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### May You Live in Interesting Times-Exhibits 1-14

William Dudley

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**FEDERAL RESERVE BANK of NEW YORK** *Serving the Second District and the Nation*

## SPEECH

**May You Live in Interesting Times**

October 17, 2007

William C. Dudley, Executive Vice President

**Remarks at the Federal Reserve Bank of Philadelphia**Exhibits 1-14 

It is a pleasure to have an opportunity to speak here today. Before I begin in earnest let me start by saying my comments represent my own views and opinions and do not necessarily reflect the views of the Federal Reserve Bank of New York or of the Federal Reserve System.

I have entitled this speech, “May You Live in Interesting Times,” for two reasons. First, it is a reminder to me that many things—including this expression itself—are not always as they seem. I had always understood that this saying referred to an ancient Chinese proverb or curse. Imagine my surprise when I did some investigative work in preparation for this speech. It turns out that Chinese scholars know of no such Chinese proverb or curse. According to Wikipedia, which is a well-known online encyclopedia, the expression is a Western invention—undoubtedly ascribed to the Chinese to make it look more wise, inscrutable, enduring and ancient.

Second, despite the fact that this expression may not be the genuine article, it is, nevertheless, an apt way to characterize the past few months.

It is remarkable what we have observed in financial markets.

Briefly, let me give you a few examples of events that I never expected to see—ever:

- AAA-rated mortgage-backed securities selling at 85 or 90 cents on the dollar,
- asset-backed commercial paper backstopped by real assets and a full bank credit backstop yielding more than unsecured commercial paper issued by the same bank—in other words, the real assets as collateral viewed by market participants as a negative rather than a positive,
- 3-month LIBOR (the interbank deposit rate in London for dollars) as high as 100 basis points above the fed funds rate target—certainly possible if the monetary authorities were in the process of tightening monetary policy aggressively, but nearly inconceivable given the widely held expectation that the central bank would likely be cutting interest rates,
- Treasury bill rates rising and falling 100 basis points in a single day, and
- nearly a failed Treasury bill auction—total bids were barely sufficient to cover the amount the Treasury was offering. This near-miss occurred despite the fact that money market mutual fund investors were fleeing to rather than away from Treasury securities.

Obviously, these have been interesting times with plenty to think about

In my mind, the major conundrum that deserves further investigation and evaluation is a question that Chairman Bernanke considered in his speech at the recent Jackson Hole conference:

How did the problems in the subprime mortgage area—with losses that probably will ultimately turn out to be in a range of \$100-200 billion—lead to such broad market distress?

If we can elucidate how that happened, then maybe we can also get some insight into how long the market dysfunction might last and what policy responses to this dysfunction might be appropriate. We have been spending a considerable amount of time thinking about this issue in recent months.

So let’s start with the subprime mortgage market. By now, the salient facts are pretty well known and agreed upon. Delinquency rates for adjustable rate subprime debt have been climbing rapidly and the rate of deterioration is most severe for the most recent vintages.

Exhibit 1 shows the delinquency rates for the subprime mortgages contained in different recent vintages of mortgage-backed securities. In this exhibit, the 07-2 tranche references mortgage-backed securities issued during the first half of 2007, which contain subprime mortgages mainly originated in late 2006 and early 2007. The 07-1 tranche references subprime mortgage loans six months earlier, and so on. Note that the trajectory of the 07-2 vintage—the most recent vintage—is distinctly worse than for earlier vintages.

The more recent vintages are performing more poorly because the underlying mortgage loans for these vintages have less protection from prior home price appreciation and are the victim of a trend to greater laxness in underwriting standards.

Clearly, the delinquency rates for the recent vintages are going to keep rising and will ultimately be exceptionally high. The rise in delinquencies and foreclosures will be exacerbated by the downward trend in home prices and tightening of mortgage loan underwriting standards.

The upward trajectories in delinquency rates for subprime mortgages shown in Exhibit 1 have led to sharp price declines for the ABX indexes associated with the particular vintage and tranche of the basket of mortgage-backed securities. The ABX indexes represent the cost of buying protection against losses on the tranches of the basket of underlying mortgage backed-securities that they reference. A lower price means a higher cost for purchasing loss protection.

As shown in Exhibit 2, the prices for the BBB-rated ABX index tranches have declined sharply, with the most pronounced declines in the most recent vintages.

As expected losses on subprime mortgages have increased, investors have also become more worried about the safety of the more highly rated tranches that have a more senior claim on the cash flows generated by the underlying subprime mortgage loans. As shown in Exhibit 3, for the 07-1 vintage, there have been significant price declines even in the higher rated tranches.

However, it is important to put this in context of the broader financial market. In particular, note that the adjustable subprime mortgage market is not that big in that context. Total outstanding adjustable-rate subprime mortgages are less than \$1 trillion. Moreover, those mortgages originated during 2006 and early 2007 represent only a fraction of that total. Thus, even if subprime delinquency rates keep climbing to unprecedented levels, it seems likely that total losses will be roughly in a range of \$100-200 billion. Although this is a lot of money, it pales next to the \$58 trillion of net worth of U.S. households or the \$16 trillion market capitalization of the U.S. equity market.

To put these losses in perspective, a 1 percent gain or loss in the U.S. stock market—which often occurs on a daily basis—is about the same order of magnitude of the likely subprime mortgage losses that will be gradually realized over the next few years.

So why have these losses—which are the root cause of recent market problems—led to so much market turbulence?

In my view, the losses in subprime mortgages had wide-ranging effects because these mortgages were embedded in a broad array of structured finance securities such as mortgage-backed securities and collateralized derivative obligations and often underpinned highly rated investment assets. As it became apparent that the subprime area was going to be a disaster, the securities that referenced these assets performed extremely poorly.

The poor investment performance of these securities made investors much less willing to invest in structured-finance products more generally. Investors lost confidence because highly rated securities that referenced subprime assets performed poorly and because investors found it difficult to value complex structured-finance products.

This loss of confidence triggered several broader developments:

- mortgage originators have largely lost the ability to securitize non-conforming mortgage loans,
- the asset-backed commercial paper (ABCP) market has contracted sharply,
- the collateralized derivative obligation (CDO) market is virtually shutdown,
- money market mutual fund inflows and outflows disrupted the Treasury bill market, and
- de-leveraging outside the banking system put pressure on bank balance sheets and upward pressure on term funding rates.

In my view, the key development was the unanticipated pressure that was placed on bank balance sheets. This was generated from three major sources:

- 1) Investor demand for securitized non-agency mortgage-backed securities has dried up. Banks originators now have to hold such loans in their bank portfolios.
- 2) Bank backstop liquidity facilities have been triggered as investor appetite for asset-backed commercial paper has fallen sharply.
- 3) The expectation that banks will have difficulty syndicating the bridge loans they provided to finance leveraged buy-outs.

Of these three sources of pressure, the rollup of ABCP programs seems to have been the most important. The potential magnitude of the funding requirement is the largest and how much will come back onto bank balance sheets remains uncertain.

So let's take a look in more detail at these three areas of stress. Turning first to the mortgage area, the constraint on mortgage loan origination can be seen most visibly in the widening in the spread between fixed-rate prime jumbo mortgage loan and conforming mortgage loan rates. As can be seen in Exhibit 4, the spread widened from about 25 basis points to around 100 basis points before narrowing a bit over the past few weeks. The rate on such mortgage loans has had to rise to induce banks to free up balance sheet capacity to carry such mortgages on their books.

Turning next to the asset-backed commercial paper area, the problem began when commercial paper investors became aware that their investments could be vulnerable to loss but were uncertain as to the extent of their exposure to particular programs.

This fear of loss among investors had a legitimate basis for those ABCP programs that finance mortgage-related assets without full bank credit enhancement. An inability to roll over maturing commercial paper in these programs could force the liquidation of the assets that the commercial paper funded. In the current market, that could lead to investor losses.

The problem started in extendable commercial paper market programs, where the credit enhancement backstop by banks was typically either absent or less than 100 percent. The problem then quickly migrated to structured investment vehicles (SIV) programs, which suffered from similar shortcomings.

From there, the problem spread as risk-averse investors started to shun the entire asset class. Asset-backed commercial paper rates rose for those programs that were able to roll over their outstanding commercial paper. This is shown in Exhibit 5, which compares unsecured and secured commercial paper rates. The volume of outstanding asset-backed commercial paper shrank sharply as some issuers were unable to roll over their maturing paper. Exhibit 6 illustrates the downtrend in the volume of outstanding ABCP.

The pressure on the asset-backed commercial paper market was temporarily exacerbated by the behavior of money market mutual fund investors, who shifted funds from prime money market funds to Treasury-only money market funds (see Exhibit 7). Because the total assets in money market mutual funds are nearly four times the size of outstanding Treasury bills, these flows led to a large, albeit mostly transitory fall in Treasury bill yields. This is shown in Exhibit 8.

The good news is that the money flows into the prime money mutual funds have stabilized. This reflects greater discernment among investors about the risks associated with different types of asset-backed commercial paper and the widening yield differentials between prime and Treasury-only money market funds.

Moreover, it is noteworthy that those areas of asset-backed commercial paper market with underlying structural problems—primarily the extendible, SIV and "SIV-lite" portions of the market—represent only a small proportion of total asset-backed commercial paper outstanding. For example, as shown in Exhibit 9, SIV programs only represented about 5 percent of the asset-backed commercial paper market in September, down from about 8 percent before the recent sharp contraction.

Moreover, as shown in Exhibit 10, much of the asset-backed commercial paper market does not finance residential mortgage asset-backed securities, so there is less uncertainty about the underlying value of the assets. And, much of the market has solid credit support, with 100 percent bank credit enhancement.

As a result, as time has passed, investors have gradually been able to distinguish between the different types of ABCP programs. Stability has returned to the multiseller, bank-sponsored programs. As a result, the overall ABCP market is no longer contracting rapidly. However, the extendable and SIV programs continue to be under pressure.

The third source of balance sheet pressure stems from the sharp contraction in collateralized debt obligation (CDO) and collateralized loan obligation (CLO) issuance. As can be seen in Exhibit 11, CDO and CLO issuance volumes have plummeted in recent months.

The virtual closure of the CDO market, in turn, has led to a virtual cessation of high-yield debt issuance—illustrated in Exhibit 12. This occurred because the CDO market was an important source of demand for high-yield debt. With investors shunning CDOs, the associated demand for high-yield debt by potential CDO issuers dried up.

These developments have created uncertainty for commercial and investment banks about their ability to syndicate the large volume of loan and debt commitments that they have made to finance private equity buyouts. These institutions are faced with the prospect that they may have to carry such loans on their books for an extended period of time at a discount to par value. Syndication will be more difficult because the ability to transform a large proportion of these obligations into marketable investment grade product through the alchemy of structured finance is not currently a readily available option.

Over the past few weeks, banks have started to syndicate such loans. Typically, however, the loans offered for sale have been the more senior tranches and, even in these cases, the loans have been sold at a discount to par. Banks are making progress in reducing their exposures, but the pace has been slow.

This pressure on bank balance sheets—both existing and anticipated—has led to significant dysfunction in financial markets. In particular, primary dealers have pulled back in their willingness to finance the security positions of investment banks, hedge funds and other leveraged investors.

At the same time, this balance sheet pressure—as well as worries about counterparty risk, have led to a significant rise in term borrowing rates. Banks that are sellers of funds have shifted to the overnight market to preserve their liquidity and this shift has starved the term market of funds, pushing those rates higher. As shown in Exhibit 13, the spread between one-month LIBOR and the one-month interest rate swap rate has widened sharply and one-month LIBOR has generally traded considerably above the anticipated level of the overnight federal funds rate. The same pressure on funding rates has been also evident in Europe. Exhibit 14 shows the same spread for the one-month Euribor rate.

For banks that had relied on term funding from the interbank market, the rise in term rates has pushed them into the overnight market. In addition, these depository institutions have turned to the Federal Home Bank Loan System as a source of term funding. For example, FHLB advances rose by \$110 billion in August. In contrast, despite the 50 basis point reduction in the spread between the discount rate and the federal funds rate target, the dollar value of discount window borrowings never rose much and, in recent weeks has dropped back to negligible levels.

The use of FHLB advances rather than borrowing from the discount window reflects several factors: 1) the lower cost of FHLB advances, 2) the ability to borrow at longer terms from the FHLB and 3) the lack of stigma in using FHLB advances as a source of funding.

So where do we go from here? Clearly, the adjustment process is far from over. Asset-backed commercial paper programs are still being rolled up. Moreover, it remains unclear what proportion of leverage loan commitments commercial and investment banks will be able to syndicate and at what price. The pressure evident in bank term funding markets indicates that the pressure on bank balance sheets—either real or anticipated—has not yet abated much.

That said, the situation does appear to have improved. First, investors' ability to distinguish between "good" and "bad" ABCP programs and structured finance products has improved considerably and I would expect this trend to continue as investors obtain better information.

Second, as time passes, the uncertainty about bank balance sheet pressures and funding requirements should lessen.

Third, the market response to so-called headline risk has changed markedly in recent weeks. In particular, large financial organizations that have announced large mark-to-market losses have generally seen their stock prices go up rather than down.

Fourth, in the mortgage sector, depository institutions will undoubtedly—at the right price—take up some of the slack in the prime jumbo mortgage market.

But it undoubtedly will take time for circumstances to return to normal. And, the structured finance market will undoubtedly have to change a lot to return to close to a normal market function. Increased transparency and greater homogeneity will probably be required for investors' appetite to increase significantly for such products.

On the policy side, the Federal Reserve has responded to the market turbulence in two ways. First, steps were taken to supply liquidity to market participants and to ensure that market participants understood that such liquidity would be available if the situation worsened.

On August 10, open market operations conducted three repurchase operations adding reserves to the banking system. This proved sufficient to break the upward pressure evident in the federal funds market, which had caused the overnight federal funds rate to trade above the Federal Open Market Committee's specified target over the prior few days.

On August 17, the FOMC announced a change to its discount window regime. The gap between the discount rate and the target federal funds rate was lowered to 50 basis points from 100 basis points and borrowers were told that they could borrow for terms up to 30 days.

Although this change did not lead to a big increase in borrowing, that was not unexpected. Even at a 50 basis point spread, the primary credit rate was higher than the rate on alternative sources of funds for most depository institutions. The so-called "stigma" from borrowing from the window exists, in part, because the borrowing occurs at a penalty rate.

That said, it would be wonderful if we could reduce the "stigma" so that it was inconsequential in the borrowing decision. One of our jobs is to act as the lender of last resort. The "stigma" against borrowing from the discount window can interfere somewhat with that.

Nevertheless, the change in the discount rate did appear to calm markets. It was a signal that the central bank stood willing to provide liquidity against collateral if markets were to take a turn for the worse.

We believe that the policy change had an impact, in part, because we witnessed—concurrently—a big increase in the amount of collateral pledged by banks at the window. This indicates that banks did view the window as an important liquidity backstop. Over the past few months, total collateral pledged has climbed by more than \$150 billion.

Our tentative conclusion is that the change in the discount window regime did appear to prove helpful by reducing the risks of a full-blown liquidity crisis.

On August 21, the securities lending fee was lowered to 50 basis points from 100 basis points. This is what we charge primary dealers to borrow Treasury securities from the System Open Market Account. The fee was lowered to encourage greater borrowing of Treasury securities from the Fed's portfolio in order to ease disruptions in the Treasury bill market. Securities lending did increase and this helped calm the Treasury bill market.

Finally, on September 18, the FOMC lowered its effective federal funds rate target to 4.75 percent from 5.25 percent. The rate reduction was undertaken not because of market stress or turbulence per se, but because increased stringency in the credit markets threatened the U.S. growth outlook.

To quote from the minutes to the September 18 FOMC meeting:

"The disruptions to the market for nonconforming mortgages were likely to reduce further the demand for housing, and recent financial developments could well lead to a more general tightening of credit availability."

As far as what will happen from here, it is not for me to offer an opinion on such weighty matters.

On that score I offer up the last FOMC statement as a better guide. The concluding paragraph reads:

"Developments in financial markets since the Committee's last regular meeting have increased the uncertainty surrounding the economic outlook. The Committee will continue to assess the effects of these and other developments on economic prospects and will act as needed to foster price stability and sustainable economic growth."

I would read that as meaning what it says. Interestingly, financial market participants are uncertain about what the FOMC will do next. As I write this, the November fed funds futures contract implies that market participants place about a one-out-of-three probability on a 25 basis points reduction in the federal funds rate target at the October 30-31 meeting. So the message is: Stay tuned.

Thank you.

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