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Session 151TS
Introduction To Securitized Assets

Track: Investment

Moderator: DAVID N. INGRAM

Instructors: BRIAN C. TRUST
KAMEL BAZIZI†

Summary: Securitized assets have existed since the introduction of collateralized mortgage obligations (CMOs) in 1983. Mortgage-backed securities (MBS) and various types of asset-backed securities (ABS) now provide a myriad of choices for terms and characteristics. New types of ABS are developed every year, some of them created by insurance companies based on liability cash flows. This session gives an overview of the types of securitized assets, the similarities and differences, and the risks and rewards of the various choices.

Attendees will view the construction of a simple CMO using a hypothetical mortgage portfolio to demonstrate the basic structure used in the marketplace and to illustrate the vocabulary used to describe these investments. This session also uses real life examples to demonstrate the more complex collateral types and structures and the risks and rewards of these financial instruments.

At the conclusion of this session, attendees learn:

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† Mr. Kamel Bazizi, not a member of the sponsoring organizations, has a Ph.D and is vice president-Quantitive Research and Consulting with CMS BondEdge in New York, New York.

Note: The chart(s) referred to in the text can be found at the end of the manuscript.

- *What a tranche is and the most common tranche types, such as principle of amortization classes (PACs), sequentials, interest only (IO) and principle only (PO)*
- *The terms used to describe the cash flow characteristics, such as prepayment speed assumption (PSA), conditional prepayment rate (CPR) and weighted average coupon (WAC).*
- *How to evaluate the applicability of CMOs and ABSs to an insurance product investment portfolio*
- *How IOs and POs were misunderstood and misused in the early 1900s*
- *The difference between yield and return for MBSs*
- *Types of ABSs*
- *The types of models and assumptions needed to evaluate the risks of securitized assets*
- *A framework for analyzing the suitability of any type of ABS*
- *Liquidity of different types of securitized assets*

MR. DAVID N. INGRAM: We have two speakers who will be teaching the basics of Asset Backed Securities. Kamel Bazizi who works for CMS BondEdge and is a CFA and Brian Trust who works for Conning Asset Management where he is responsible for providing asset/liability and integrated risk management advisory services to life insurance companies. Prior to joining Conning, Mr. Trust was senior vice-president within Swiss Re Investors' asset/liability management unit. Mr. Trust's experience of over 18 years includes development, implementation, and maintenance of asset/liability models used for strategic investment decisions, product design, creating strategy, cash-flow testing, and budgeting for life insurance companies. He received his B.S. in mathematics from Lebanon Valley College and is a fellow of the Society of Actuaries and a chartered financial analyst (CFA).

MR. KAMEL BAZIZI: The topic of this particular presentation will be collateralized mortgage obligations (CMOs). I will first start with an overview of the CMO market and how CMOs were introduced into the market. And then I will talk about the various different CMO tranches and the different collaterals that back CMOs. I will then discuss static risk measures versus option-adjusted spread (OAS) risk measures, namely, durations and convexities of the different bonds. I will then address some prepayment modeling issues. And, finally, I will discuss an example of the CMO where I will show the performance of the planned amortization class (PAC), which is a fairly stable bond, versus the performance of a more volatile bond, such as a support tranche.

The mortgage market has grown from $1 trillion in 1980 to over $5 trillion today, and about 25 percent of that is in the CMO form, which is approximately $1.2 trillion. The mortgage market first took off in 1980, but fixed income investors were very unhappy with the investment characteristics of the mortgage collateral. Why? It is because the durations of the mortgage collateral could be too long or too short to match the duration of their liabilities. The convexity of the collateral can be so high as to make their yields too low, or the convexity could be so low as to make the risk unacceptable. To remedy the situation and provide a wider range of durations and convexities to make a wider range of investors happy, the cash flows from the mortgage collateral have been reengineered in the form of CMOs. That was the birth of CMOs.

In fact, Freddie Mac issued the first CMO in 1983, which was a fairly simple structured CMO. Real estate mortgage investment conduit (REMIC) structures came a little bit later. By the way REMIC structures are similar to CMO structures except for some regulatory differences. As I pointed out, there are currently about $1.2 trillion of outstanding CMOs, and about $700 billion are issued by Fannie Mae, Freddie Mac, and Ginnie Mae agencies. The remaining $500 billion are issued by private entities.

What is a tranche? A tranche is actually a French word for a slice. Basically the cash flows from the mortgage collateral are sliced into different bonds with different durations and convexities, and each bond is called a tranche. There may be various and very complex CMO structures out there to a point that they are even intimidating. However, all the structures are actually based on some very simple structures. I will name five of them. The simplest structures are the sequential structures. Second is an accretion directed (AD) bond. The third one is a planned amortization class (PAC) and a support tranche. Fourth, I would say, is an interest-only/principle-only (IO/PO) pair. The fifth structure is a floaters/inverse floaters. These go in pairs. And I'd like to say a word on each different structure.

As I mentioned, the sequential structure is basically the simplest form of CMO structure. In this structure we create bonds with increasing maturities. How do we accomplish that? We find the earliest cash flows from the mortgage collateral to the shortest duration bonds. And why does one want to do that? That way you provide a wider range of durations that would appeal to different investors. For instance, the short-duration bonds typically appeal to banks. The intermediate bonds would appeal to investment managers. And the long-duration bonds typically appeal to insurance companies. What is a an accretion directed (AD) bond, which is the second structure I pointed out? Instead of paying interest to this bond, that payment is being directed to the shorter-duration bonds to make them even shorter. In that way the AD bond becomes a longer bond. So basically this structure allows you to create shorter- or longer-duration bonds. Remember, the whole idea of reengineering the mortgage cash flows into CMOs is to create bonds with various durations and maturities. So these are various techniques that allow one to provide exactly that.

The third structure I want to talk about is the PAC and the support bond. This structure pays up according to a predetermined schedule, and, therefore, when prepayments pick up, the excess payment goes to the support tranche. Basically this structure provides a prepayment protection to this PAC bond at the expense of the support tranche. And, again, in this structure what one does is shift the prepayment risk from the PAC bond to the support bond. Two different bonds with different risk or negative convexity characteristics can be created by having a PAC with a more stable structure and fairly modest convexity, and shifting all the negative convexity into the support tranche.

Another structure I mentioned is an IO/PO. Under this structure you slice the cash flows into interest only and call them IOs and principal only, and they are POs. It turns out that IOs, in fact, have negative durations. So, we just invented a bond with a negative duration that would appeal a certain type of investors. On the other hand the PO turns out to have a highly positive convexity. Again we turned mortgages with negative convexities into a bond that has a highly positive convexity. By the way POs with a highly positive convexity usually appeal to mortgage services that use them to hedge their service in portfolios.

The last structure I want to talk about is the floater/inverse floater structure. Typically a support tranche, as I said earlier, is an unstable bond, and, therefore, one way of taking an unstable bond and making some bonds that have more price stability would be to turn them into a floater/inverse floater. As you may know, a floater bond has more price stability and very short duration. So all the risk from the support tranche basically is diverted into the inverse floater. And, again, why would anyone invest in an inverse floater? It has very high negative convexity and high risk, but it offers a very handsome yield. So for people who know how to hedge the risk in these instruments and use them to enhance their yields, they are good investment vehicles.

The earlier tranches were fairly simple tranches, which included the first CMO deal that was structured by Freddie Mac in 1983. It was composed of three different sequential tranches, as the CMO structures evolved, more and more complex structures came along.

When mortgage lenders originate mortgages they have three options. They can retain loans for their portfolios, The second option is to sell the mortgages to agencies, such as Fannie Mae, Ginny Mae, and Freddie Mac, if the loans conform to requirements by these agencies. The agencies securitize these loans and issue what are called agency CMOs. If the loans do not conform to the agency requirements, then these lenders securitize the loans themselves and issue what are called private-label CMOs, also commonly known as whole-loan CMOs.

Agency CMOs are guaranteed by these agencies, but the whole-loan CMOs are not. In order to securitize them and sell them to investors, one has to obtain a certain form of credit enhancement. There are different types of credit enhancement techniques, such as senior/subordinated structuring, letter of credit, overcollaterization, and third party guarantee. The most popular one is the senior/subordinated structuring technique, in which a senior piece with a very high quality is created, and another subordinated piece with a lower quality is created. Typically the subordinated piece is the piece that absorbs any losses that are due to defaults.

Next I'm going to discuss some of the analytics underlying CMOs, and we'll talk about the static measures such as the yield modified duration, average life, and the dynamic measures which are typically obtain these in the option-adjusted spread (OAS) model, which is much more involved. Static measures typically are easier to compute because they depend only on market data, and they don't necessarily depend on other theoretical assumptions. Static measures are commonly used by traders for pricing and trading securities, and they also provide a common language for market participants.

However, those measures don't necessarily capture the callability of these mortgages. If you want to capture the callability features in mortgages you have to use dynamic measures typically obtained by using option-adjusted models that are much more involved.

Dynamic measures are model specifications, and implementation can have a large influence on the results you obtain. As was pointed out earlier, these are model-

dependent. And the model, or any OAS model, is typically based on using a term structure model or an interest rate model that is used to forecast future interest rates. To project prepayment cash flow you would need a prepayment model which is also different from, for instance, one dealer to another. Volatility assumptions are also an ingredient that goes into the calculation of OAS risk measures.

Volatility assumptions can be historical volatilities. They can be implied volatilities, and –somewhat, participants use the swap market to imply volatilities. Some others use the Treasury market to imply these volatilities. So these ingredients put together can give you these dynamic measures that are typically different from one dealer to another or one system to another.

Given the cash flow distribution rules for each tranche and a single prepayment assumption, typically called a base case prepayment, you can compute all the static risk measures for any tranche. Typically you would need either a spread over a Treasury curve, along with the cash flows, to compute a price and then compute the duration, average life, and yield. or you need the price for that, given the cash flows, and back out again the yield and the durations.

I think I talked about the use of the term structure model, prepayment model, and volatility assumptions to compute all the OAS risk measures. In order to compute an effective duration and convexity, one needs to use the OAS model to compute an OAS spread. Then, holding the OAS spread constant and shifting the yield curve up and down by a certain amount, typically to any five or 50 basis points, provides you with the price changes corresponding to these yield moves. Those price changes allow you to compute a duration and a convexity.

The same thing can be done in any scenario analysis of your choice. Any shape of the yield curve that you want to analyze can be put into a model like that to quantify the impact of these scenarios at the security level or at the portfolio level.

Remember by reengineering the cash flows from the mortgage collateral we didn't get to where it involved the prepayment risk completely. What we did was reallocate the prepayment risk into certain tranches. So for those tranches that

bear all the prepayment risk, they are very sensitive to prepayment assumptions. So the prepayment model that you use to quantify this prepayment for these particular tranches that are sensitive to prepayment is very important. And, as a matter of fact, typically even for the static case where interest rates are constant, you still need a single prepayment speed assumption (PSA), if you want to compute the static risk measures. So, whether you're in a static mode or in a dynamic mode, you would still need a prepayment model to compute both the static and dynamic risk measures.

Prepayment models are typically constructed using historical data, but, as you know, the future market environment is not guaranteed to perform like the past environment. The model derived from historical data requires regular calibration using market data form because you use the prepayment model to compute it. For instance, you use the prepayment model to compute the prices of these tranches, so looking at the market and seeing where those securities trade at, gives you an idea of how well your prepayment model that is derived from historical data performs in the market. If you notice, for instance, significant deviations in the prepayment model, then you know it's about time to address the prepayment model that has not accounted for new market dynamics.

A prepayment model is typically looked at in terms of two components, one that is not sensitive to interest rates and another that is. In the absence of any incentive, mortgages still prepay, and that component is typically referred to as the housing turnover of prepayment. The component that is sensitive to interest rates is the refinancing incentive or the burnout. Burnout is prepayment terminology that refers to mortgages that have already been exposed to refinance incentive, and that don't prepay as fast as they were originally prepaying when rates drop again. They tend to slow down as rates drop the second time, the third time, and so on. And two other factors affecting prepayment are simply seasoning which you may know as aging_. Seasoning refers to the fact that prepayments are initially low and then pick up as pools age until around 30 months. They plateau from there on, and, in fact, later start slowing down because of that burnout factor I just pointed out.

People use different measures for quantifying prepayment speeds, and the most common ones are single month mortality (SMM) measures. It's simply a monthly prepayment speed. If you take the SMM, and annualize it just like you would annualize a monthly yield into an annual yield, you would get a conditional prepayment rate (CPR), which is again simply an annualized prepayment speed. The PSA can be calculated by using the formula PSA=CPR x (100/6) x MAX(1, 30/m), where m is the age in months of the mortgage. It may not be obvious from the formula that beyond month thirty that curve is actually flat at six percent. At the flat part a six percent CPR is equal to 100 percent PSA, but between month zero and month 30 there's a curve there that is referred to as the PSA curve.

Now I'm going to turn to an example, a CMO example, which is run through the Bondedge system. This CMO deal was issued in May of 1999 and contains 39 tranches, but again I'll bet you if we looked at the different tranches, we're going to see that as complicated as this deal may look, it's composed of those basic structures that we talked about. It's going to have sequentials, PACs, IOs, POs, and floaters. Two different pools of Freddie Mac collateral back this deal: 6.5 and six percent pass-through pools. The seven percent support bond is the one bond that I would like to compare to show you why the performance of the support bond is not as stable as a PAC bond. Within that deal I picked two different bonds. One is a six percent PAC and –the other is a support bond.

Again using the Bondedge system and those two bonds, one can compute the one-year total rate of return as a function of interest rate changes. When interest rates change, prepayments change as well, and so Chart 1 the total rate of return in percent as a function of interest rate changes from minus 300 basis points to plus 300 basis points. The blue curve represents the total return of the support bond and the green curve represents the total return of the PAC bond. If you look at an even narrower range between minus 100 and plus 100, you can see that the PAC bond is a lot more stable over interest rate changes than the support bond. The PAC bond has a fairly stable return of around 5 percent as opposed to the return on the support bond. Depending on whether the rates are low or high, the support bond can have a return between zero and somewhere around 12 or 13 percent.

Chart 2 shows the same two bonds looking at the average life versus interest rate changes, instead of looking at the total return. The blue curve again represents the support bond, and the green curve is for the PAC. We can make the same observation. The average life of the PAC is fairly stable at around two years across interest rate changes, and the average life of the support bond can vary between almost zero at negative 300 bps, and 23 or 24 years at plus 300 bps. I didn't point out a catch with PACs. PACs do have some prepayment protection because whenever there are excess payments they go into the support tranche, which gets paid faster. However, a support tranche is typically 25 to 30 percent of the entire deal. Prepayments are very fast. The support tranche will disappear very quickly, and the PACs will no longer have any support and will have to eat whatever risk remains. This is kind of what you see when rates drop dramatically and the support pays off. Whatever risk there is beyond that point is going to go into the PAC. So, PAC has a certain protection but only in what is called the prepayment speed. There's a lower speed and a higher speed, typically of 150 to 250 PSA. Between those speeds the PAC is protected, but outside those speeds the PAC does carry some risk.

Chart 3 examines the effective duration of the same scenario. For people who are not familiar with effective duration, it simply tells you about the price sensitivity, or the particular tranche to interest rate changes. That's all it is. We can make a similar observation again. The effective duration of the PAC is fairly stable except for very low interest rates, but the effective duration of the support tranche is pretty wild and goes between zero and 10 years.

The difference between the so-called price return comparison in Chart 4 and the total rate of return is that in the total rate of return the coupons are reinvested and, therefore, added into the return over a certain horizon. In the previously example it was one-year horizon. In this comparison, a price return is instantaneous. But, again, a similar observation can be made here to the fact that the support tranche is much more volatile than the PAC tranche.

Chart 5 shows convexity. The convexity simply captures the fact that the duration also changes across interest rate shifts. So the convexity' is basically the rate of

change or the duration as rates change. For these two bonds notice that the convexity is highest at negative 100 basis points. Again the convexity of the PAC is still only of the order of 0.5, and the convexity of the support is of the order of two, which is four times as much as the PAC convexity. But remember that in that region the PAC will also lose its prepayment protection.

MR. BRIAN C. TRUST: My role is to teach you about asset-backed securities. I'm going to cover several topics. First, what is an asset-backed security? I'm going to give you a couple definitions. Second, I'm going to talk about what kinds of collateral back asset-backed securities. Third, I'll give you some data on the size of the market , and it's become a pretty important market over the last several years. Fourth, I'm going to talk about why issuers actually issue asset-backed securities. Fifth, I'll talk about why insurance companies buy asset-backed securities. Sixth, I'll give you a list of the key kinds of risks that investors face when they enter into these asset-backed markets. The description of this session was that we were to give a framework for how you might decide whether or not asset-backed securities or securitized assets are good fits for insurance company liabilities, so seventh, I'm going to give you the framework of the rating agency . How do they evaluate asset backed securities? I think that'll give you a good feel for the kinds of things you need to look at when you're deciding whether or not to buy these things. Finally, if time permits, I'm going to talk about some of the modeling issues related to asset-backed securities.

First, what is an asset-backed security? When I started this I wasn't really quite clear on whether or not CMBSs or commercial mortgage-backed securities and residential mortgage-backed securities, should be included. Here in the U.S. the typical definition excludes residential and commercial mortgage-backed securities. Asset-backed securities are basically bonds backed by pools of various types of financial assets. The idea is that the bond, instead of being based on the creditworthiness of a corporation or a government, is based on the creditworthiness of a pool of assets. The performance of those underlying assets determines whether or not you're going to get your principal and interest back.

A key term that I need to define is securitization. Basically "securitization" is the process of creating these mortgage-backed and asset-backed securities where we're turning relatively illiquid assets into marketable securities that investors might be interested in buying. As Kamel discussed, when you're creating the CMOs, you're creating a range of securities. The idea behind creating CMOs was to take mortgage-backed pass-through cash flows that weren't quite as attractive to investors and by slicing and dicing and putting them together in different combinations, coming out with a more attractive package of cash flows that an investor's willing to pay more for. This whole field is known as structured finance and has developed over the last 20 to 25 years.

The first asset-backed deals followed the first CMO by only a couple years, with the first deal issued in in 1985. The first types of collateral were backed by computer leases and auto loans. Now, what kinds of assets go into these asset-backed securities? Hre I have given you some examples. As Dave said, over the last several years, more and more exotic deals have come out, but these are the old standbys of the asset-backed market.

First, are loans to consumers. These are credit cards, auto loans, home equity loans, student loans, and manufactured housing loans.

Credit card debt, are unsecured loans of Master Card, VISA, and private label (retailer) portfolios. Citibank and MBNA are by far the two largest issuers, but Discover and American Express are also big issuers.

Auto loans are loans to individuals to finance purchases of cars and trucks. Each of the Big Three automakers (Ford, DaimlerChrysler, and GM) has a very large, captive finance company that originates these loans, and they're among the largest issuers of auto loan asset-backed securities. Honda and Toyota also issue these loans.

Home equity loans are first or second mortgages. They can be a lot like mortgages where you borrow an amount upfront and then you have a scheduled repayment. Or, they can be open-ended like credit cards, in that you're given a line of credit

and you can borrow additional amounts in the future, while the payment terms are defined upfront. But, the actual cash flows on these loans are a little bit more unpredictable than on the typical first mortgage.

Student loans are loans to finance post-secondary education, such as college or graduate school. Sallie Mae is a typical issuer of student loans.

Manufactured housing or mobile home loans are secured loans that are used to finance the purchase of manufactured housing. Conseco' Finance has a really huge market share in that asset class.

The other major category of these asset-backed securities are those backed by commercial loans. These include dealer floor plans, equipment loans and leases, aircraft leases, collateralized bond and collateralized loan obligations, insurance premium receivables, stranded costs, and royalty bonds.

'Dealer floor plans are loans to car dealers to finance their inventory purchases. As the dealers are receiving new shipments of cars, while they're sitting on the lot they're paying interest, and usually that interest is paid to Ford, GM, and Chrysler who sent them the cars. These dealer floor plans are revolving-type loans that are turning over very quickly in that as soon as the car is sold, the loan' is paid off, and then the next car is brought in, and a new loan' is made.

Equipment loans and leases would be for heavy-duty equipment purchases, big purchases, –such as tractors and the type of equipment that Caterpillar and John Deere might sell.

Aircraft leases are leases on commercial aircraft. GPA Group, an Irish firm, is a common issuer. GE Capital also has a big leasing arm that does this type of deal.

The fourth category is collateralized bond and collateralized loan obligations. Backed by pools of bonds or pools of bank loans, these deals are issued mostly by asset managers and banks in attempts to either take advantage of arbitrage opportunities or to get bank loans off of balance sheets.

The last three categories are less familiar to me, but insurance premium receivables are loans to commercial borrowers to finance insurance premiums. Corporations typically back these.

Stranded costs bonds have grown a lot over the last few years. People that live in states where the electric utilities have been deregulated have an extra charge on their utility bills right now that are payable over the next several years to compensate the previous monopoly for all those costs that the utilities sunk over the years in building plants, dams, and nuclear plants. So, as part of the deregulation, the states allowed for them to collect some fees to recover that. Basically all the utilities have 'borrowed against the future cash flows of those stranded costs.

Finally, there are royalty bonds, in which advances are taken on future royalties. These are also called the David Bowie bond because David Bowie wasthe first musician to borrow against his record royalties. Anything that has expected future cash flows can be borrowed against. That's the idea behind asset-backed securities.

Chart 6 shows the size of this ABS market and how it compares to the total debt market. 'This market is the same size as the CMO market, at $1.2 trillion. The credit cards are the most mature market.

The asset-backed securities market has grown since 1996. At the end of 1996 this market was a $400 billion market. The market has tripled since then, for a 27.4 percent annualized growth rate, whereas the public and private debt markets' have only grown at an 8.8 percent rate. So, asset-backed securities have grown from 3.3 percent of the market to 6.8 percent of the market, which is why this is a pretty important subject for actuaries to start to understand. These are going to grow to be a bigger part of your portfolios.

Collateralized bond obligations (CBO) and collateralized loan obligations (CLO) growth rates are amazing. At the end of '96 there was only $1.4 billion outstanding. That's grown to $150 billion, fourth place behind credit cards, home equity loans, and auto loans, in just 4 ½ years. That market took off in 1997 and 1998 as a lot of

asset managers originated CBOs backed by high yield bonds. Unfortunately, you may have already heard a lot about them in the news recently, and you may hear more in the future as a lot of those deals are blowing up as the high yield market has not performed very well over the last several years.

As for types of investors, banks and money managers bought about two-thirds of the supply between 1999 and 2000. Governments and corporations each purchased about 11 percent of the asset-backed securities, and insurance companies purchased about 10 percent of new issuance over that time horizon.

I wanted to gather some data on how life insurance companies are investing in these, so I found a recent study by ACLI. The ACLI performs a lot of surveys of companies. Not that many companies participate, but I think the figures in Table 1 seem to be taken from a pretty representative sample, with 30 companies representing 48 percent of the industry's assets. As of June 30, 2001, these 30 companies had about 8.6 percent of their bond investments in asset-backed securities split across the different asset classes. About 80 percent of these investments are NAIC Class 1 which is AAA through A. Class 2 is about 16.5 percent, which are the BBB investments. The high yield group, which are Class 3 through 6, or BB and below, represented about 3.4 percent. There is a lower average quality on CBOs and CLOs than on home equity loans and manufactured housing and all the other categories, but that's the nature of the CBO market, with lower rated deals.'

Table 1

Life Insurer ABS Investments

Distribution of ABS:

	% of Bonds	% of ABS
Asset Backed Securities - Total	8.6%	100.0%
Home Equity Loans & Manufactured Housing	2.7%	30.9%
Auto Loans & Credit Cards	2.0%	22.7%
CBO's & CLO's	1.5%	16.9%
Other ABS	2.5%	29.5%

NAIC Ratings:

	Class 1	Class 2	Class 3 to 6
Asset Backed Securities - Total	80.1%	16.5%	3.4%
Home Equity Loans & Manufactured Housing	86.3%	10.1%	3.6%
Auto Loans & Credit Cards	79.1%	19.1%	1.7%
CBO's & CLO's	65.0%	29.6%	5.4%
Other ABS	82.7%	13.9%	3.5%

Legal Status:

	Public	144A	Private
Asset Backed Securities - Total	60.5%	25.6%	13.9%
Home Equity Loans & Manufactured Housing	88.8%	7.1%	4.1%
Auto Loans & Credit Cards	67.5%	24.6%	7.9%
CBO's & CLO's	9.1%	50.6%	40.2%
Other ABS	54.6%	31.6%	13.8%

Source: ACLI's June 30, 2001 Invested Assets Portfolio Profile Survey
- 30 participating companies representing 48% of industry assets

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Legal status shows us if it is a public or private placement. The life companies had about 60 percent of their asset-backed securities in publicly-issued asset-backed securities, and 25 percent issued in what's called the 144(a) market which isn't completely public but isn't completely private either. This market lies between the public and private markets. The true private placements are about 14 percent. Here you can see that CBOs and CLOs are rarely issued in the public markets. Most of them are issued as either 144(a)'s or private placements.

Why do issuers issue asset-backed securities? For banks, a primary reason they issue these asset-backed securities is to basically get to remove all these assets from the balance sheet. If a bank is issuing credit cards and putting its credit card loans into a pool to be sold to the markets, the credit card loans will be taken off their balance sheet. What that does is reduce their required capital, or in other words, the bank equivalent of risk-based capital (RBC) would be reduced. Insurance companies, as Dave mentioned, are doing this kind of thing, too, in order to reduce required capital. This secured borrowing provides an additional source of funding. The more sources of funding that a company can come up with, the more likely that

they will be able to lower their overall borrowing costs, resulting in an overall lower cost of capital to the company.

The companies that sell these asset-backed securities or sell the assets that go into them typically retain the right to service the assets. So they do continue to collect servicing fees. So, the assets are taken off the balance sheet, but they can continue to collect income. That's a key incentive to do this. If it's done right, and if you follow Financial Accounting Standard (FAS) 140, you can set these up so that you can realize an accounting gain on sale. So that gain wi'll flow through your income statement immediatley. But they need to be set up correctly, so that you don't have to pay taxes on that capital gain. So they're typically set up as an accounting gain on sale, but for tax purposes you're trying to make it look like it's still debt so that you "pay as you go" for tax purposes.

Another, more qualitative reason is that it's a way of improving asset/liability management in a couple ways. This is a way of financing assets on your balance sheet with a very matched liability. You're perfectly matching the liability by passing all the cash flow right on through to the investors. From an asset/liability management standpoint these securities can also be used to reduce concentrations of risk. So if a bank felt it was over-exposed to a particular type of risk, it could use an asset-backed transaction to reduce that pocket of risk. Because there's a lot of scrutiny of these deals, it also imposes underwriting discipline on companies, requiring them to put their underwriting process of rating agencies and investors. 'Finally, it's not as common, but it also would offer a business exit strategy. A company that wants to get out of a particular line of business could use an asset-backed security to get rid of that risk if they can't find a buyer.

Why would we buy asset-backed securities? Well, a large percentage of asset-backed securities are very high credit quality. Based on statistics that I found, over 90 percent of the public issues are rated AAA by the rating agencies. That being said, they do offer a little bit more than the usual AAA corporate bond type yields. They offer an attractive yield with lower prepayment risk than the CMOs that Kamel has talked about. They have lower prepayment risk because the types of loans that back these aren't as prepayment sensitive.

Because these assets are removed from the balance sheet and separated from the issuer, if that issuer or that seller was downgraded, these assets are set up in such a way that it's 'relatively unlikely that the pool will be downgraded, unless there's a lot of trouble brewing there. For example, if the company that sells the loans is also the servicer and they're having to lay off people or if people are distracted from their jobs because their company' is going out of business, servicing may suffer. So, collections on overdue loans may not turn out as well, negatively impacting the investors.

ABS area good diversifying asset class because they have different types of prepayment risks. Prepayments are more related to defaults on consumer loans rather than to changes in interest rates. It's hard for an insurance company to get this type of risk directly, but by letting the banks do the origination we can get exposure to the consumer loan market. The more developed sectors like credit cards and auto loans have been around for a long time. They're very well established. The data's there. Everybody has a good understanding. Therefore, they offer excellent liquidity. They may be considered substitutes for a corporate bond. As with the CMOs, there are deals that can be structured with different tranches, as Kamel described, and so you can also meet a wide range of maturity needs through the asset-backed securities market.

Chart 8 compares different types of asset-backed securities. Home equity loans and manufactured housing loans are up at the top. These are spreads to the swap curve, not the Treasury rates. Keep in mind that swap rates are not risk-free rates. Credit cards and auto loans only achieve 10 basis points of spread, but that's 10 basis points above what swap spreads are. Auto loans and credit cards have much more stable and predictable cash flows. That's why the spreads would be much lower on those. Home equity loans and manufactured housing have mortgage-like characteristics so there's more prepayment risk. Therefore, investors want to be compensated with higher spreads.

In Chart 8 I've compared speads for asset-backed securities to agencies, mortgage-backed securities, mortgage-backed pass-throughs, and A-rated corporates. When I first started learning about asset-backed securities about five years ago, we always

used as a "rule-of-thumb" that asset-backed securities had triple-A quality with single-Atype spreads. As this market has grown, spreads have tightened considerably. So I'd say now you probably get a spread that's inside of single A's and outside of agencies. The asset-backed spreads are also comparable to the mortgage-backed spreads that you get. These are option-adjusted spreads.''''

What are the key kinds of risk that investors face? As with any fixed-income security, there' is the interest rate risk. This risk is defined as the change in price because of changes in interest rates or spreads. The risk measure that you would use to capture that risk would be the duration measures that Kamel talked about. As opposed to the mortgage-backed securities, the CMOs are backed by agency type collateral which has a pretty strong guarantee. Most of these asset-backed securities don't have quite as strong a guarantee. There are AAA-rated tranches that have protection, but this protection is not derived from an external party. It's mostly because of credit enhancement. The risk is that you don't get all of your principal back because the underlying collateral has started to perform poorly. If borrowers fail to make their payments, somebody has to lose, and that's the investors. Prepayment risk is the risk that the investor gets his or her money back early and has to reinvest the money at lower interest rates. So uncertainty of timing of cash flow is the prepayment risk.'

Liquidity risk is the risk that you can't sell the asset when you need to without having to accept a low price just to get rid of it. A lot of the more developed types of asset-backed classes are very liquid. People are willing to buy them because there's a lot of data available, andthere's a lot of comfort after years of investing. For some of these things, like the David Bowie bonds, there's not a lot of data to say what the experience is going to be. Those are much less liquid. Those type of deals would be issuedin the private placement markets because if you're buying them, you're probably going to be stuck with them until the maturity date.

Event risk occurs if the servicer is having problems. For example, event risk would be if the servicer is downgraded. There's a possibility, although it's not a very strong possibility that, if the servicer or credit enhancement provider is downgraded, then there could be a downgrade to the deal you've purchased.

Finally, there are a lot of complicated legal and tax issues that are beyond this discussion, but if there were unexpected rulings in a bankruptcy situation or unexpected tax rulings, that could also affect the asset-backed investor.

Now I would like to discuss the framework for rating these securities. I've broken the process into six categories -- collateral characteristics, analysis of credit enhancement, analysis of the cash-flow structure, cash-flow stress testing, legal and tax issues, and seller and servicer risk. I'm going to go through each of these briefly, starting with collateral characteristics. If you want to get a rating, the rating agencies expect you to be able to provide a lot of historical data. Three to five years of data must be provided on things like the prepayments and gross portfolio yield.

The gross portfolio yield is a historical record of how the average credit card rate has evolved for that issuer. More importantly, the rating agencies want information on the default loss and charge-off experience. Charge-off is the practice of writing off a loan once it's become delinquent or it goes into default. The servicer then has to go out and try to either recover the asset or try to recover something in a bankruptcy court, but the charge-off is the result of the losses. The rating agencies are interested not only in what the average experience has been, they're also interested in seeing how variable that experience has been so that they can define stress tests.

The most important topic here that I'm going to cover is credit enhancement. Kamel mentioned it briefly, but it's much more important for asset-backed securities. The goal of credit enhancement is to protect investors from the default losses on the underlying collateral. It's necessary in order to get a rating on the security that's higher than that of the seller's unsecured debt and the underlying collateral. Without credit enhancement most of the types of loans that would back these would not be of AAA quality. They would be BBB or lower quality loans. But through credit enhancement certain tranches of the deal can achieve higher ratings. The issuer will select the types of enhancements. I'll tell you the types of enhancements. The issuer selects the types based on a cost/benefit analysis, but

the amount of enhancement is determined based on rules set by the rating agencies for how much protection they require in order to get a AAA rating. Excess spread is the first source of credit enhancement for any asset-backed deal. It's defined as the interest payments and finance charges received on the collateral less coupons that have to go out to bond holders and servicing fees that have to be paid to the servicer. Finally, this excess spread is used to absorb default losses. Excess spread is calculated every month for deals, and one of two things typically happens. Either that excess spread can be placed in a reserve account to cover future losses that aren't covered in future months, or on other deals it may be released to the seller as income.

Types of credit enhancement can be broken up into internal and external types. Internal types would include the senior /ubordinated structure that Kamel mentioned, in which there's a senior tranche that gets first priority at all of the principal as it is received. The subordinated tranches have to absorb losses first. So as experience deteriorates, the senior tranches get first priority. Over-collateralization is another credit enhancement, in which the issuer puts in more collateral so that the pool can absorb some losses before the investors are affected.

The last three internal types are related to the excess spread. An "excess spread account" is the reserve account that's built up out of excess spread. In a "cash reserve account" some seed money would be placed into the account. An excess spread account would typically start at zero because at time zero there's nothing built up, but in order to cover losses in the early months it may be necessary for the issuer to put some cash in a reserve account. A "collateral invested amount" would be like these except that it's actually a security sold to an investor where the investor receives a coupon for a period of time, but all losses go against this tranche, and at the end of the deal they may or may not get their money back.

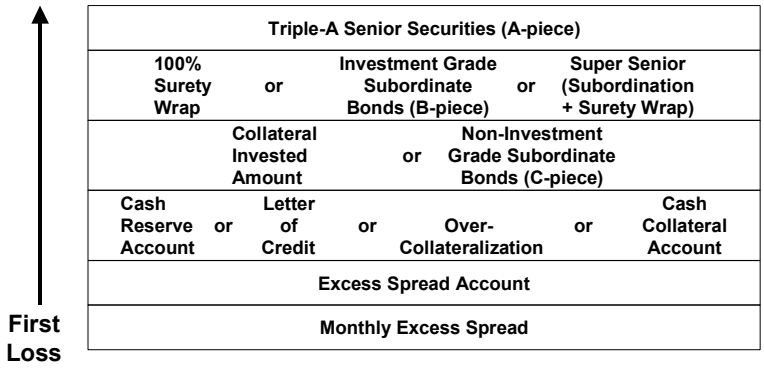
On the external side of credit enhancements is the surety wrap. This is a financial guarantee issued by a monoline property casualty company like Municipal Bond Investors Assurance (MBIA) where they ensure timely payment of principal and timely payment of interest in exchange for collecting a premium. A letter of credit is another external credit enhancement, which is the bank version of that. In this

credit enhancement the bank collects a fee and agrees to make up losses up to a certain amount, if losses exceed some other threshold. Another one is a cash collateral account. This is a bank loan like the cash reserve account where the issuer had to put the money. Here a bank loan is taken. So that's why it would go in the external category, because it's money from the bank. Excess spread goes to pay back that bank loan in the early days, but it's an initial fund. A final external credit enhancement is the corporate guarantee, which used to be more common. It's not as common because if the corporation that provides the guarantee gets downgraded, it automatically will result in the asset-backed tranche being downgraded. It might be more of an implicit type of guarantee in that the seller could agree to put more collateral in down the road, or, if things are going poorly, they may agree to buy back some of the defaulted loans or replace some of those loans, but that's becoming more and more difficult with some of the accounting rules.

Table 2 is not really a typical structure in that it's got every possible type of credit enhancement that I've discussed, but it gives you the idea. First, the monthly excess spread covers losses. We work our way up from the bottom. If monthly excess spread is not enough to cover defaults, the excess spread account would be next, and so on up the chain. The last losses would be allocated to the senior tranches, which areusually called the A Pieces. You may hear the terms A Piece, B Piece, and C Piece. The A Piece is the senior tranche whilethe B Piece would be the subordinated. Even subordinated tranches can be investment-grade, if there ise enough additional protection at lower tiers.

Table 2

Credit Enhancement Structure



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The cash-flow structure is really just like that of a CMO. You need to understand how the principal and interest cash flows are going to be allocated to the different tranches. Also, how are default losses going to be allocated to the tranches? Deals may have provisions called "triggers", in which the cash-flow priorities can change. Things could be going along with one set of priorities, but if experience deteriorates on the underlying collateral, in order to protect the senior tranches the senior tranches may suddenly jump ahead of other tranches and start receiving all the of cash flow for a period of time. Those provisions are called trigger provisions. Other structural issues are fixed or floating coupons. I looked at some data that showed that during the first half of this year over 50 percent of all asset-backed securities were issued as floating rate securities. Another issue is amortizing versus revolving principal. With credit cards, there's no fixed prepayment schedule, but investors don't want all that uncertainty as to when they're going to get their cash flow back. So, revolving principal structures have developed in which during an initial period of time the principal that comes in goes to buy new principal or new loans, so you have revolving principal during this period, until some date that's specified. After that date all of the principal goes go to pay down the investors.

Another issue is pass-through versus multi-class structures. Multiclass is a CMO-type structure in which there are various tranches and principal do not go to everybody equally. Alternatively, a pass-through would be like a mortgage-backed pass-through. Some types of deals, mostly older deals, had that type of structure, but they're not very common anymore.

The final issue is stand-alone pool versus master trust. A stand-alone pool would be for auto loans where there's a specific list of loans that's established when the deal' is done, and those are the loans backing the deal. A master trust is more fluid. It's used with credit card deals. There's a really large pool that might actually be backing a large number of deals. All the credit card debt is going into one big pool. Everybody shares in the risk of that pool of collateral.

Another important topic is cash-flow stress testing. Rating agencies are looking for the doomsday scenario when they're setting these ratings. 'In order to give an AAA rating they're going to put the asset-backed securities through what they consider to be a worst-case scenario. This is done to demonstrate that under that scenario the security will still receive timely payment of interest and ultimate payment of principal before some specified date, which is known in the prospectus as the final maturity date. You'll usually see two maturity dates associated with asset-backed securities. You'll see a final maturity date, and you'll see an expected maturity date. The expected maturity date is what investors usually look at. The final maturity date may be several years after the expected maturity date.

There are also legal and tax issues. I'm not an expert here. I'll just hit the two key concepts. The whole goal of the securitization process is to isolate these assets from the credit risk of the seller. That's what enables the rating agency to give this pool of assets and the securities a separate rating from the rating of the issuer.

As for tax issues, the idea is making sure that investors are protected from adverse tax consequences, like such as double taxation if the trust or the entity were set up incorrectly. It could be taxed like a corporation, and then the interest received by the investors would be taxed again.

Chart 9 is a diagram that I put together showing that ABS deals usually are done through a two-step process. This is necessary sometimes for legal reasons, other times just for pure accounting reasons. There's a sellerthat transfers assets to a special purpose entity (SPE) that is considered to be "bankruptcy remote", which is a legal term. That bankruptcy remote SPE transfers the assets on to a trust that then issues the securities. The purpose is to set up a bankruptcy firewall between the pool of assets and the issuer, or the seller.

There are risks associated with the seller and servicer. The rating agencies spend a lot of time evaluating the underwriting policies and the marketing strategy of the seller so that they can answer several important questionsAre they good at attracting quality customers? Are they making changes to their procedures? Do they have good procedures for collecting delinquent loans? How experienced is management? How strong is the financial servicer? If you want to be a servicer, usually you have to get a rating.

I'm just going to quickly hit on some of the modeling issues because Kamel has already discussed prepayment risk. With prepayment risks, there are components that are sensitive to interest rates, and there are components that are not sensitive to interest rates. Similar to the mortgage-backed securities, there's a refinancing component. Refinancing is sensitive to interest rates. Simple turnover because of trading in a car or relocating would not be sensitive to interest rates. Now I will discuss the relative prepayment risks. There are typically very stable, predictable cash flows for a credit card pool. Auto loans also have very stable prepayment characteristics. Leases have low prepayment risk because they have prepayment penalties. Small business loans typically are lower-risk. Higher risk is associated with the more mortgage-related securities like home equity loans and manufactured housing loans.

Kamel already discussed CPR, so I'm not going to discuss that, but it becomes the basis for different prepayment terms that you'll find in the asset-backed market. Table 3 shows these in more detail.

Table 3

Prepayment Models

	Stands for:	Ramp * (months)	Stated as:	Initial CPR	Ultimate CPR	Used for:
PSA	Prepayment Standard Assumption Curve	30	100% PSA	0.2%	6.0%	MBS
HEP	Home Equity Prepayment Curve	10	20% HEP	2.0%	20.0%	Home Equity Loans
MHP	Manufactured Housing Prepayment Curve	24	100% MHP	3.7%	6.0%	Manufactured Housing
PPC	Prospectus Prepayment Curve	Varies	100% PPC	Deal-specific		Home Equity Loans
ABS	Absolute Prepayment Speed	None	1% ABS	Monthly prepayments = 1% of original balance		Auto Loans
MPR	Monthly Payment Rate	None	12% MPR	Total monthly P&I = 12% of prior month balance		Credit Cards

* "Ramp" is the number of months for prepayments to increase from the "Initial CPR" to the "Ultimate CPR"

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There are a number of prepayment drivers. Auto loans are not usually refinanced because, when you refinance an auto loan, you've got to refinance at used car loan rates, which are usually 2 or 3 percent higher than new car rates. So there's not much financial incentive. Also, if you have a pool with a lot of dealer incentive loans where people are paying 1.9 percent for five years, there's not a whole lot of incentive for people to prepay those loans either. So auto loans are more stable.

Manufactured housing and home equity loans are more mortgage-like. Mobile homes are a depreciating asset in a lot of instances. So those are also more difficult to refinance because you may have a case where the value of the home is less than the outstanding loan or you may not have enough equity to get a new loan. Home equity loan prepayments are a little complicated to model because they're usually second in line behind a first mortgage, and when the first mortgage is prepaid the home equity loan automatically has to be prepaid by the borrower. So you have to

know not just about the home equity loan, but you also have to know about what's going on with the first mortgage loan.

Where default losses are concerned, auto loans have very low default rates because people still need their car. They have high recovery rates because it's easy to repossess the car if the borrower doesn't' make the payments.

Credit cards have very high default rates and very low recovery rates because this is unsecured debt, and if the borrower files for bankruptcy, the credit card company is the last to get paid.

Home equity loans have very low default rates because the penalty is losing your home. They usually have very high recovery rates, except for some of the newer types of products where home equity loan lenders are letting people borrow up to 125 percent of the value of their home, which can lead to problems. In an economic downturn declines in property values could also increase losses.

Finally there are a few factors that affect liquidity risk. The type of collateral is one of them. The longer the collateral has been around, the more people understand it, the more predictable the cash flows will be, then the more liquid the deal will be. Sellers that have been around a while that have proven that they can provide the data, and that are regular issuers in the market, are also favored from a liquidity standpoint. The size of the deal is also important from a liquidity risk standpoint. Larger pools of assets that lead to larger deals provide more liquidity from the supply and demand side as well as from a diversification viewpoint.

Availability of information is another liquidity risk driver. As I said, if there's no information available, it's very difficult to get a price and it's very difficult to sell an asset-backed security. There have been a lot of players that have been in these markets over the last five years that are no longer in the markets. Many are finance companies that have gone out of business. As those players exit the market, the deals that they issued become "orphaned", and then the bonds are very difficult to sell.

Supply and demand issues also affect liquidity risk. There has been a lot of industry consolidation, so there are fewer issuers. This could be a bad thing, but it also could be a good thing because it provides bigger pools of assets, which are more liquid. As the number of investors buying asset-backed securities expands, and as more investors get comfortable with this asset class, there's more demand. In the last year, ERISA rules that had been limiting pension plans have been relaxed so that pension plans are permitted to buy more of the subordinate tranches that they couldn't buy in the past. Asset-backed securities are not widely included in the broad bond indices. '''As asset classes, asset-backed securities are not widely included in the big indices. There are some asset-backed securities in there, but due to liquidity constraints and other pricing issues and the fact that a lot of them are floating rate, there are all kinds of issues that cause these asset-backed securities to be excluded. Therefore, they are less liquid because index investors aren't interested in them.

Swiss Re's investment department uses a variety of data sources in order to evaluate asset-backed securities. I don't know all of the possible sources, but I found out about some. Intex Solutions is one of these sources. It is a software company that has a good system for evaluating asset-backed securities. Lewtan Technologies' ABSNet is an Internet-based data provider. Mostly you can get news and you can get some data, but there is no modeling capability on ABSNet. If you want to get information on the actual experience of the deals that you own, you can try to get in touch with the bank that's been trustee for the deals, and they'll give you access to their Web site where you can look up reports that will tell you about how the default experience and prepayment experience has been evolving. Bloomberg is another data source that has very limited information, except for information on credit card deals. We use Intex's tools for modeling cash flows, since this is the only system that actually allows us to play with the default rates and the default recovery. This is not as important for the AAA tranches where you're not exposed to the default risk, but it's much more critical to have that capability if you're buying the lower rated tranches. We also use yield book and, of course, CMS Bondedge, and we use Bloomberg sometimes for securities that are not available on any of those.

Finally, if you want to get more information, you can check out www.securitization.net, www.vinodkothari.com, www.absnet.net, or the book "Asset-Backed Securities," which is edited by Anand K. Bhattacharya and Frank J. Fabozzi and published by Frank J. Fabozzi Associates (1996). These are some of the resources that I used to get a lot of my information for this presentation. The book is a little outdated at this point, but it's the best and most up to date I could find.

MR. INGRAM: Brian, you alluded to the fact that some people had trouble with some CBOs, and the one deal earlier this year that I'm aware of is American Express having to write off $800 million because of CBOs that they had issued. Can anybody describe in more detail what the problem was there?

MR. TRUST: My understanding is that the American Express problem was a convergence of an accounting issue as well as markets being in disarray. Basically what changed was an accounting rule. An Emerging Issues Task Force (EITF) rule, EITF 99-20, has spelled out for companies that are reporting on a GAAP basis when they have to write down securities. American Express had a huge CBO portfolio for which they really hadn't had to mark down the value of their bonds. What happened was this rule came into effect, and they had to write down the value. The accounting issues on asset-backed securities and CMOs are covered by FAS 91 and EITF 99-20. You are required to take a prospective look at what the future cash flows are going to be for the security. If the sum of the future cash flows is less than the carrying value on those securities, you have to write them down. So American Express had a substantial one-time write-down to bring those all of their CBO's down to their true value that had been hidden in the book value accounting. The CBO markets have not been performing well. There are a lot of high yield bonds for which the values have fallen, and it's causing a lot of trauma.

MR. NEIL J. DAVIDSON: (American General) Can someone explain how FAS 91 works? My investment department just tells me when the yield on a portfolio goes down, that it was because of FAS 91.

MR. TRUST: FAS 91 is similar to FAS 97. When you buy an asset-backed or a mortgage-backed security, you have to calculate an initial book yield. That book

yield is used for calculating investment income for some period of time. However, when you set that security up you have a certain prepayment assumption. You calculate this book yield based on expected cash flows at the time of purchase. A few months down the road, or a few years down the road, some actual experience has occurred, and interest rates will have changed. So your expectation for cash flows beyond today will have changed. FAS 91 requires that you constantly true-upthe book value and book yield. Basically you go back to the purchase date and put in a new stream of cash flows. This new stream is the combination of actual historical cash flows up to today and your new guess for what future cash flows are going to be. Then you recalculate the internal rate of return (IRR) based on your original purchase price, which becomes the new book yield for future periods until you re-evaluate the security again. There's a constant unlocking like FAS 97. Your book value and your book yield are calculated for any security that has prepayment risk.

MR. DAVIDSON: How does this impact the determination of future yields.

MR. TRUST: With FAS 91 you can have a "catch-up". Unfortunately, you recalculate the IRR going back to the date that you bought the security. Once you have that new IRR, you jump forward to today and re-calculate the present value of all the future cash flows at that revised IRR, and that becomes your new book value today. You could have a lot of volatility because you have to catch up at that point based on the chang in book value from the last time you did your income statement to the next time you do your income statement. That change in book value is one of the components of your investment income's statutory income calculation. So you can end up with all kinds of volatility in the periods where FAS 91 adjustments are going on. I don't know how frequently your company does it, but the more often, the better. A lot of companies do their FAS 91 adjustment just once a year, though. So they're going along throughout the year under one set of assumptions, and then all of the sudden you see the big change in the book yield or you suddenly see a big jump in statutory investment income in the period. That is because of this one-time book value catch-up that had to occur. And then for future periods you use that IRR to calculate investment income, until the next time you do the FAS 91 adjustment.

MR. INGRAM: There is another analogy you can draw between some of the things we've discussed and some of the actuarial practices. You heard about PSAs, and when PSAs are used they'll be used in terms of multiples of a standardized curve. That's pretty much analogous to when you're pricing for mortality in an insurance product, and you're saying I'm using 75 percent of the Basic Table or something. The PSA curve is used in exactly the same fashion, and it's based on the same kind of thing. The curve that they use was originally developed by one of the agencies based on experience from a certain period of time.

Chart 1

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1-Year Total Return Comparison

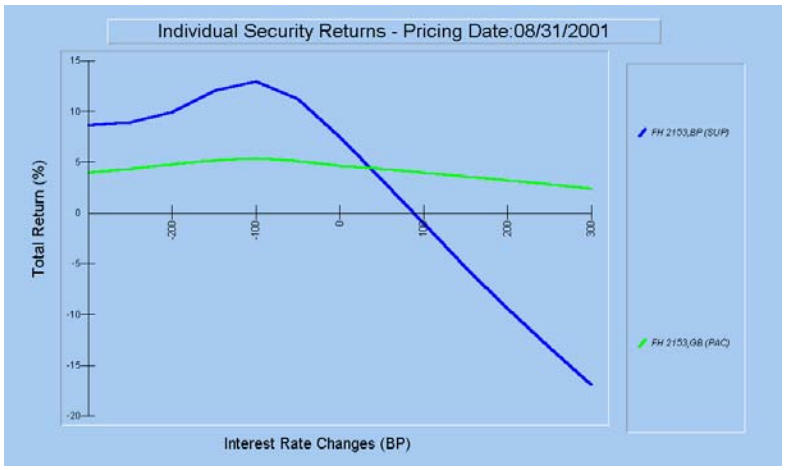

Chart 2

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Average Life Comparison

Chart 3

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Effective Duration Comparison

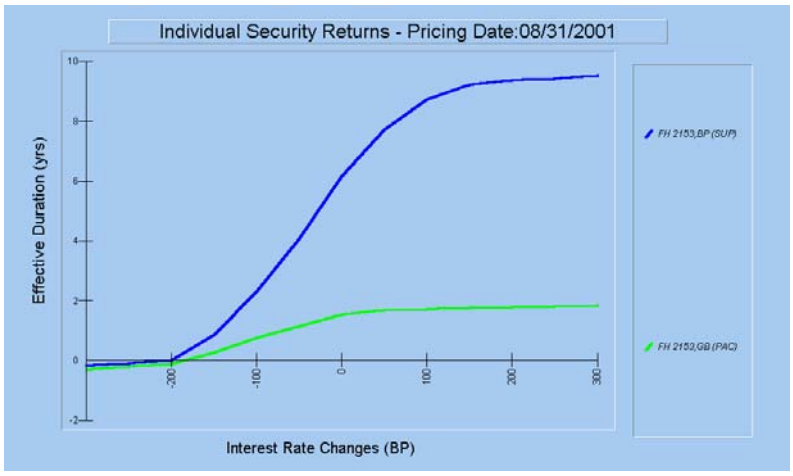

Chart 4

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Price Return Comparison

Chart 5

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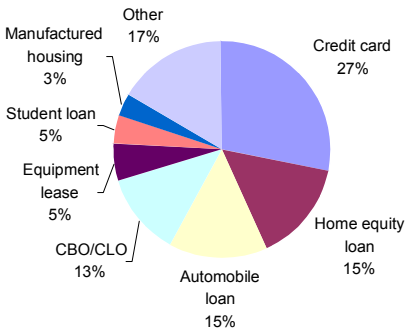
FINANCIAL TIMES

Convexity Comparison

Chart 6

Amount Outstanding at June 30, 2001

ABS Collateral Type	Total Amount Outstanding ($ billion)
Credit card	$ 339.1
Home equity loan	176.7
Automobile loan	174.5
CBO/CLO	151.6
Equipment lease	66.0
Student loan	54.5
Manufactured housing	40.4
Other	199.0
Total ABS outstanding	$ 1,201.8
Total public & private debt	$ 17,669.9
ABS as % of total debt	6.8%



Source: The Bond Market Association

Chart 7

ABS Sector Spreads

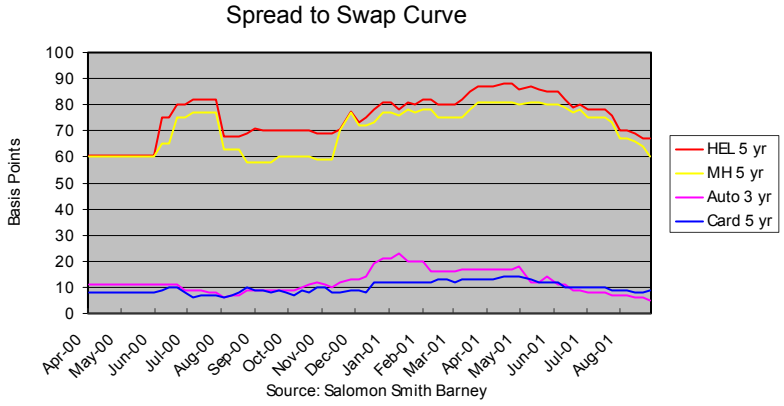


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Chart 8

ABS Spreads versus Other Assets

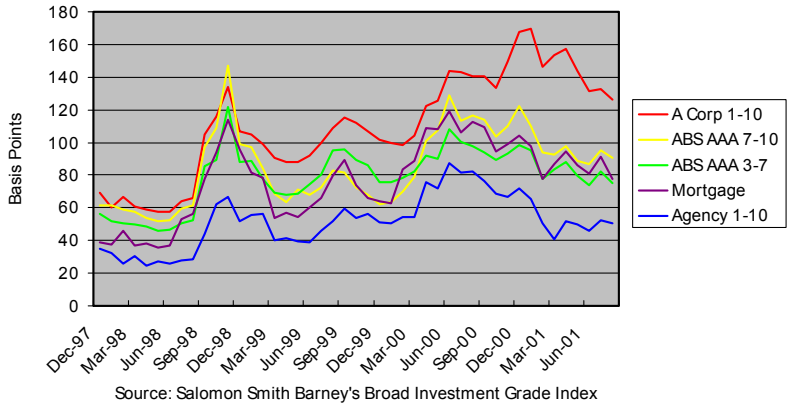

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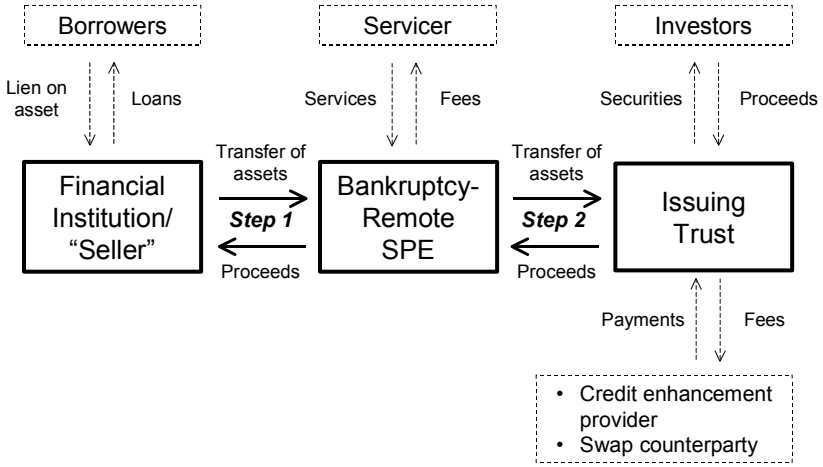
Chart 9

Two-Step Sale Process



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