



Understated Risk:

Are CDOs and Structural Changes in Mortgage Securities Undermining More than the Lending Industry

**Thursday, February 15
10:30am - 1:00pm**

How Resilient Are Mortgage-Backed Securities to CDO Market Disruptions?

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Discussants:

Mike Fratantoni, Mortgage Bankers Association

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Moderator:

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[Event Transcript]

Moderator John C. Weicher, Director, Center for Housing and Financial Markets, Hudson Institute: (The participants will talk louder to reach you back there.) On behalf of Hudson Institute and our Center for Housing and Financial Markets, I want to welcome everyone who has come out this morning, it's better today than yesterday but you've still had to brave very cold weather and the road and the sidewalk conditions in more than a few places are not great. And we are especially grateful to the authors who have come to join us from farther north. We at Hudson are pleased to be able to host this seminar today to provide an opportunity for the authors to present their findings to you. This is a second seminar that the Center has hosted. Last October we joined with Hudson's Center for Employment Policy to sponsor a presentation by Harvey Rosen of Princeton University, the immediate past Chairman of the President's Council of Economic advisors. Harvey and his co-authors presented evidence that the regulatory reforms in the mortgage market during the early 1980's had improved the efficiency of the mortgage and housing markets letting people buy homes based more on their long-term income prospects rather than their current income. Today's paper looks at some possible risks from more recent mortgage market changes. The topic is certainly timely. Front page stories in the Wall Street Journal last Thursday and Friday called attention to the problems that some lenders at least are having with sub-prime mortgages and mortgage securities. This week we've seen stories in Barron's on Monday and the Financial Times yesterday and the Journal again today, though today only on page four. Subprime mortgages have been a growing share of the mortgage market in recent years,

back to the mid 1990's in fact and they have enabled many families to buy homes who otherwise would have to wait much longer. At the same time, default rates on subprime mortgages are much higher than they are on conventional prime loans or government backed mortgages and that can create problems for homebuyers and for the neighborhoods they live in, and possibly for lenders and the housing finance system more generally. This morning's paper focuses on the potential problems in the mortgage market, problems for lenders, and possible problems for the overall market. The authors have been concerned about these risks for some time. Dr. Joseph Mason is associate professor of finance and LeBow research fellow at Drexel University's College of Business. He is also a fellow at Wharton School and a visiting scholar at the FDIC and has served as a financial economist with the Office of the Controller of the Currency. His research on financial intermediation and financial history and related issues, has been widely published in the leading academic journals as you see in his biography in the kit that we have provided and he is now working collateralized debt obligations and mortgage prepayments as you will see in the bibliography of today's paper.

Co-Author Joshua Rosner is a managing director at the Institutional Equity Research Firm of Graham Fisher and Company. Some five years ago, almost six now, Josh warned about potential risks stemming from the growing use of subprime mortgages combined with some new practices in the mortgage market. He will be updating that discussion this morning. His work has received significant coverage in the general and business press, and also in housing and mortgage industry publications. Before coming to Graham Fisher, Josh ran the Financial Institutions Group at Medley Global Advisors. Earlier he was an executive vice president at CIBC World Markets and a senior vice president at his predecessor firm, Oppenheimer and Company.

I'll take a moment to introduce our discussants. Dr. Michael Fratantoni is Senior Director of Single Family Research and Economics, in the Research and Development of the Mortgage Bankers Association. In that position he is "responsible for providing research and analysis on policy issues of importance to the mortgage industry" and today's topic certainly is. Mike previously served as Director of Economic and Policy Research in the Regulatory Policy Division of Fannie Mae and he has published scholarly articles on the mortgage market in several academic, economics and finance journals.

Our second discussant is Dr. Tyler Yang. He is President and CEO of the IFE group, a financial engineer and consulting firm here in Washington. His specialties include developing credit and market risk analytical models, and managing portfolio risks and capital. One of his current projects is conducting the Congressionally-mandated annual actuarial study of the FHA mutual mortgage insurance fund, which he and IFE have done since 2005, incorporating new technical refinements into the analysis. Tyler has held senior positions at Freddie Mac, Fannie Mae and Price-Waterhouse. He has published widely in academic journals of real estate and related fields, is an editor of four journals and is past president of the Asian Real Estate Society.

I am sure you will agree that we have a distinguished panel here this morning, both authors and discussants, so again I want to welcome you all to today's discussion of the

potential risks associated with subprime mortgage securities. We know it's timely and we certainly expect it to be lively, and there is lunch afterwards. With that I will invite our authors to present their findings. I understand that Josh Rosner will speak first and then Joe Mason.

Josh?

Joshua Rosner, managing director, Graham Fisher and Company: Thanks. I'd like to first start just by making sure that people understand that this is a paper that is actually in progress, in process and we are continuing to do further research and would invite anyone else who might be interested in taking up the mantle of this to do further research as well. Unfortunately there is not a lot of academic work out there at this point and our research really is just starting to scratch the surface. Historic changes that have occurred over the past 15 years have really changed the nature of housing and home ownership in this country. Changes in governmental policy, structural changes in origination and servicing, the growth of the securitization markets, and most importantly, the demand by investors for mortgage related structured finance products. This really came as a result of the problems we had in the late eighties and the stagnant home ownership levels and low affordability which really got the regulatory world and the industry to focus on ways to increase home ownership. As a matter of fact there was a 1994 group put together, it was the largest public-private initiative until that point which created a strategy whose primary goal was to get home ownership rates to 70% by the end of the millennium. Previously home ownership rates, as you see, really were in an average of the low 60's and the previous high was 65.9% in 1981.

So the industry, trying to come up with creative ways to increase home ownership, decided that they would change down payment requirements. We saw down payment requirements over this cycle go from the historically 20% down payment which was believed since the 1700's to be the appropriate number to keep an investor with a financial commitment to the asset, the home was a savings plan. If you think Econ 101, the difference between housing and other assets was that it was a forced savings plan where monthly investments increased the owner's equity and since it was relatively illiquid, equity invested was hard to take out.

We changed that feature quite considerably, so that since 1999 more than 5% of all residential mortgages were originated with either zero down or negative equity. That is a considerable, considerable change. And what all of the literature, all of the studies have demonstrated is that there is obviously a direct correlation between loan to value at origination and default. As a matter of fact, there have been a number of studies demonstrating that the default rates with 10% or less down increase anywhere between 4 and 10% over 20% down mortgages.

Cash out refinancing became the opportunity to extract home equity. It really is one of the major changes and features. We saw total mortgage equity withdrawal increase from \$289 billion in 2000 to over \$900 billion in 2005. And I think that this is also important to think about in historical context. By 1999 47% of homeowners had refinanced at least

once. In 1987 only 8% had. And the total dollar value of refi's in the 80's, through the decade, was \$2.93 trillion. We had \$1.4 trillion in 2005 alone.

If you look at some of the other changes: homeowners have really gotten used to spending appreciated equity, gains that exist only on paper and if prices fall as they seem to risk doing at this point, we very well could see that liability is far larger than the value of the house. Other significant changes, we changed private mortgage insurance requirements which were historically required on the top 20% of a loan that had an 80% LTV, and that was really to protect the lender. Borrowers have been increasingly able to use silent second mortgages and piggybacks to avoid the private mortgage insurance expense. It's been estimated that the total dollar volume of piggybacks went from 20% of originations in 2001 to 40% in 2004. And if you look at the work, there have been some studies that actually demonstrated that first lien loans with piggybacks have a 43% higher default probability. And when you look at FICO scores that are less than 660, that default probability is 50% more likely than on conforming loans. Even so, it's often impossible to identify these loans because of the way they are originated and the documentation, if they are originating with different lenders, there is no way for investors to really track the cumulative loan to value and so aggregate loan to values that were often given, don't really tell the story and the data is further obscured from investors investing in large pools of MBS.

We've seen significant changes - the increased use of technology in the industry. The industry has relied on automated valuation models which have dramatically changed the traditional appraisal process. The appraisal process historically was an independent, unbiased process and we've moved largely away from that towards automated valuation models, models which actually are fine in a rising home price market but have been demonstrated to pose significant risks in markets where prices are stagnant or weak because they tend to rely on outdated, seven months old typically, data sets.

Similarly we've allowed borrowers to take on significantly more leverage as a result of automated underwriting systems that have been employed. The industry has long claimed that automated underwriting increases efficiency, increases predictability and that's possibly true. I think the analogy that one might draw is we are capable of flying in planes that are piloted by the technology but at the end of the day I don't know if many of us would want to get in a plane where there wasn't a pilot or copilot there for overriding those systems. Similarly the automated underwriting systems increase the allowable debt limits. Historically there was a historic 28-36 rule, where your monthly mortgage payment shouldn't be more than 28% of your monthly income and 36% of your total debt load. That really has been eviscerated in this cycle as well. We have changed the requirements of pay stubs and income verification and have seen a significant move toward the use of liar loans. It is estimated about 45% of subprime originations in the past couple of years used loans with low doc or no documentation. We have seen a significant -- because of appreciation -- increase in investor share; where homes were part of the reason why we think of home ownership as an investment and a stable asset, we have seen a move towards speculating on homes. As the asset became more liquid, as you

were able to extract equity and remain in your home, you were also able to leverage the asset, to purchase second homes.

I know Michael will probably disagree with this number; this number is widely contested - the National Association of Realtors number - but this vacation home and investment home number is dramatic. It creates a risk of what we would term phantom inventory. Which is that investors who have purchased homes as investment assets have very different characteristics, very different ties to the asset than primary residential owners and if home prices stagnate and their hurdle rates are not met, they become increasingly likely to have to list the asset, especially if they financed them with some of the newer, more highly leveraged, negative amortization and subprime mortgage products. That may be part of the reason we have seen an almost doubling of the number of months supply of inventory over the past year, is investor stress bringing some of these products to market.

The bottom line is that we have undergone a dramatic change in underwriting, in appraisal, in loss mitigation where in prior cycles if I was 90 days delinquent the servicer would typically call and essentially say “pay up or get out, deadbeat” and the industry has embarked on loss mitigation strategies that are now required in FHA and incented at the agencies and by subprime lenders in working out bad loans. The reason for working them out obviously is that if 30 to 60% of the mortgage balance is lost in foreclosure, the industry has strong incentives to keep people in their homes. The problem is there is very little transparency about how the loss mitigation strategies are affected. They seem to have significantly higher default rates; loan modifications it’s estimated have redefault rates of 25%. Yet industry statistics are not available to investors or not widely available to analyze. And, frankly, excuse the historic relationship between delinquency, default and foreclosure statistics as published by the Mortgage Bankers Association. With that I will actually move on to Joe.

Dr. Joseph Mason, associate professor of finance, LeBow research fellow at Drexel University’s College of Business, fellow at Wharton School, visiting scholar at the FDIC: Thank you Josh. Moving on, the structural changes that Josh mentioned really set the stage for what we want to talk about in this paper which is ultimately that we believe that the inherent complexity and opacity of mortgage-backed securities and CDO valuation has hidden the risks of these structural changes until well, about now, when the losses are finally becoming manifest. And we argue that this may not be an efficient way to organize markets. So I’m going to take a moment and talk about some of this complexity.

First of all, complexity in mortgage and mortgage valuation. The most difficult element of mortgage valuation is that mortgage valuation contains both elements of default risk and prepayment risk. Default risk is predicted by models that are well accepted throughout the mortgage industry. We are all familiar with the names of these firms with Fair Isaac really being at the top, computing FICO scores that we use to value mortgage applications. I’m not saying that these models predict well. I’m saying that these models are well accepted throughout the mortgage industry. In fact we all know that these models haven’t been tested particularly on subprime loans during a recession and all the

modeling agencies say that. Nonetheless we can gather around a flag here and accept a common standard for default risk valuation.

The same cannot really be said for prepayment risk. And in fact, prepayment risk manifests itself far more often than default risk. This chart is from some research of mine with Charlie Calomiris using about 4.2 million FHA loans you can see the default risk on the bottom there is miniscule affecting about 4% of the sample whereas prepayment affects about 67% of the sample. The problem here is that there are no well-established industry models of prepayment risk. The industry typically adjusts for prepayment speeds using PSA models which I think are familiar to all of us here. However, the PSA assumptions and adjustments are not models per se. Modeling prepayment is typically now beginning to be more often done in a framework such as myself and Charlie Calomiris are using, where we separate out exogenous and endogenous prepayments with exogenous prepayments being those that occur for reasons other than interest rates, there is a job transfer, or you just like a nicer house, but you're not sensitive to interest rates around the timing of that decision.

What we do in our paper, which is separate from that presented here, is that we control for those exogenous prepayments, bring them in to an endogenous model predicting prepayments that happen in a falling interest rate environment and what you can see from the bottom two sets of coefficients, the percent change in mortgage rates and the standard deviation of that percent change in mortgage rates, are that borrowers tend to respond to falling rates as if they are exercising a standard interest rate option, which is what we would expect. But this type of modeling is not commonplace and given the complexity of modeling prepayments along with some of what we still don't know about modeling defaults, that makes mortgages themselves very difficult to value.

Build on top of that then the additional complexity that is built into mortgage-backed securities. Mortgage-backed securities are very deeply tranced. They have a lot of different securities to the structures that support a given pool of mortgages. You can see here that over time, from 1986 to 2003 using European securitization data--we don't have American securitization data aggregated that we can use to affect this type of analysis--we see the number of tranches per typical security issue rising significantly across time. Now that's capped out at 16 tranches and mind you this is only by the number of deals with this many tranches in it, not by the dollar value of these deals.

Interestingly enough, this tranching is also affected by the maturity of different products within the structured finance sector. Residential mortgage-backed securities are one of the most mature securities and one of the deepest tranced. Again these numbers that show the percent of deals with particular numbers of tranches within their structures are generated from the number of deals not the dollar value of deals and the largest issuers tend to have the deepest number of tranches. Typical residential private residential mortgage-backed securities will have up to easily 25 tranches; GSE deals would typically have fifty and more. In other words, residential mortgage-backed securities are more complex in terms of their tranching than other types of structured finance. But residential mortgage-backed securities also use different types of securities. This is not just straight

waterfall tranching but residential mortgage-backed securities tend to use specialized securities in their financing structures like interest only and principal only strips, sequential pay securities and planned amortization class bonds which add further complexity to the structured finance arrangement.

For examples of mortgage-backed securities we took a few simple examples from ABS Net and we tried our best to graph these out and I want to say that this chart does not do justice to the esoteric nature of some of the securities involved in these deals. Because in fact, not all of these securities are directly above one another but sometimes you may need three or four bars across for a particular security in order to properly position these senior subordinate structures. This slide is really only meant to give a sense of some of the complexity involved and also in the fine print that you cannot read above the top of each bar, some of the magnitude involved, for instance, the rightmost is a Wells Fargo structure, Wells Fargo mortgage-backed securities trust 2006 and (my reading glasses still don't get there) I believe that's AR18 which is 1.2 billion out of 191 pools totaling 141 billion dollars in their master trust. So this is just one series of an entire master trust that adds additional complexity to the valuation of these asset backed securities.

So the main point again is that mortgages are complex and difficult to value and mortgage-backed securities are built upon that complexity and so those fundamental changes to underwriting and servicing standards that we talked about are not easily identifiable in the complexity of the mortgages and MBS ultimately posing risk to mortgage funding at the end of the day.

Now what funds the mortgage-backed securities? CDOs. CDOs build complexity upon complexity. Typical CDO funding structure looks on the surface similar to something like a residential mortgage-backed with different tranches stacked upon top of one another with floating and fixed rate tranches and sometimes IO and PO strips. The general structure looks somewhat similar to a lower class residential mortgage-backed or other type of asset-backed, here we are talking about something like 77.5% typical securities in the AAA rated tranche which is the class A securities and residential mortgage-backs typically will have about 90% in the AAA class A set of tranches and the difference between 90 and 77.5% just accounts for the additional riskiness of the collateral securities within the CDO collateral pool.

But CDOs differ from mortgage-backed securities in a number of very important ways. First, CDO pools are actively managed; residential mortgage-backed pools are static. Assets don't move in and out of residential mortgage-backed pools and asset managers do not have discretion. CDO managers do have discretion. They can drop assets, trade them, replace them at will. This element becomes even more severe at times because CDO transactions can close before the pool of underlying assets is fully formed or even formed at all. In other words, we give the managers money to invest in some unspecified pool of assets which then may change over time. It is very difficult to tell what is in these pools at any one point in time, unless you happen to be an investor who has already invested money in the pool.

The CDOs are very heterogeneous with respect to granularity. Residential mortgage-backed securities and asset-backed securities will have hundreds of thousands of accounts in the pools. CDOs will have sometimes as few as five loans; sometimes as many as a thousand or two thousand, investments. Still that pales in comparison to the greater granularity in asset-backed securities and mortgage-backed securities. As a result, CDOs illustrate more ratings volatility than asset-backed securities or mortgage-backed securities and that happens because CDO collateral heterogeneity and lack of granularity increases opacity to the deal. At the end of the day, secondary market trading and therefore liquidity is very, very limited.

Here is another picture of some representative CDO structures; again these aren't meant to be exact replications of the structures, given their complexity, this is just meant to say that the CDO structures are even more complex than the RMBS. The CDO structures also introduce even more esoteric securities; the biggest one of issue lately is the payment in kind security where if the CDO misses a payment due to investors, they may promise investors a piece of the principal payout at the end of the deal. So it's like paying off my IOU with another IOU. I'd like to get into that kind of business of passing on my IOU's. If any of you will take that from me I will be very happy to provide it at the end of the seminar.

The problem is not with the structures per se, however, the problem is with the incredible growth we've seen in the CDO market. This is a standard graph. This is taken from Lucas, Goodman and Fabozzi. You can replicate this graph from a number of different industry sources, the numbers are about the same and you can see that annual cash CDO issuance has skyrocketed in recent years. But you'll also notice that the growth has not been smooth. There have definitely been problem periods along the way.

What happens during this problem period and can we learn from this? Well I think that Lucas, Goodman and Fabozzi put it best when they maintained that the CDO market is opportunistic. It will drop collateral types that are out of favor with investors and pick up types that are in favor with investors because the CDOs are actively managed. The best example of this they say is the switch out of poor performing high yield bonds and into well-performing high yield loans between 2001 and 2003. Also we need to remember what happened in 1999 through 2001, when manufactured housing loans, aircraft leases, franchise business and 12B1 mutual fund fee ABS all tanked, CDO investors poured out of these sectors and hmm, how much have you heard about financing in these sectors lately? Not much. These sectors are largely gone.

And so we have to ask, is this what we are going to see in RMBS if RMBS tanks? Well, let's look at what we know. We know that CDO rating changes tend to follow other rating changes within the constituent collateral. Here is a graph of the relationship between CDO ratings changes and RMBS and ABS ratings changes; we provide a detailed statistical analysis in the paper. There is no need to go into the gory details of that here. Save to say that statistically we can show in the aggregate that CDO ratings changes follow ABS rating changes very well, related back to this Lucas, Goodman and Fabozzi account of the way the industry fell out fairly recently.

We also know that there is an extremely high proportion of current CDO collateral that is mortgage-backed securities. How much? That's the big question. The FDIC reported that 81% of the \$249 billion of CDO collateral pools issued in 2005, or \$200 hundred billion, was made up of residential mortgage products. Moody's reports that among the residential mortgage-backed securities 70 to 75% of those are below AAA rated, that is among residential mortgage-backed securities in CDOs. So if you take that \$200 billion of residential mortgage-backed securities in CDOs reported by the FDIC, multiply that by the 70% number that Moody's gives, you come to the conclusion that there is somewhere, and I can put error bands around this, no problem, about \$140 billion of lower tranch residential mortgage-backed securities and CDOS.

How does that relate to the size of the industry? Well SIFMA puts total residential mortgage-backed security issuance in 2005 at \$1.3 trillion. Assuming 90% of AAA in all 2005 RMBS that leaves a total of \$133 billion in lower tranch RMBS actually issued in 2005 suggesting therefore that CDOs took in more lower tranch RMBS than was actually issued during 2005. The point being there is an incredible concentration of lower tranche RMBS in CDOs.

And so, is this 1999 to 2003 redux? Where we saw the fallout in ABS and CDOs fled the sector and led to a deficit in funding for ABS? Well, we know that CDOs are buying a lot of lower tranche MBS. The point to make here is the 10% of lower tranche RMBS that the CDOs are buying provide crucial credit support for the other 90% of AAA securities. In other words, if you can't sell the bottom 10% of mezzanine you can't sell the top 90 and on top of that if CDOs exit RMBS that will leave a substantial hole in the market for these crucial lower tranche residential mortgage-backed securities.

The point being therefore if we experience this kind of scenario, we could actually experience a deeper economic effect. These are not manufactured housing; this is not mutual fund 12B1 fees. This is not some minor consumer finance sector that doesn't play into economic aggregates. This is the housing sector. There is a little bit of research, just a little bit and as Josh said we want to open the invitation to additional research, part of the point of this session, that little bit of research has suggested that things like housing starts which is HS there, non-farm payrolls which is NP, the real funding gap, default rates and CDO issuance are all related to the ultimate price of default risk. So if we see an increase in defaults, which we are seeing now, especially in the mortgage sector, we could see decreases in housing starts. We could also then see follow on decreases in non-farm payrolls, and decreased CDO issuance, all of which will lead to an increase in the price of default risk, which will then feed back to housing starts, non-farm payrolls, and CDO issuance in a death spiral for the economy.

This kind of effect won't start a recession; I want to be clear. But if we get into an economic downturn, it can keep a recession going very strongly. We are already starting to see spreads widen among the AA and BBB and BBB- pieces of home equity deals, so the question is, what's to be done? Well in order to talk about public policy issues I want to propose to the audience, a basic framework for thinking about these issues. This

framework comes from Nobel Laureate Robert Merton, where he poses an idea of financial market development as being the following: Typical new financial products tend to start over near the commercial banking sector. Commercial banks are a typical institution that breeds new products, sells them to customers, and the commercial banking sector is very opaque. These products tend to then mature and move through the financing structure, become standardized, ultimately moving out to open markets and public markets and becoming more transparent in the process.

The point is the CDO market is here, and it's stuck here, to the right in the opaque region. If the CDO market is funding socially and economically important investment in the U.S. economy, I think we want to move it to the left and enhance transparency. I want to be careful when I say this. Transparency should certainly be enhanced. There are particular pieces of regulation that aren't functioning here. The SEC imposed regulation AB with respect to asset-backed securities fairly recently. It's a great idea. I love it. They left out a crucial sector of revolving asset-backed securities like credit cards which tends to be the largest sector; nonetheless, it's a step in the right direction. Could we extend something similar to CDOs? Just to enhance transparency? Not asking for anything more. Well it could, but CDOs are hampered by - or rather that transparency is hampered by - Rule 144A. CDO securities are typically privately placed and unless you are a qualified investor, and you have permission of the issuer, you cannot look at the prospectus; you cannot look under the hood of the deal or see what the concentration is.

That is a particular problem because so far even typical financial regulators -- the FDIC, the OCC, and the Fed -- are not qualified investors. The FDIC is currently pursuing qualified investor status and that will be good once the attorneys make the ruling. I don't think there will be any problem there but even after that, they need to obtain permission on an issuer by issuer basis to look under the hood of the deals. I want to be clear. I don't want to shut down this industry. I think this industry is very important. I think capital deepening is very important for the U.S. economy. I am only looking for transparency to enhance stability in a socially and economically important funding market.

In fact, I want to provide this in a way that fosters continued innovation. I want to encourage innovation in capital deepening, that's a good thing for the U.S. economy. But we are arguing that we hit a limit point here, and Lew Ranieri in a recent interview even said, "When you start divorcing the creator of the risk from the ultimate holder of the risk, it becomes an issue of does the ultimate holder truly understand the nature of the risk that you have redistributed." It is not clear that we haven't gone in some ways too far, and that we haven't gone beyond the ability to have true transparency. That's the question we open up today and that's the question that we hope to spur additional research into. Thank you.

John Weicher: Thank you very much, Joe and Josh. We now have discussants and there will be a certain rearrangement up here to enable the discussants to come to the computer rather than the other way around. While they are doing that, I am sort of reminded that early in my career in Washington, when I was Chief Economist at HUD and there are at least a few people in the room who will remember back that far, part of

my job was forecasting interest rates for the President of Ginnie Mae and the reason was that in those days Ginnie Mae sold FHA loans into the secondary market about every other month. Built up a portfolio, sold it off, and the sale consisted of two guys from New York coming down that morning with briefcases strapped to their arms, coming in and submitting sealed bids and the Ginnie Mae folks going in the back room and picking one bid and awarding the pool to that guy, and after this had gone on, as far as I know, for a year or so, there came a day when three people came down from New York and the two who were regulars were looking very askance at the third guy showing up and the third guy won the pool. Then Governor Carter beat President Ford and I stopped having anything to do with Ginnie Mae selling FHA loans and fortunately no longer had to forecast interest rates either. Now we have tranches inside of pools inside of securities inside of trusts if I got that right as we went through and what did we have, 18 tranches in some cases. The market has changed.

Our first discussant is Mike Fratantoni from the Mortgage Bankers Association. Mike?

Dr. Michael Fratantoni, Senior Director of Single Family Research and Economics, Research and Development, Mortgage Bankers Association: All right. Thanks for having me here today. And thanks to Joe and Josh for their paper. I agree it's a very interesting topic. CDOs are definitely an innovation in the market, growing quite rapidly. It makes sense to try and understand what's happening. I'm going to do two things. One, just give you some of my general feedback to their research, and then go through what I think are some of the fundamental changes we are experiencing in the market and how you have to look at the CDO innovation in the light of those fundamental changes. You can't look at them in isolation.

First, when you are conducting any research, the most important thing is you have the question right. If you've got the question right, and you've got good technique, you can get to the right answer. So their question is, how resilient are mortgage-backed securities to CDO market disruptions? Their answer is that they are not terribly resilient. I think that's the wrong question. I also have some disagreement with how they got to that answer even for that question, but I think there are other much more interesting questions that can be asked. First, it's not absolute resilience, it's relative resilience. We are coming off a long period of time where the mortgage market -- in terms of the secondary market -- was dominated by agency mortgage-backed securities, simple pass-through securities, perhaps being repackaged. We have moved to a situation where private label securities account for the bulk of the market.

I think a very, very interesting question is what's the relative resilience of the agency style pass-through MBS market versus the private label dominated market where CDOs make up a component. And that's a more interesting question from my perspective. Another question that is very interesting, again very topical, to what extent are market signals giving us good information about underlying risk in some of these subprime securities? There is some uncertainty around some of this performance because we haven't been through a full cycle with this level of subprime origination. Are we getting good pricing information? Another sort of related question is, even for price signals that

we're seeing from more traditional types of the market, are we still getting the same type of information from them that we got in the past -- when you're looking at spreads for example. Are very thin spreads telling us what they used to tell us? I don't think so.

We live in an increasingly global environment; we're running a current account deficit of about 7% of GDP. I don't know how many of you have the same experience but on a snow day I sit home with my feet up, and read a lot of Wall Street research reports; it's a lot of fun. That's a day off for me. It is really enjoyable. Yesterday it just sort of caught me blindsided once again. Listen to this one sentence that came out of a research report that was just put out, talking about flows into the mortgage market. "Finally we are concerned that with Chinese New Year beginning this weekend there could be some temporary diminution in buying activity." I've been reading these things for 15 years; I've never seen anything close to that. Obviously there is a lot of importance attached to global capital flows coming from abroad, supporting the U.S. market; a lot of these are going into the mortgage market through this CDO channel. You can't forget that. This is a very different world than when all this was being purchased by domestic U.S. banks.

Another interesting question that they could ask, and Joe alluded to this at the end of his discussion: you look at the assets backing CDOs and their number is 70% of the collateral backing CDOs is rated below AAA - but 77% of the capital structure of a CDO is rated AAA. At first blush that seems like some kind of just wonderful alchemy. How can you take these assets that are not rated AAA and make them AAA just by rearranging them? Well, traditional finance would say there is one way you do that. If you diversify in an efficient and sophisticated manner, if the correlation in terms of the default risk across those assets is low enough, you can get that kind of a result. You can question that result. I know Josh has done some real somewhat quantitative analysis trying to question that result, but again that's what I think is a more interesting question.

What are some other possibilities of how you got there? One is that the rating agencies are wrong -- and I say that in a non-accusatory manner, they have a very, very difficult job to do -- but they have a limited number of buckets into which they can put assets in terms of how risky they are, and there's some dispersion around that central tendency within each bucket and you can take advantage of them. If you talk to the Wall Street dealers they are saying they are actively doing that, they are arbitraging the rating agency ratings and they are being effective at that.

The third is that -- and I think this is what Josh and Joe are somewhat concerned about -- is that they are engendering all this complexity and it's difficult to poke through, and so there's not a clear signal there. As I said, it's an interesting hypothesis and I don't think they proved it, but again it's an interesting point.

Let me again get to some more of the points that I think are important to understand as we're looking at this market. The one I think is most important is shown on the graph here. This is from the Federal Housing Finance Board, looking at how the cost of taking out a mortgage has just come down phenomenally over the past 25 to 30 years, whether you look at percent of the loan balance, or in nominal dollars; in real dollars it comes

down even more. People are much more willing to reallocate their financial portfolio and re-establish what their home equity position is, because they know it doesn't cost very much to do so. There is much greater liquidity. It speaks very much to the paper that Harvey Rosen gave earlier [at Hudson], that this greater liquidity is undoubtedly a benefit to consumers. You remove a binding liquidity constraint; you know, that's first year economics. That is absolutely an improvement in utility from the borrower's perspective.

Another aspect of the economy that we have to keep in mind -- Chairman Greenspan would speak on this frequently. For reasons that we don't really understand, the level of macroeconomic volatility in the U.S. economy has come down. That's especially true of the residential housing market and whether that's cause or effect, it probably also has something to do with opening up the U.S. economy to a greater extent to global capital flows, and the increased trade across the world. It's something we don't understand but obviously it has a bigger impact. The financial shocks that hit the U.S. tend to be smaller and we tend to have a better ability to ride them out. I don't know whether this is going to hold going forward, but it has implications for credit spreads, which are very tight right now, with some exception in the subprime mortgage market. Again, what is that telling us in light of a globalized world and a much diminished macroeconomic volatility?

I'll spend just a couple of minutes talking about the subprime market. As was mentioned, it now accounts for about 20% of all mortgage originations. What I think people don't understand as well, is that it really is an important source of mortgage credit for people to buy homes. This is from a survey that we conduct every six months, the latest data are for the first half of 2006, and 45% of subprime mortgages are for the purchase of a home. One in four of those purchase loans is by a first time homebuyer. That's a different picture than people have of the old subprime market, which was primarily a cash-out refi market. There is obviously still a fair amount of cash-out refinancing going on. But this is an important source of mortgage credit for new homebuyers.

As was mentioned, the performance recently certainly has gotten worse. But "gotten worse" must be put into context. On this chart, the black line with the x's is subprime ARMs, and this is a foreclosure inventory rate. It's up to about 4.5%, that's an increase from 2005. The year 2005 was the lowest level we have seen in our survey since we have been able to break out subprime loans separately. We're at less than half the level we were back in 2002, in terms of foreclosure rates. What our data lacks in detail it has in terms of comprehensiveness. We have a very good picture of the entire market. What people are concerned about -- again when I'm sitting there on snow days reading my Wall Street research reports, this is the story -- it's that loans originated in 2006, for their age are performing worse than earlier cohorts of loans. Without a doubt this is the story right now. These loans have not hit an interest reset yet. This is not a product issue. These are loans that were originated before the housing market started its fairly significant deceleration. So there is absolutely evidence here that for their age these loans are performing poorly and this is being tracked in new synthetic securities looking at the subprime market; spreads on lower rated tranches of subprime securities have really increased significantly. These have only been around basically for the last year so we don't really know what where the equilibria for these spreads are, but these are now

liquid, active trading instruments, these synthetic securities, so we can get a good picture of the market going forward. But again it's difficult to know what this means relative to where we've been historically.

This chart is sort of my way of thinking about -- and this is actually compliments of my colleague Jamie Woodwell at MBA -- how the mortgage industry has evolved over time. In the old world, you had a household owning a property. You had an investor; typically a bank or a thrift investor provided the funds, and the household got the property. Every month they paid principal and interest. That was the end of the story. There were some good things about that world I guess, but everybody has seen "It's A Wonderful Life" and there were a lot of bad things about it too. It kept capital trapped in particular communities. You had cash rich and cash poor areas.

So there were lots of reasons for developing a secondary market, to get mortgage-backed securities, simple pass through MBS that I don't even need a slide for. The principal and interest comes through from the property holder, and it has a guarantee on it from Fannie Mae, Freddie Mac or Ginnie Mae and then it passes through to the investor as it comes in each month.

That was difficult for a lot of investors to handle, so they developed structures like REMICs where some people said "Well, I want a short-term investment," and other people said, "I want a longer term investment." So, pay some people first, pay other people later. This same type of structure was then applied to deal with credit risk. And so most private label securities, in terms of mortgage-backed securities, are in this REMIC form, and -- look at the right side -- the higher rated securities have higher priority of repayment but get a lower yield. You're paid for bearing risk in the market, just like in every other part of the financial markets. The lower rated securities have lower priority of repayment and much higher yield.

Here's where we are today, and some of the innovations. The Achilles Heel of the private label MBS market was that you couldn't count on enough buyers of those lower rated tranches. And as Joe and Josh mentioned, without those buyers for the lower rated tranches, the deal just doesn't work, because you need somebody to bear the risk. In the agency market, Fannie, Freddie, and Ginnie bear the risk. In the private label market, the structure bears the risk, and if you can't sell the lower rated tranches, it doesn't work. What do we have today? We have this incredible flow of global capital pushing down longer term yields, there are very tight credit spreads; we have investors looking for any higher yielding investment. We have this insatiable appetite for higher yielding types of investments. There is incredible demand for these lower rated tranches and that is supporting the private label market, now being the dominant form of securitization rather than the agency pass through. And the CDO is one tool again to try to reduce the risk while still having investment in these lower rated tranches. With synthetics, again instead of just investing in a single security, you can invest in the subprime market as a whole, at different tranche points.

Just let me close by making two points. I think Joe particularly in his remarks -- and this is clear in the paper -- there is a tone that the CDO market is exceedingly complex and less than transparent. I think complexity is somewhat in the eye of the beholder. Half humorously, this is a final exam question that I gave to some undergrads when I was teaching a real estate finance class. As you look through it, I'm asking them to value different tranches of a REMIC for a given prepayment speed, and a given interest rate environment. These are undergrads, and they had a calculator. They all got it right. There is absolutely operational complexity in these things, and this kind of a diagram makes you think, "boy that's going to be difficult to keep track of," but conceptually, you are accessing capital, you are dispersing risk, investors are allowed to choose where they'd like to be in terms of priority of repayment and what's the risk-return tradeoff they want to make. It is not that hard from a conceptual standpoint, obviously. There are legal, operational, and all kinds of other risks that are more difficult to handle. Then the question of opacity and for some reason I don't understand -- I guess everybody on Wall Street has extremely good eyesight -- but again the Wall Street research reports that I'm just deluged every day, this chart is the kind of information these guys look at every day -- information on silent seconds, information on investor share, information on credit score distribution, performance characteristic, geographic concentrations, product distribution, different permutations in product. These guys are overwhelmed with information. Everybody has access to the information. Do you have the analysis to make sense of it? That's a good question. I don't think there's a lack of information. So with that, let me turn it over to Tyler.

John Weicher: Thanks, Mike. Tyler, you're on.

Dr. Tyler Yang, President and CEO of IFE Group: There is always a disadvantage to being the second discussant because all the important issues have already been discussed. So let me see what I can add on to that. First, let's go over the paper.

The paper basically did introduce the two main issues. One is the recent development in the primary mortgage market, how the lenders have gradually moved into higher risk mortgages, which actually helps the market a lot by allowing a lot of households who cannot be a homebuyer otherwise. So from the policy perspective maybe this is good. From the financial management perspective it may cost additional risk. One of the interesting issues may be to examine what's the right balance between these two policy goals.

The second issue introduced here is the complexity of the CDO market. Mike reiterated that and we know that there is a market issue versus an operational issue, so I will try to do some more discussion about that. Then, the more important thing is the authors have linked at least two markets together to see what's the potential issue - what happens on Wall Street can affect individual homebuyers in a local market. They not only show the connection but also tried to give an estimate of how big the impact could be, and finally they make a recommendation about more regulations and disclosures needed to make this market more efficient. So my comments would probably just follow the same approach. .

I will talk first about some of the impact of the CDO market and then go to the primary mortgage market activities, and then talk about some of the policy implications after that.

You have seen this graph at least two or three times. We started with Joe and Josh's very complicated graph, went to Mike's reduced form, and my version is "for Dummies." In the middle basically is a mortgage pool passed through a REMIC structure. We know that a mortgage has two main risks. One is default and one is prepayment; Joe and Josh talked about this thoroughly. These two risks are disliked by market investors. So in order to sell these securities into the market, Wall Street becomes very creative. They say "If you don't like the credit risk, we can carve it out and put a defense against you," so all the default risk would be carried by somebody else. Or, "If you don't like prepayment we pass the prepayment risk to somebody else." So in the graph the blue piece, the tranche A2 is the safest piece in the whole security, and that's where the bulk of the money goes. Tranche A1, those people will get any unexpected prepayment upfront, so whenever there is a prepayment their investment will be reduced. They carry a lot of prepayment risk. But because of the existence of those people, we can have a very safe A2 tranche. Similarly on the bottom side those people are taking the credit risk. Whenever there is a credit loss, those people will be hit first. Here we separate into two pieces. One is the residual piece; most of the time nobody really wants to buy those securities or those are usually retained by the initial issuer. The tranche BBB or the BBB rated piece is the part that's really the focus of this particular research, the piece which is mainly invested in through the CDO market.

If we understand why the securities are created as they are, I think this will help us better in setting out to think about policy implications and operating strategies. This is how I see the problem links the CDO market with the mortgage market. From the homebuyer to the CDO market, there are several linkages. First, the borrower has to get a lender to issue a mortgage, and then the lender turns around to sell it to the secondary mortgage market – the REMIC tranche, which is what we just saw, and then on the REMIC we have some high risk tranches, which the typical investor would not like. Those are the pieces that CDOs are particularly in favor of. They want a high return and they are willing to take the high risk. So that's how the CDO gets involved with individual homebuyers. As Josh and Joe have suggested, the REMIC needs to have to be able to sell the lower tranches first before they can sell the higher quality tranche, and the CDO is the main buyer for REMICs in the last few years. So as a result, the question here is if CDOs lost interest in this market and pulled out, what would happen to this market? Does that mean that the REMIC tranche business will collapse? Does that mean there will be further feedback to the lenders, that they don't have a channel to resell their securities? And finally if that happens we will see a hit to the homebuyers market. The magnitude of this impact, as the authors said, is that the CDO is investing about \$140 billion and with 1-to-10 leverage, it probably implies that \$1.4 trillion of private label deals could disappear if the CDO totally pulls out. That is a huge number, and if that's really the case we need to do something to prevent that from happening.

What I would like to add to that logic is that the story doesn't end with the CDO. The CDO is only an investment vehicle. You can think about it as a mutual fund, a fixed

income mutual fund. It happens to be heavily concentrated in the lower tranche, higher risk MBS securities. Who invests in CDOs? Those investors are where the true money comes from. Typically we see a lot of hedge funds, and the existing MBS mutual funds, and some of the global investors, as Mike suggested. So whether the CDO exists or not, is one thing; whether these fundamental investors would care about investing in this piece is the fundamental issue, I think. What happens if the CDO structure disappears and nobody wants to manage it any more? What would happen to those initial, original investors? They would just go back to the traditional REMIC market, and directly buy the lower tranche of the REMIC; maybe they have a preference for the higher diversification in the CDO market, and as a result they may not like the REMIC tranche as much as they like the CDO tranche; so they will ask for a higher spread. That will come out as a cost eventually to the homebuyers.

So the question here is probably not whether the disappearance of the CDO will cause mortgage funding to dry up, but rather how much more will it cost. It is an efficiency issue. Let's say the entire market has lost interest in those lower credit tranches. What can the lenders do? Do they stop originating mortgage? Do they stop selling MBS? Well, not necessarily. Before the private label REMIC became popular, there were many different ways that the lender could repackage their portfolio. For example, they can retain the whole risk in the portfolio and just fund it with capital, which can be run at a very high cost. They can try to purchase private mortgage insurance on the individual mortgage, they can sell it by issuing a mortgage-backed bond, or they can cross-hatch by some other creditor in the funds market, and they can use other credit enhancement methods to package the mortgage and still sell it in the market.

What I'm trying to demonstrate here is that the effects of the CDO on the homebuyer's cost of capital may not be that direct; there are a lot of alternatives. So like Mike suggested, I would think the question that should be asked here is: if the CDO pulls out, how much additional cost would be translated to the individual buyers? How much higher an interest rate do they have to carry in order to buy their home? This will come from the higher yield spread; alternative investors will require the higher PMI premium rather than the CDO spread; or the cost of capital from just keeping the mortgage in the balance sheet. One interesting research issue would be just to compare the CDO market spread with other alternative MBS issuance and see how much benefit the CDO has against other alternatives. That can help us quantify what's the contribution of the existence of the CDO, to help homebuyers in today's U.S. market.

So if that's the situation, I want to talk to the next issue: what kind of policy or what kind of regulation would be needed to help this market become more efficient or be under control. If we just compare the left hand side, which is the graph of the middle risk, it's the CDO or REMIC tranche. On the other side if the left side is up here, everybody will be issued just a simple MBS pass through. There are also ways to enhance it so that it can become investment grade. One typical way is just by direct collateralization. If that's the case we can think about, if the left hand side is not feasible, we can still create the senior tranche by looking at the right hand side. And these two securities are both rated by the rating agencies and they can reach the same rating, both are BBB rated. But they can

imply very different risk. Why? If nothing happens, both security holders will get fully paid as promised on their note. But with no mortgage pool there would be defaults. So as long as there is some loss incurred, some loss would be carried; it would be taken by those first loss pieces, either the residuals on the left hand side or the over-collateralization on the right hand side. When the loss keeps on increasing -- just like what we are seeing in today's market -- as the prime default rates keep rising, once they reach this starting loss position, once they eat into the BBB level, we see on the left hand side the BBB tranche of the CDO will quickly exhaust all the principal and they will realize a negative 100% return. But if we purchase a BBB rated pass-through the return will be only like a negative 20% because you can still recover a big portion of your principal back by selling the house and collecting the money.

So one important issue where I think the government needs to help, is to help the market really understand the difference between buying a BBB bond versus a BBB CDO tranche. Those two imply very different risks. These risks are not reflected in the rating, because what rating agencies are traditionally doing is just giving you an indicator of what's the probability that you will incur any small fraction of the credit risk. They don't tell you how much your loss given default would be, that is how severe it will be, and they don't tell you how much interest you are guaranteed to get. You may not receive any interest if all the mortgages default tomorrow. So those are the additional issues that a rating agency may need to consider. How do they refine their rating methodology to really help the investors to understand these complicated securities? That's where I see the SEC and some other agencies need to put in some regulation to enforce that fair disclosure of the risk.

The next question -- Mike touched on this -- is how much to disclose. Mike showed you the comprehensive list and here I am just repeating some of the elements being disclosed. In some of the cases you can actually follow an individual security on a loan by loan basis to see how they entered into delinquency and how do they go to default as they age. So there is a lot of information there. The question is just what Mike said - how can you comprehend these data? How do you consolidate the data into a buy/sell decision on these securities? So another important issue here is: If we want to get more financial disclosure, what particular information is needed?

Then, let's go to the next question. Why do we need government regulation in this market? Because we want to protect some financially weak individuals? In this case, if we look at the CDO investors, however, most of them are institutional investors, they are very financially savvy. They are probably the most financially savvy persons in the whole country. So we don't need to worry about protecting them from losing money because of ignorance. What we need to worry about is to make sure that pension funds, life insurance companies, or small investors, they don't get into those high risk CDO investments, or try to put a limit on how much they can concentrate in these securities. We don't want them to lose because of their ignorance of the risk involved.

What has the government been doing on regulating this? A lot. The OCC, the Fed and the FDIC, they are coming up with Basel II and 1A. There is comprehensive regulation

about how to treat the capital, the risk based capital on those structured transactions. Then the question here will be, what additional regulation should we need on top of those risk based capital, is just Basel II enough or not? And which agency should be looking into those regulations and who should be regulated on this food chain.

I'm 100% in agreement with the authors that the recent trend of stepping into high risk lending is a potential threat to our economic stability and Mike has seconded that as well. I think it's only fair to state that we should analyze that problem by itself, because the problem exists with or without the CDO market as we saw earlier. If the CDO market disappears, there will be other investors coming in to support this market, to support this high risk lending. The question is just how much additional cost to carry. This is a graph from recent research of mine with Man Cho and Cary Lin, which compares a traditional FRM default risk, which is the bottom blue line which tries to capture the probability that a borrower will face some payment shock that they cannot afford, and the top one, the purple line, is representing the same probability for an option ARM, which carries a very low introductory interest rate and has a high reset frequency, plus negative amortization. If we put on top of that the prepayment penalty, you can see where this potential risk will go; from this graph it just says the potential risk can go as high as six times that of the traditional FRM products, shown on the similar graph.

The last question I want to throw out for people to talk about is: When we are trying to increase our nation's homeownership, where should our focus be? Typical homebuyers could be either constrained by their wealth, which means they don't have enough down payment, or they could be constrained by income, which means they don't have the money to qualify for the debt to income ratio. In the upper left corner, those are rich people; we don't need to worry about them. They've already bought their mansion. In the upper right corner, those are people who don't have enough wealth, but their income is probably okay and they probably have greater income potential in the future. Those are the people who are doing a lot of buying. The way to help those people is to offer higher LTV loans, with almost no down payment. This way they can become a homeowner quickly. The FHA and the 125 mortgage are examples of these. In the lower left corner are those people who have enough money sitting there, but they don't have enough income. The people falling in this category are very strange and I have a hard time to categorizing them; the chart shows just some examples. The way the government can help these people is just to try to reduce the mortgage interest rate, like those IOs and option ARMs, which can lower their entry point, but we see potential risk over there. Finally in the lower right corner are those poor people who are constrained by income and also constrained by lack of wealth. The question is how far we want to get into that corner to make them homeowners? Is that in their best interest for them to become a homeowner, or they should be just waiting for a while?

So that's the comments I have. Thank you.

John Weicher: Thank you, Tyler. Thank you, Mike. I don't know if either Josh or Joe want to make a comment quickly and then we'll open it to the audience?

Josh Rosner: I think one of the questions or issues here is what is homeownership? Historically homeownership had been the goal of buying a home, having the equity trapped to build your ownership of that asset to the point where you actually become a homeowner. You are not, by taking a 125% loan to value, a homeowner. You are a renter with debt and maintenance obligations. And so the question becomes as we move into some of the products, are we assessing the risk, both to the lenders, who are big boys, and to the buyers, the borrowers; but I think also there are the systemic questions and so this conversation where it resolves to “institutional investors are sophisticated and among the most sophisticated,” I think is a little bit of a spurious argument because it denies the fact that institutional investors are in a business, and the business is driven by relative performance, not even necessarily absolute performance. Just as we saw with the dotcom period, the number of clients who will say to me in conversations, “look I hate that I’m buying this, but I have to buy it, okay?” becomes problematic.

It becomes even more problematic when in CDOs you have a wall of liquidity which is what Michael’s talking to and I agree there is an incredible amount of liquidity in the system. That is part of what has driven spreads to be so narrow, but where you end up is you have the creation of an asset, the CDOs, which are being rated by rating agencies who for the first time are rating assets where credit risk is not the primary risk of those assets and you’ve opened up a market for institutional investors who are constrained by their business charter where they can only invest in investment grade assets to grab for yield on a competitive basis. And to go after assets that they might not otherwise be able to buy, because isn’t an AAA an AAA? The answer is obviously when you look across assets, no, an AAA is not an AAA. In fact even in a CDO structure within the same structure, you can have two AAA rated tranches, one that is a super senior tranche, rated AAA and one that is a senior tranche rated AAA. They both have the same rating, but they’ve got very different risk characteristics. I don’t think that’s largely understood by the markets and I don’t think that that risk transference is fully understood in this room or by the folks here, which is why we think this is an area of such dire further research.

Joe Mason: I would just like to go on record being very clear, that I support subprime lending, I support CDO markets and the tiering and tranching of risk, and personally I laud the capital market developments that have led to increased capital depth within the sector. I want to preserve those and I also want to go on record noting that the way I want to preserve those is not through hard-wired regulation but merely through transparency. I’m not a big backer of regulating the CDO sector. I am a fan of providing transparency to capital markets. Some of this information is available. There is a great deal of information available. Information can overwhelm. We all know that. Mike noted that the valuation is conceptually very easy and he is right -- if you believe all the model inputs that go into that. When I teach my undergrads, I point out to them that these assumptions of prepayment rate, default rate, and so on and so forth that we are using in this word problem, are all given to you in class. But in the real world we have staffs of quants on every one of those trying to estimate reasonable parameters that move over time. So, once you have those, yes, the exercise is very easy; but to just assume you have those and you have it right is to ignore a great deal of complexity in the exercise.

I want to really applaud Tyler, and just thank you. You brought out the additional subtlety in the argument that we were not able to bring out in the first draft of the paper when you note that -- and I agree -- that it's not that there would be no residential mortgage-backed security issuance if the CDO market tanked in this area, but that it's the way you put it, new investors or old investors would have to rethink their investments in the sector. I want to be careful about saying that and I also want to add to that, that not only will there be a reallocation, it will be a costly reallocation among investors, and we want to know more about the cost. I'm not saying the world is going to fall apart but there is going to be a cost; and secondly we are going to see increased spreads in the sector. Increased credit spreads. And when you see increased credit spreads it's not clear that BBB pass-throughs become economical, and this whole effect can happen without CDOs selling off, but just with increased spreads. I'll give one simple case in point and then open it up: the credit card sector during the 1998 Russian Crisis. Credit spreads widened and credit card ABS deals were no longer economical to take to market. Credit card monoline banks sat, because deals were not economical to take to market. Typically these banks are looking for a billion dollars of funding every quarter and the ones I know of operated on about 120 days of liquidity, backup liquidity if the deal didn't go to market. The deal didn't go to market. We got into day 100 and one of the banks I'm familiar with just dumped the deal on the market, took a bath on the pricing point, but knew that without funding in 20 days, they were done. I don't want to see that happen in residential mortgage markets. I think even the hiccup -- I think we'll recover but I think the hiccup could be economically costly in the meantime and hurt homeownership and hurt the kind of subprime borrowers that we are trying to encourage, and many of those are credit-worthy at a price. I think their needs are being met by the market. I want to encourage that and I want to support that in a meaningful, stable fashion that provides stability for U.S. homeownership and economic growth.

Mike Fratantoni: I don't know whether it's an apocryphal story but apparently a Harvard academic came down to work on Wall Street and apparently said something like "Markets look a lot less efficient from the banks of the Hudson than they do from the banks of Charles." My fear always is that everything from the banks of the Potomac looks like a market failure and I don't think that's true. I think we see dynamic innovative markets, hugely competitive, they evolve over time. I think just leave them alone, I think they're going to work this out.

Joe Mason: I'm willing to bet that on something other than housing markets, but we can talk more.

Tyler Yang: I think the authors have raised a lot of interesting questions and they did a good job in just analyzing the facts: what's the market condition we are in. There are a lot of interesting questions to be answered, one of them will be how severe that hiccup would be, and if we can quantify that I think that's a tremendous contribution to this market and to the policymakers. I look forward to seeing the next version of the paper.

John Weicher: Thank you all. I think it's time to invite you all in the audience to raise questions with our panel. As usual please raise your hand. We have two folks with

microphones who will come to you, Shilpa and Eric, and please wait until they arrive and state your name and your affiliation for the benefit of the panel and the audience and so we have the information with the transcript and the video. I would like to take the prerogative of the Chair to ask the first question, which is: The concerns about CDOs are at least partly in the context of a scenario where home prices depreciate. So far they aren't depreciating. The prices for both new and existing homes are fluctuating in a fairly narrow range, right around their all time highs. The Census home price index is still rising. It's risen in 17 of the last 18 quarters. The OFHEO price index is still rising, it hasn't dropped in any quarter for 13 years, though we'll see another index in about a week or ten days. Those indices are rising more slowly than they have recently, but they are still rising and there seems to some developing consensus that the worst is behind us - the Wall Street Journal's last poll of economists, the movements in the Chicago Mercantile Exchange futures market for house prices. Suppose prices are flat for the next couple of years, or rise a few percent a year, what's likely to be the situation for MBS, subprime MBS and the CDO market?

Josh Rosner: I think that speaks to one of the real underlying uncertainties that we try to actually bring some light to. Which is that historically mortgage lending was done by local institutions who either ended up having to own those loans or end up selling them into government or agency programs. As we become increasingly reliant on capital markets for funding, one, one could argue that the underwriting standards have declined but two, we are more at the mercy or less I should say driven by regional economics than by perception in the capital markets and so the answer actually is that there is still the underlying feature of the macroeconomic and regional economic driver, but capital markets could decide tomorrow that they are walking away from the CDO structure, or walking away from some of the private label structures and it could actually transmit back into the real economy, so I don't think that there is a set answer in terms of trigger points financially.

Joe Mason: I think you raise a good point, John. And to some extent there is additional diversification in this market that as we've made these investments at the CDO level of aggregating MBS are I would say generating a true national diversification within real estate, so that at the end of the day you have to look at the national value of real estate which is not the situation we had in say the thrift crisis where we learned about California exposures. That said, however, I would like to point out that it's not the overall level of home prices that's the issue, it is more the level of defaults and as Josh pointed out, these mitigation practices have been imposed by the GSEs and FHA upon lenders in the background and they are not widely known that a bank is prohibited in many cases from merely foreclosing at 90 days as used to be the practice. Those changes came about a couple of years back and I would argue that today we are seeing artificial foreclosure and default rates - artificially low, and we don't know how artificially low. Part of what we're trying to look into is estimate how artificially low that is, and is it low enough to dig enough into these CDO tranches of BBB residential mortgage backs in order to feed through the mechanism, and that's an area that we just don't know the magnitude. We want to know more. It's not overall prices, I think.

Tyler Yang: I think that compared to other financial markets, this is a nice property of the housing market. That is, it reacts to anything slowly, and the issue is, people tend to overreact in the very short run. Jim Follain, the original discussant for this session has a recent article just comparing the house price growth rate forecast in August last year versus December last year and it showed in August everybody was extremely pessimistic and expecting the house price to drop by 5 to 10% in some of the local MSAs, but by December those expectations all shrink down to a 1 or 2% drop at the most. So, before we see any house price drop there is some speculation out there, but usually we see house price tends to be moving very smoothly. Compared to the last few years, 15, 20% annual return, any small growth would be viewed as a recession, but we are not talking about a house price drop, just a slow down.

Josh Rosner: Although that does go back to the question or the point that Joe raised in terms of loss mitigation, where we know that 50% of what would have been foreclosed a decade ago, are now worked out and show as current. That's a pretty staggering number. And we don't really have enough -- we don't really have any information from the subprime world. We have information from FHA, we have information - just the headlines, not granular - in terms of transparency from the enterprises. Neither of them will give any more information and we find that those in the case of loan modifications, those have a 25% re-default rate, within two years potentially. That actually ends up harder to mitigate these loans in a rising rate environment, in an environment where prices aren't appreciating. So I don't think that it's really just tied any more to, and this goes back to the point, prices.

John Weicher: I think it's time for the audience.

Bob Samuelson, Newsweek: This is for Mike Fratantoni or anybody else on the panel. You told me once, a couple of weeks ago, that the increase in subprime lending had to a great extent and I think I'm quoting you correctly, displaced FHA and VA loans. So my question is, why did that happen? In other words, why is the private market, I think at higher nominal interest rates but maybe not, displacing government guaranteed loans which would seem for the offering for any sort of riskier borrower.

Mike Fratantoni: Right. Just to recap the data and this is again coming from our National Delinquency Survey, you look at outstanding loans, in 1998 subprime was about 2% of outstanding, today it's about 13.5%. Prime in 1998 was about 69% of outstanding, now it's about 76%, so the prime and subprime shares of the markets have grown, the FHA and VA shares have shrunk from about 30% of the market to about 10%. We actually did a study on this. It's available on our RIHA website, HousingAmerica.org. We were basically going to our members and saying, "You used to be an active FHA lender, why aren't you today?" Most often the answer is the availability of different types of products. FHA has had a more difficult time bringing new products to market and the subprime sector has been very innovative in terms of new products. There is a substantial training cost associated with keeping your employees up to speed on FHA and the study goes into that. There is also a sense of risk with originating an FHA loan. If you look at the delinquency rates, between FHA and subprime, they are about the same in

terms of total past due rates -- FHA was higher for a number of quarters -- so it suggests a borrower with a similar credit record, but you're giving them a rate which is not supporting that level of risk and so if that FHA endorsement doesn't come through, you are left with a loan that's not a 7% rate, it's an 8% rate in the market but you approved it at a 7%. So there's a risk to a lender in originating FHA. That's the third issue.

Bert Ely, Banking Consultant: A question for the panel is to what extent is the complexity that has developed in the market and particularly as it's reflected in the CDOs, reflected the extent to which mortgages prepay either for rate driven reasons or as we saw last year, an awful lot of mortgages were refi'd at higher rates because it was a lot of equity cash out associated with it. Those are two factors driving complexity, then prepayments and the third is kind of what I'll call the demographic factors, the house sells, there is a divorce or something like that. The question comes down to this then, if there was a mortgage product out there in which the homeowner could get the benefit of a lower interest rate and could also borrow out equity without having to go through a formal refinance process, and in effect you had less mortgage turnover, would that reduce or have any effect on the complexity of the market that we see now. Another way to put the question is, to what extent is the acceleration of prepayments for rate purposes as well as equity extraction, adding to or compounding the complexity of the whole mortgage-backed securities market and particularly what I'll call the CDO tail or tip.

Joe Mason: Yeah, this has always been an interesting institutional question to me. U.S. consumers don't like ARMs and don't like prepayment penalties. Those two types of products resolve a lot of the complexity. The relatively free prepayment that we have today is costly on the other side to the mortgage issuer and the ultimate buyer of the security backing it, and that is an incredibly difficult thing to value. You look at the U.K. market. Prepayment penalties are standard. ARMs are standard. You look elsewhere in the world. These features are very common, but we have a very low ARM penetration rate and we have staunch resistance at the Congressional level to prepayment penalties which we consider evidence of predatory lending. So if we could get over some of those institutional hurdles, institutional in the sense of cultural beliefs in the U.S., I think it would go a long way to making these markets more efficient.

Anne Canfield, Executive Director of the Consumer Mortgage Coalition: First, I think we have some historical precedents for some of the things that are going on in today's market. Mr. Mason mentioned the Russian Crisis. When I look back to that period, admittedly it lasted for about 15 minutes, not very long, but there were a bunch of subprime lenders that went out of business because they didn't have a lot of capital and the investors stopped funding them. The people that picked up the slack were Citibank, Household Finance, Wells Fargo, anybody that was a large financial institution, Fannie, Freddie, etc., that had some available capital, they made a killing, and because it didn't last very long, the consumer really did not feel any impact. They were able to get mortgages through that period and so there was really no interruption whatsoever. I suspect if it had lasted a real long time, you might have seen rates go up a little bit. But it didn't seem to me that we didn't have any big crisis. There were a bunch of subprime lenders that went out of business, but from the consumer's perspective, there was no big

deal. So I look at that and I think we've had some experience in that, it will probably happen again in the future. What's happening right now is that you have again probably a bunch of investors are taking a hit, a bunch of subprime lenders are going out of business, but so what? We feel sorry for them but you know it's not the end of the world. There's a lot of people with a lot of money out there to invest in this sector and I think it's going to continue.

The other thing, just with regard to loss mitigation, the reason the industry engaged in loss mit, it was not just because Fannie and Freddie and FHA thought it was a good idea; it was a lot of lenders who improved their loss mitigation activities because they lose less money -- they lose money on a foreclosure, etc. -- if they do loss mit. So it's been a big tool, I think CRS did a study on it just for those of you who go back to the late nineties.

Josh Rosner: Is there though in the loss mit, that there has long been this sort of social policy perspective spun on it, that it's good to keep homeowners in their homes. Those are the pieces. It would be nice to be able to analyze the data, look at the effectiveness of the mitigation and see if what we are doing is actually engendering an S&L type kicking the bad debt down the road.

Anne Canfield: No I think the way we look at it, and the way at least our companies who are fairly sizeable companies engage in it, you take a look at each individual borrower and their personal financial situation. If it's a job loss which is a temporary situation, obviously you want to restructure the loan, keep them in their homes, etc. if that's what they want to do. If it's a divorce and there were two incomes needed to afford the mortgage payment and that's not going to continue, we want to move them out of that home and into you know a refi; basically to do a presale and put them into a new home, so that they can not have their credit record impaired.

Josh Rosner: There is no standard applicability actually over deed in lieu, special forbearance, partial claim, preforeclosure sale, or a loan modification and so you've got industry players applying disparate processes in a way that's not transparent so we can actually have this further conversation.

Anne Canfield: It's true each lender has their own practices but I suspect if you got into it you'd see a lot of them were very similar. You'd like to take a look at all the data and have it categorized but the outcome is that you do have lower foreclosure rates than you would have otherwise had.

Josh Rosner: Right, and in a rising rate environment or in a flat home price environment will you be able to continue on these practices, or do they become uneconomic.

John Weicher: This kind of gets back to the question I was raising at the beginning. I might say about loss mitigation from the FHA standpoint at least as of a couple of years ago, something over half of the loss mit loans where there was basically forbearance were current within a year and that looked good from FHA's standpoint and seemed to look good from our lenders' standpoint as well at that time. Question over here, Chellie?

Chellie Hamecs, National Association of Home Builders: I want to get back into the issue of defaults and foreclosures and some data issues. I'm wondering if you might know of any data that shows the percentage of risk layering, the interest-only and payment option loans that may have low docs and other risk layering; and any estimates on percent of those that may go into foreclosure – if you read the Wall Street Journal articles you'd think that everything is going to go into foreclosure very soon and the whole market is going to go down the tubes. But we are rather concerned about this because there is already a lot of inventory out there and we don't to have a lot more come on line.

Mike Fratantoni: Let me start. It really is not really a product issue and the reason I can say that is if you look at subprime ARM loans which are getting a lot of scrutiny right now. Look at their foreclosure rate in Arizona for example, it's less than 1%. If you look at prime ARM loans in Ohio, they are almost 2%, so it's not the product that's driving the performance, it's the regional economics and that's where I disagree with Josh to some extent. It's just that the Midwest has had a very difficult time in terms of the job market. In terms of some of the nontraditional aspects, all the data I've seen is that there is some interest-only product in the subprime market. But it's less than in the prime market. It tends to be with borrowers with somewhat better credit, higher credit scores than the rest of the subprime market, larger loan balances suggestive of higher income. Pay option and neg-am products are basically absent from the subprime market. That's a prime and Alt-A phenomenon. Just to echo one of Joe's points, another data issue, prepay penalties are becoming increasingly common, even in the prime market. Last year almost 15% of prime jumbo loans had prepay penalties. And the reason for this is, investors are willing to pay up substantially to get some protection against prepayment risk, even if for a year or two; so it's an evolving market -- so that there's a need to get greater acceptance of those kind of things particularly to Bert's point, to protect against the prepayment risk which is very difficult to manage.

Desmond Lachman, American Enterprise Institute: I just wonder whether the panel is not very overly sanguine with regard to the possibility of liquidity drying up. When I see the chart showing an explosion of CDOs and hedge fund participation I have to wonder whether we aren't forgetting what occurred with the LTCM crisis in 1998. You know that risk hedge funds currently seem to be mispricing risk along a whole range of assets and when these processes tend to unwind, it tends to get ugly and it tends to get self-fulfilling, so I was just wondering what is the basis for having a very complacent view that credits --, if, you know, the hedge fund financing dries up -- that they are somehow going to continue lending or will just get a whole repricing of risk in the market that then could have the kind of feedback effects that main speakers were talking about.

Josh Rosner: I think that actually there's another piece to that question, which is also are the operational systems put in place by the issuers and the buyers decent enough and we've already seen that there has been significant operational weakness in confirming trades in these products to the point where you know the New York Fed has called meeting after meeting to actually address the fact that it has taken 45, 44 days on average

to confirm trades in these over-the-counter markets. So I think that it's a real question. We don't know who the owners are. We don't know where the assets are. We don't know where the risk is spread. You mentioned Long-Term Capital and I think actually it's an interesting sort of point because in the case of Long-Term Capital at least regulators were able to get the involved parties into a room and work to slowly unwind and liquidate, add liquidity to illiquid markets to unwind positions. Here we don't know who is holding them. We don't know because it's an over-the counter market that the valuation on the assets, the marketing on the assets is correct, which would add yet another level of complexity so I'm not as sanguine and frankly to add to Anne's comment before, the 2% of the players in the industry, Mego Mortgage, ContiFinancial, that went out of business in the wake of the Russian Crisis, it was a very small piece of the industry. I was very involved in that. It was nonexistent and those borrowers were not really subprime playing in subprime products the way they are today.

Joe Mason: I would like to just briefly address Desmond's comment which I think is dead on. If there is worry about this sector, one way of dealing with that uncertainty is to just shed the risk. And information helps that. Helps relieve the need to shed the risk. So it's up to the CDOs. They can provide transparency on their own or they can wait for a regulator to step in or do something else. Right now might be an opportune time to voluntarily provide that transparency and take a couple of additional bips on their financing as a result as a gesture of good will. I think that can pay off in today's markets. But one of my favorite pieces of research is my paper with Charlie Calomiris on the June 1932 Chicago banking panic which was a classic manifestation of uncertainty, asymmetric information about where the risk lies and so all the depositors pulled their money out of Chicago banks. Well, what happens at the end of this crisis? This happens during the third week of June. On June 30th bank call reports are due. During that period every bank published excerpts of their call reports in the local paper. As soon as people saw the excerpts of the call reports and the financial statements, not that they knew how to read financial statements, but they saw them -- the bank filed with the regulator, everything is good, okay I'll put my money back in the system. Information is key and transparency can be voluntary, it can be regulatory, but it is very valuable.

John Weicher: Anne, do you want to get back to Josh?

Anne Canfield, Executive Director of Consumer Mortgage Coalition: The people that went down in '98 were the hard money lenders, subprime people.

Josh Rosner: They disappeared largely and not even as a result of the Russian debt crisis. They disappeared because they were employing gain on sale assumptions that were incorrect and once investors realized that the assumptions that they were given were mismodeled, they pulled all the capital away from those players and placed it with institutions who were not employing gain on sale accounting.

Anne Canfield: Okay.

Josh Rosner: So the mismodeling errors were the driver of capital flight. And that capital migrated up to lenders who were actually employing accounting that was more readily transparent to investors and that is exactly sort of the corollary that we are concerned about.

Anne Canfield: Well that's... I guess, having done a little research I would take issue with some of the historical, but anyway, to the other point is on CDO transparency, if, don't you think that they will if they have to sell their, if they want to sell their risk to somebody else and it's going to require that they -- and it's going to be beyond the private placement market -- that they would make that information more available or how would, why wouldn't that happen?

Joe Mason: You have 45 days to effect the trade. So you are stuck with it in your portfolio. In the meantime investors sell off the securities underlying the CDO at a deep discount. Everybody is taking a liquidity premium. I don't know how sharp the shock is going to be. I agree that, and I think we're lucky; the effects of the '98 Russian crisis were limited. And the market was made whole. But that was going on nine years ago. These markets have grown immensely both on the ABS side and on the CDO side and of course you had RMBS on there, it's a big market that's providing funding for the banking sector primarily, that's underwriting a lot of these consumer loans and now housing markets. I just want to learn the lessons from '98 even though luckily they weren't big. I want to be able to extend those and I want to pay attention to markets today to make sure that we don't get a big '98 that forces us then to learn the lesson, that we should have learned back in '98, to pay attention to markets, to realize the reliance on funding in these markets and to know who is holding the risk and keep the pulse on the markets for that risk.

John Weicher: Mike wanted to comment. Okay. Bert and then over here and then maybe it will time for lunch.

Bert Ely: Bert Ely again, this is a question for Dr. Yang and by the way Dr. Yang I thought your slides were great. In your- in that one bar chart you had- the BBB market going to CDO, then there was that little strip down at the bottom, the residuals which you said no one wanted to buy. Coming back to a point that I think Josh made, if no one wants to buy the BBB that are going into the CDO market, and if no one wants to buy that, then don't sell the stuff above it, but what about that bottom tranche, who is buying that stuff and someone -- Dr. Yang I believe -- made a reference to maybe the lenders are keeping that. Some of you may remember we had a bank failure five and a half years ago called Superior Bank that had retained a lot of that stuff. Keystone Bank, another very expensive failure. If we look at what's been going on in Puerto Rico in recent years with the banks down there. They are keeping this stuff. That is the really radioactive component of all this. My question for the panel is number one, who is actually holding those hot potatoes, radioactive potatoes today and number two, what happens when those folks pull back from the market or are they possibly pulling back now?

Joe Mason: Those typically aren't saleable and those will reside back at the bank or the issuer and that's why Dr. Yang did raise the specter of Basel II capitalizing those at you know 125 and well you have to ask you know is that an appropriate level for toxic waste? The regulators did demand a 1 for 1 capital ratio on those a while back, again we don't know but it seems like on my research on the banking sector we're arbitraging up the capital ratio relative to risk.

Bert Ely: The impression I have is from looking at the call report data that that stuff has been pushed out of the FDIC insured banks and thrifts to great extent in light of the failures. They put the high capital ratios on but effectively that's driven the stuff off of the balance sheet because of the capital penalty. So again who owns that stuff and what's the appetite in that market? How liquid is the market for that kind of stuff? Because if that dries up then you don't even get the BBB tranches that the CDOs are buying out there in the marketplace.

Josh Rosner: There's clearly no answer to that or no way to tell who owns it. Debbie Lucas had done actually a pretty good study on exactly that question, who owns the toxic waste. But anecdotally I think that it is actually throughout my client base -- throughout the investment world, the hedge funds own it, those investors who are not necessary tied to charter in terms of investment grade. It is in certain pockets, not broadly. It's been suggested to me, and I don't have this confirmed but you know someone in this room probably would know, that when Amaranth blew up, among the first assets that they were able to liquidate were their equity tranches of CDOS, and that raises all sorts of questions because thankfully they were able to liquidate those in strong markets, and the question then again becomes, what would have happened were we actually in a very different market when they were forced to try and sell those positions.

John Weicher: Tyler, did you want to comment here? The question was originally to you.

Tyler Yang: Okay, when I was in Freddie Mac I was in charge of the credit portfolio risk management and during that period we studied extensively all kinds of credit enhancements we could use, to use as a capital replacement or to use as an enhancement to sell off some of our securities. During that period we issued one particular issue which is probably the pioneer of the synthetic CDO you see today, which was called MODERNS, that was issued in 1998. During that tranche sale, we do have a tranche- it is not rated- and that tranche was selling for a premium of 20% above LIBOR. And there were people buying that. Some of them are European hedge funds and some of them are the domestic companies that originally would invest in this as their first loss position, for example, a private mortgage insurance company. They are familiar with this kind of first loss position so they are willing to invest in it as long as that yield is high enough for them to benefit and shortly after that, I understand that the spread for this non- rated tranche has risen to 30 to 40%. So that, as long as the issuer is willing to pay that price there are buyers willing to take, so the question now we come back to is what the alternative cost for the lender if they retain it in the portfolio and fund it as an equity or capital by themselves, which one is more efficient for them to manage these.

John Weicher: I know we can go on for a while but we've been going on for a while. The lady in about the 7th row has had her hand up rather patiently.

Patrice Hill, Washington Times: I guess I'm not real clear on where you all feel we are in this process. You've had a number of these bankruptcies of the sub prime lenders, the New Century on Friday and HSBC has come out with admitting some problems and I think you mentioned that the credit spread is now much wider for the subprime loans. Are we at the beginning of a kind of shock as you've described it and even if not, has the increase in spread started to affect some subprime borrowers who seem pretty much unable to pay much higher interest rates, otherwise they wouldn't be taking out the kind of exotic loans that they are.

Mike Fratantoni: Let me start with our forecasts. We see similar to what John mentioned, home price growth in the 1 to 3% range over the next couple of years, with interest rates basically being flat where they are. We had 4 ¼ percentage point increase in short term rates coming from the Fed from 2004 to 2006 and that increase is working its way through the economy, a slow down in the housing market, we've seen this increase in delinquencies and we are thinking in about the middle of 2007 things will level out. Just remembering that we were starting from a very low starting point in 2005 with such a strong housing market, so that's how we see it evolving. We think right now that spreads are probably overestimating the risk because we've got all this repeatedly bad news about increases in delinquencies period after period. Once that levels out, we think spreads will return -- again we don't know what the equilibrium is, but spreads will probably come down some. We are seeing some subprime failures. We are seeing that some of the larger institutions have increased their loss reserve. We think there is going to be a repositioning, but then the market will level out.

John Weicher: Thank you. I'd like to call this very stimulating and lively discussion to a halt. I want to thank our panel for some interesting presentations and some interesting discussion. I'd like to thank you all for coming and for raising significant issues. I would like to thank Ioannis Saratsis and Phil Ross at Hudson for making the arrangements. Lunch is served in the back and I'm sure we will have plenty of time for one-on-one discussion over lunch, especially perhaps on the subject of loss mitigation. Thank you all very much for coming this morning.

[end]