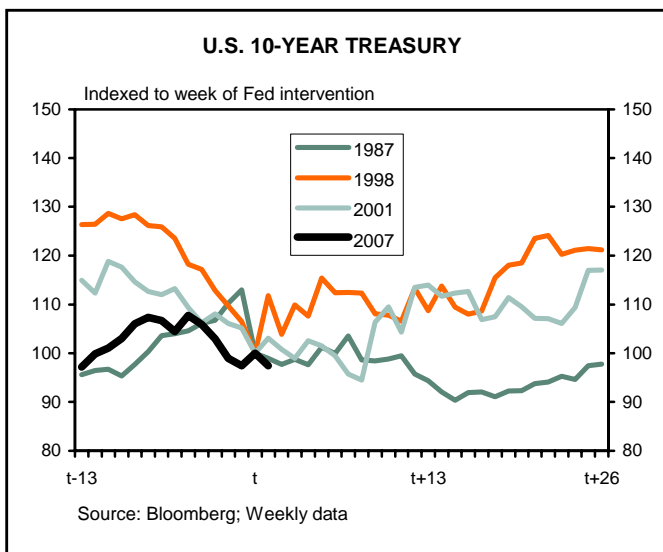
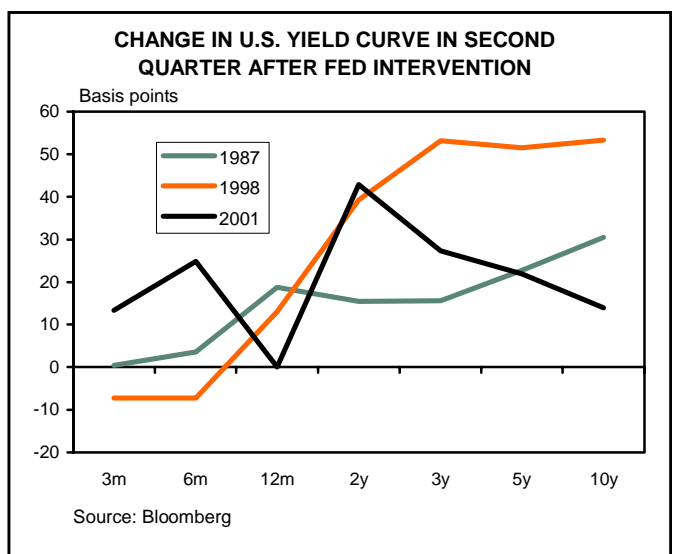
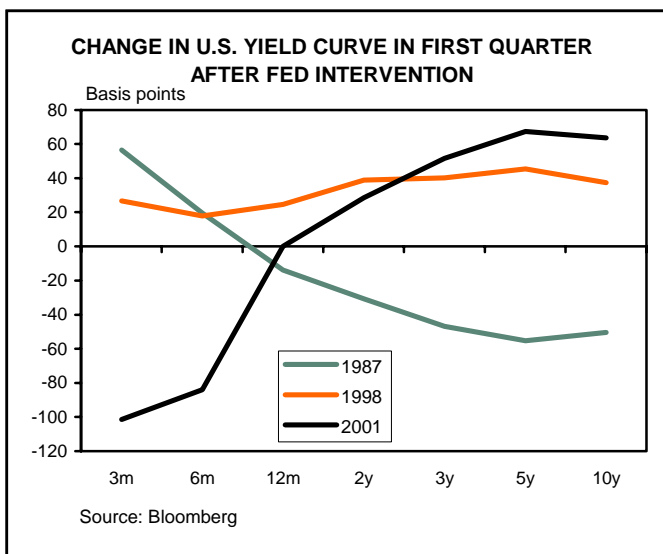
The experience has been relatively similar for the Canadian S&P/TSX, as well. While a credit crunch can be a jarring episode, it does tend to resolve itself one way or another in relatively short order. And, legislative hearings and regulatory changes address the issues which gave rise to the immediate problem. With confidence restored, albeit shaky through the recovery, business does go on.



PAST FINANCIAL PATHS - BOND MARKETS

In bond markets, while the evidence is mixed, the overarching message that the bottom does not fall out of the economy remains, as well. Over the course of the first quarter after the Fed's intervention, the yield curve has flattened, steepened, or shifted up. These changes seem more aligned with the economic underpinnings than suggesting a common response to the Fed's actions. In 1987, the stock crash came in the context of wider economic concerns which saw the curve flatten. In 1998, the Russian default and fallout from LTCM were seen as having a limited impact on the economy after the initial fears. And, in the case of 2001, the curve continued to normalize as the economy recovered from the recession.

In each case outside of the 1987 episode, including the current one, short- and long-yields were already falling in the quarter prior to the Fed's intervention. With sharp flights to safety in the immediate aftermath, yields two quarters after the event have tended to be either flat or higher relative to where they were when the Fed first injected liquidity. In each past case, though, the Fed cut interest rates suggesting this time would see a different dynamic if the Fed sticks to their current tack. Yields in each case have also appeared to materially change direction relative to their prior trends, which may imply a significant impact from the Fed's actions or the events leading up to it.



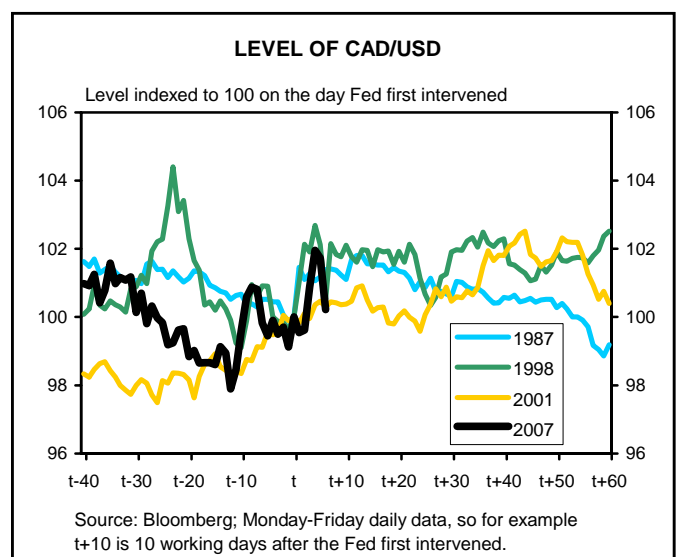
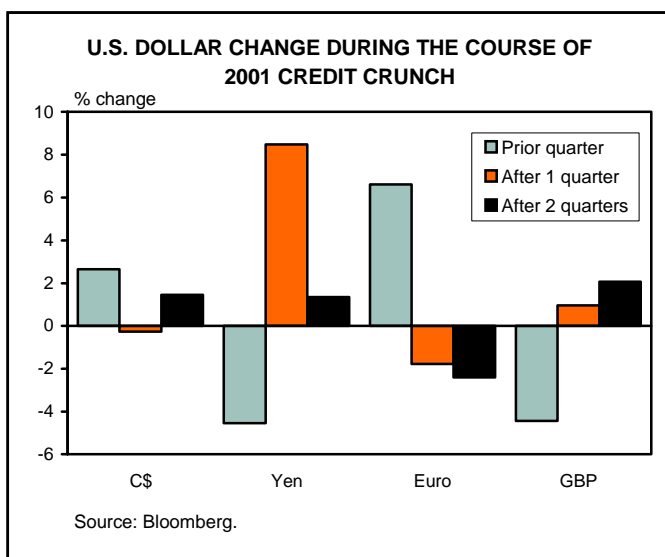
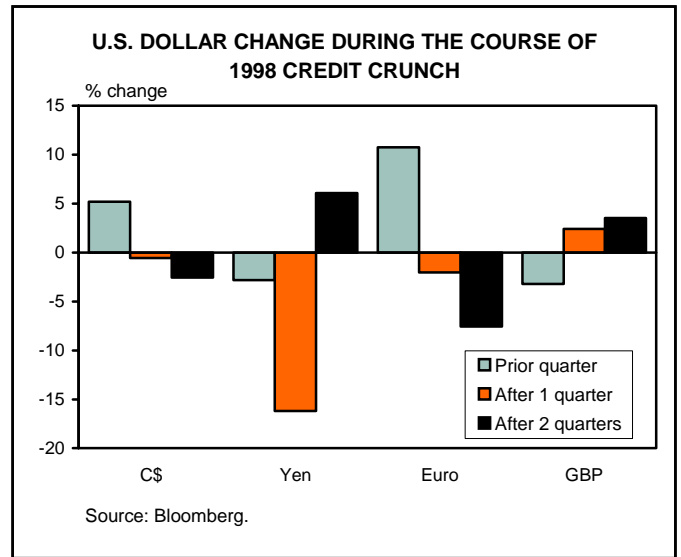
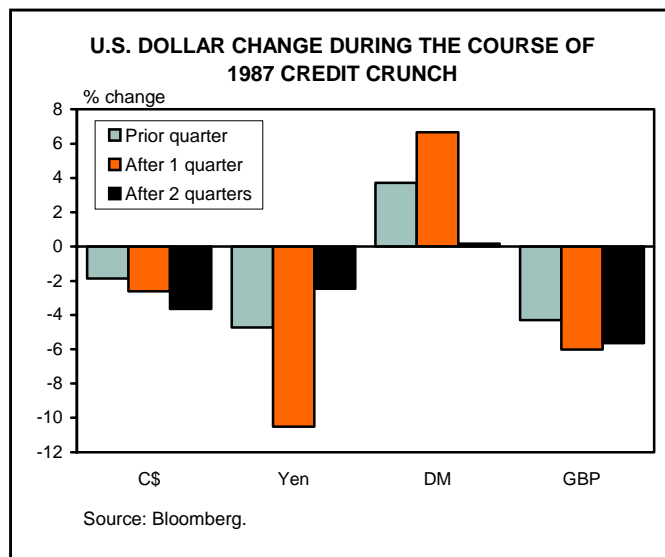
PAST FINANCIAL PATHS - CURRENCY MARKETS

There appear to be few consistent trends in currency markets. Against G-7 currencies, the U.S. dollar had its largest moves vis-à-vis the Japanese yen immediately following each liquidity episode. The euro (or deutschemark in 1987) and British pound have tended to move in opposite directions relative to the U.S. dollar in each of the last three episodes, with the pound weakening in the last two.

In terms of the loonie, the conundrum is that past trends have appeared to be counter-intuitive. In 1998, the Russian default crisis and ensuing weakness in commodity prices had more of an impact on Canadian economic prospects than those of the U.S., yet the Canadian dollar strengthened with rising Canadian interest rates. In 2001, with events centered on weakened U.S. prospects, the Cana-

dian dollar weakened against the greenback. The changes in the value of the Canadian dollar against the U.S. dollar have tended to be limited, perhaps reflecting the initial expectations that close trade and financial ties would keep Canadian and U.S. economic prospects closely aligned.

Regardless, the past developments in financial markets seem to suggest that the worst fears do not seem to be realized in the post-uncertainty world. In the meantime, financial uncertainty tends to be positive for the U.S. dollar. While there can be some sharp movements in asset and currency values during the immediate crisis, markets have historically adjusted and worked themselves out in relatively short order.



WHERE DO WE GO NOW?

The most unique feature about the current turmoil is the near total disconnect between the economic fundamentals and the sheer terror in financial markets. Because of this, it would be foolish to assume anyone knows right now how this will end. The economic fundamentals did not get us here. The economic fundamentals do not justify the sharp change in sentiment we have seen in financial markets. But if history is any guide, at some point, economic fundamentals will be important again.

This is no longer an issue about subprime mortgages, the U.S. housing market, or the U.S. or even global economy. Rather, this is a crisis of confidence in the financial system. There is reduced trust between institutions. The complex debt instruments that precipitated the current market turmoil make up just two per cent of U.S. dollar financial assets, and the ones specifically linked to subprime housing debt make up just one-third of one per cent. But, no one knows exactly which products are an issue, which aren't, and who is holding them. This air of uncertainty is now the biggest fundamental driving markets. On that account, there are still potential avenues for these financial disruptions to get worse. We have tried to highlight these potentials not because we believe they are likely, but to bring some sort of structure and clarity to the discussions of what is at risk and what is not. A great deal of the report has been quite focused on details of exactly how financial products and markets are structured. This can make understanding difficult – precisely one of the issues

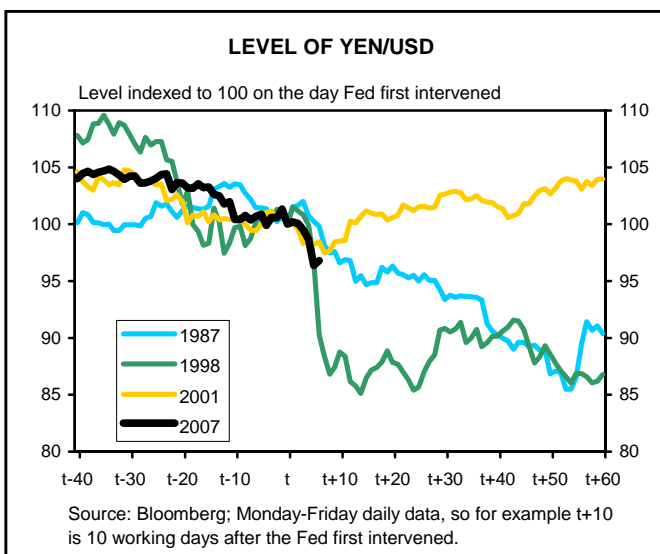
driving current uncertainties. But, past financial crises have taught us that just like finding a leak in your plumbing, following the money through the system is the only way to find where the weak spots lie.

Given what we have experienced to date, economic stability is not yet threatened, though the global economy is certainly walking on eggshells. If financial normalcy were restored tomorrow, most national economies as they stand today are healthy enough to pick themselves up and walk right past this. But sustained illiquidity can feed back into the economy if it lasts too long. Any time you have sharp moves in equity, bond, or other asset markets, this puts a strain on businesses and individuals to adjust. The sharp moves we are seeing in currencies such as the yen are also a concern. Carry trades were not nearly as prevalent as they are now so sharp changes will test cross-border capital flows.

We do have historical precedents in the fact that the last three liquidity squeezes such as this did not lead to recessions in the U.S. or Canada. The same innovations and incentives that got us here are now hard at work at fixing the problem. The central bank response to date has been to bridge the gaps left by financial dislocations, to reduce the interest rates they charge to depository institutions, increases the time they have to repay this money, but not to cut the broad Fed Funds Rate. Fed Funds Rate cuts are an appropriate tool for invigorating an economy. And, while they are an effective tool at inspiring confidence, central banks have much more targeted tools they can use to alleviate fear without leading to collateral damage through asset bubbles later. They may still need to cut rates, but you don't send in the claims adjuster until you put the fire out. With the central banks help, financial markets can still resolve these issues without rate cuts if they want to. In that regard, recent agreements between Canadian financial institutions to resolve the asset-backed commercial paper dilemma are commendable.

The simple question that we need to answer to sort through the current mess is who owes what to whom and when? And unfortunately, right now, there's no clear answer. For the time being, asking the right questions will have to suffice.

Richard Kelly, Senior Economist
416-982-2559



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