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SECURITIZATION OF POLICY LOANS

Moderator: V. MICHAEL SHANTE
Panelists: P. DAVID FRANZETTA*
JAMES E. HOHMANN
JAMES A. TILLEY
Recorder: V. MICHAEL SHANTE

- What they are and their history
- Purposes and potential benefit
- Implementation
- Converting policyholder loans (PHLs) into marketable securities
  - -- Objectives and benefits of selling PHLs
  - -- Legal investment issues
  - -- Determining the market value of PHLs
- Establishing the actuarial principles
  - -- Selection of PHLs
  - -- Loan repayment decrements
- Financial structure of the transaction
  - -- Structuring the bonds
  - -- Maximum bond value
  - -- Redemption schedules
  - -- Structuring the equity
- Marketing the securities
  - -- S&P rating issues
  - -- Private placement of securities
  - -- Investment characteristics
  - -- Pricing considerations for the PHL bonds and equity
  - -- Institutional buyers

DR. V. MICHAEL SHANTE: Basically, securitization is a process whereby we convert assets into securities. In general, an asset is nothing more than a stream of future cash flows and a security is essentially a standardized bundle of future cash flows. By converting an asset into securities we can sell it very efficiently by placing the corresponding securities in the capital markets. In a more general sense, liabilities also represent a stream of future cash flows, with a "minor" difference that, compared to assets, they represent a stream of negative cash flows. Thus, at some point in time, I think we could also securitize and sell the liabilities.

The Prudential transaction was the first ever such transaction in many respects, and we will go into more details about it later. In this transaction we sold $619,060,301 face value of PHLs by securitizing them into $445,640,845 face amount of bonds and $10,802,059 of equity. Even by the Wall Street standards it was a very large transaction.

* Mr. Franzetta, not a member of the Society, is Vice President, Investment Management at The Prudential Insurance Company of America in Newark, New Jersey.

To help set the stage for presentations from various panelists, perhaps a brief overview of the securitization process will be helpful (and I will try not to take away any of the big thunders that all of the panelists have prepared for you). The process of securitization involves three major parties: First, there is the seller of assets or receivables. The second party, called an "Issuer," represents an intermediate step. It is an Issuer in the sense that it issues the securities. The Issuer often is a special purpose corporation or a trust set up to execute the transaction. Finally, the third party is the investor group who buys the securities. Basically, the Issuer raises cash by selling securities to investors and applies these funds to purchase assets from the seller and to fund various reserve accounts that may be necessary to make the transaction work.

David Franzetta will talk about the transaction from the seller's perspective. That is, why would an insurance company want to sell its portfolio of PHLs and how it would go about doing it. Jim Hohmann, being our resident actuarial expert, will talk about how the cash flows are generated from these assets by looking at the underlying lapse, mortality and voluntary prepayment rates. I will focus on the Issuer's perspective: How do we manufacture securites? How many? Of what kind? And in what structure? Finally, given these securities, Jim Tilley will describe how we sold them to the investors.

MR. P. DAVID FRANZETTA: I guess the best place to start is at the very beginning. In July 1985, The Prudential Insurance Company of America was approached by Prudential-Bache Capital Funding with an offer to help us analyze the possibilities of securitizing some portion of The Prudential's PHL portfolio. At that time, many types of assets had been securitized. In case you are unfamiliar with the term, securitization is simply the conversion of a stream of cash flows into standardized, unitized securities for efficient placement in the capital markets. Prudential-Bache suggested that since mortgages, computer leases, auto loans, and credit card receivables had been subjects of securitization, we should consider applying the principles to PHLs.

The idea was immediately appealing. To deal with the many aspects of such a complex transaction, we put together a working group with representatives from the various areas of our company which would have a stake in the deal. The working group grew over time to include members from the following: the Accounting, Auditing, and Tax divisions of our Comptroller's Department; Portfolio Management, Treasurer's Staff, and Cash Management groups from the Investment area; Actuarial and Product Development; Legal Counsel -- including Insurance, Investment, and Tax Counsel; and the Systems and Programming units from Insurance Administration.

Our first task was to determine the potential benefits of a PHL securitization. Looking at The Prudential's portfolio of PHLs -- over $5.5 billion in total, with almost $4 billion of those loans earning only 5% annual interest, which was well below The Prudential's acquisition rates on new investments -- the group saw the following potential benefits:

1. Enhancing portfolio yields by redeploying sales proceeds into higher-yielding investments;
2. Increasing liquidity, thereby getting positioned to increase yield in a rising rate environment, as well as to realize trading gains;
3. Sheltering gains from other sources by generation of tax losses on the sale of low coupon PHLs at a price below par;

4. Reducing the equity or "add on" tax through the reduction of surplus, corresponding to book losses recognized on the sale of the low coupon PHLs at high market interest rates; and
5. Generating servicing fee income over the life of the transaction, sufficient to cover not only the marginal cost of the transaction but also administrative expenses and overhead normally associated with PHLs, plus a contribution to surplus.

The transaction, in its simplest form, called for us to sell PHLs to an outside party for cash. The amount of cash had to be sufficient to cover all transaction costs, provide a premium return to cover the risks associated with the transaction, and also provide an additional increment of margin for profit.

The working group also identified what it felt would be the necessary ingredients for the deal. It was obvious that we would need to sell a large number of individual PHLs so that the law of large numbers would be able to operate. We also had to find a way to develop some believable statistics about the behavior of our PHLs. Jim Hohmann will have much more to say about this subject. An administrative servicing system capable of handling all of the complicated accounting and record keeping also had to be designed, programmed, tested, and installed. We had to make sure that we had sufficient policyholder surplus available to withstand the immediate book loss we expected to sustain upon the sale of the PHLs. This point was of particular concern to our corporate treasurer. We had to work very closely with our tax attorneys and accountants to assure that the transaction was compatible with our tax plan. Finally, we had to be prepared to make an extensive commitment of resources for an indefinite period if we hoped to successfully bring our deal to market.

We were convinced that we could put together a profitable transaction. But before we could even begin trying to answer the question, "How much money can we make on this?" we had to cross a number of preliminary hurdles. Among the more significant legal and administrative issues that required resolution were the following:

1. Are PHLs assets? Can they be separated from insurance policies and sold? Our legal research led to affirmative answers on both counts.

2. Where does the cash come from to pay interest on the PHLs we have sold when policyholders do not pay the interest in cash?

   When interest is not paid when due in cash (or by application of policyholder dividends), the insurance company usually extends an additional loan to the policyholder. The proceeds of that new loan are applied to the payment of interest. These additional loans are not owned by the purchaser of the PHLs or pledged to them in any way. Rather, the insurance company holds these new loans as assets. Both the insurance company/seller and the purchaser would thus have loans secured by the policy's cash surrender value.

   Obviously, to support the rather complicated accounting required, the administrative and servicing systems had to allow for separate administration of the sold PHLs and any new PHLs extended to the same policyholder by the company after the date of the PHL sale. All of this, of course, had to be done in a manner totally transparent to our policyholders.

3. What effect, if any, would the sale of PHLs have on any future policy update programs?

   Nothing in the proposed sale and servicing agreements specifically prevented any policy modifications or update. But, we couldn't do anything that would disturb the purchaser's rights to the cash flows from the PHLs purchased. That meant we couldn't decrease the loan interest rate or loan balance; defer or forgive the payment of interest or principal; or otherwise interfere with the purchaser's rights to collect interest or principal when due and payable.

4. This transaction may be "alive" for as long as 50 years. Does this levy any additional requirements upon us that would not have otherwise existed?

   The administrative system created specifically to service this transaction was designed to process the collateral until the last PHL was repaid. A "clean-up" call provision was also included in the proposed sale agreement, giving The Prudential the right to repurchase all remaining PHLs when the outstanding balance of the PHLs drops to 5% or less of the original PHL balances sold. This was expected to occur after about 30 years.

Once we were satisfied that we had acceptable answers to these questions, we were ready to go ahead with a full-blown economic analysis. The key to determining the viability of the transaction for us was the use of a break even reinvestment rate (BERR) approach. We felt that the value of the proposed transaction was best determined by performing a hold versus sale analysis, and solving for the BERR, where the BERR equaled the interest rate at which we had to reinvest the proceeds from the PHL sale in order to have the same after-tax surplus value under both the "hold" and "sale" scenario. Assuming the proceeds could be invested only at the BERR, we would have been indifferent, from a financial standpoint, to the transaction.

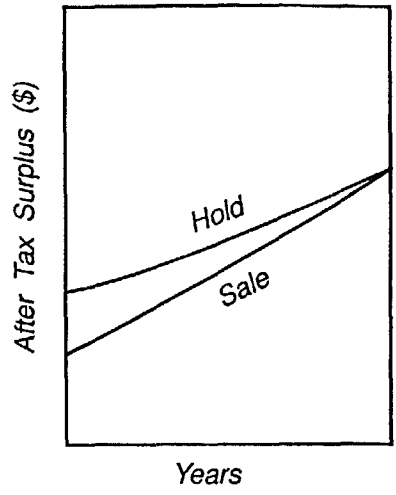
Given the expected paydown schedule for the PHLs we planned to sell, we could determine the after-tax value of the surplus associated with the PHLs if we held them until the last of the loans was fully repaid.

For the "sale" side of the analysis, instead of starting out with PHLs, our starting value was the expected proceeds from the sale, including the immediate tax savings associated with the loss. Although this was a much smaller dollar amount, the cash was assumed to be immediately available for investment at the BERR which was, of course, substantially above the PHL coupon rate. The funds in the "sale" analysis could thus grow much more rapidly than in the "hold" scenario, by taking advantage of the reinvestment arbitrate. The BERR, determined by iteration, was the reinvestment rate which produced the same after-tax surplus at the end of the analysis period for both the "hold" and "sale" scenarios (Graph 1). We then compared the BERR to the 10-year U.S. Treasury Bond yield, since the 10-year Treasury was the riskless instrument most closely duration-matched to the PHLs sold. Our objective was to structure a transaction with a BERR at least 40 basis points below the 10-year Treasury yield (Graph 2).

In a financing transaction, we would have been looking to borrow when market interest rates were low, so that our borrowing costs would be reduced. Since our transaction was driven by interest rate arbitrage, however, we stood to gain more as interest rates rose.

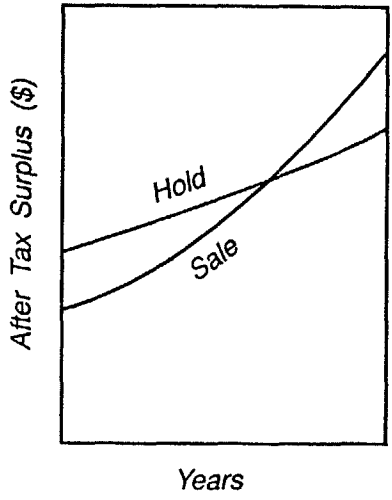
GRAPH 1

Hold vs. Sale at BERR



GRAPH 2

Hold vs. Sale at Hurdle Rate



In fact, the transaction was extremely sensitive to interest rate changes, at least from a timing standpoint. The analysis we conducted late in 1987 indicated that an interest rate move of ± 25 basis points would be worth ± 13 basis points to the BERR. (As an aside, the basic repayment behavior of the PHLs was expected to be relatively stable throughout a wide range of interest rate movements, due in large part to the low coupon rate on the PHLs.)

Having completed this preliminary analysis, we were ready to begin in earnest to put the deal together. At about this time, Morgan Stanley & Company joined forces with The Prudential and Prudential-Bache to assist in the structuring and marketing efforts. Our working group continued to expand, with the addition of the rating agencies, an outside consultant, independent public accountants, our outside counsel, plus everyone else's attorney. Our basic objective was still to translate our PHLs into immediate cash. But to make this work we had to add some complications, over and above a straightforward sale of PHLs directly to investors.

A special purpose corporation (SPC) had to be created to issue securities to investors and, in a simultaneous transaction, use the proceeds of the securities sales to purchase PHLs from The Prudential. The principal and interest payments on the PHLs, net of a servicing fee paid to The Prudential, would be sufficient to service the debt and pay a return on the equity securities of the SPC.

At this point, we ran into a real snag. We had learned a lot about the characteristics of PHLs -- not only the legal and administrative aspects, but also their characteristics as investments. PHLs were valuable to us since they were essentially riskless, as well as perfectly matched to their offsetting liabilities. On the down side: they carried low interest rates; were, prior to this transaction, highly liquid; individually at least, are highly uncertain as to their repayment, since they had no definite amortization schedule or maturity date; and, had a book value well in excess of their market value.

It was the repayment uncertainty that created a special set of problems related to the structuring of the debt securities of the SPC. The investment bankers wanted the bonds to have as close to a fixed payment schedule as possible. So we had to find a way to deal with the potentially wide variance between actual PHL cash flows and the expected cash flows which would be necessary to service the debt. Assuming that for some period of time PHL repayments were faster than expected, the SPC would face a period of cash flow excess followed by a period of cash flow shortage. The solution was to allow the excess funds to be reinvested. Funds would then be available to be drawn down from the cumulative excesses to service the debt during the later cash flow shortage period (Graph 3).

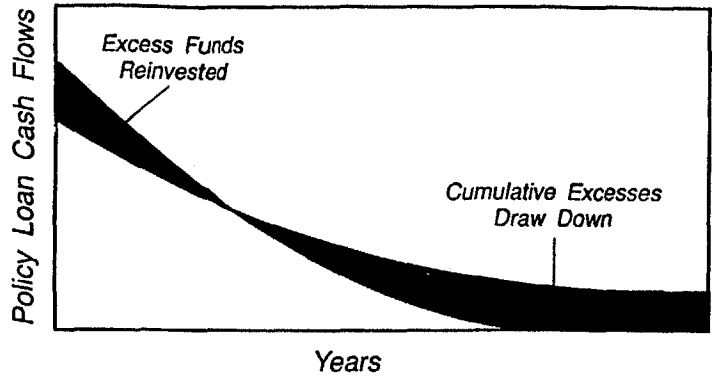
Conversely, if cash flows on the PHLs were slower than expected for some period of time, the cash flow shortage would be followed by a period of cash flow excess. The solution here was to have the equity investors establish a fairly large debt reserve fund. This fund could be drawn upon if necessary, to support the minimum principal repayments promised to bond investors during a period of cash flow shortage. The debt reserve fund would later be replenished during the cash flow excess period (Graph 4).

The structure for the transaction was now essentially complete. An AAA rated bank would provide a reinvestment contract to cover the fast pay contingency.

GRAPH 3

Reinvestment/Draw-Down of Excess Cash Flows

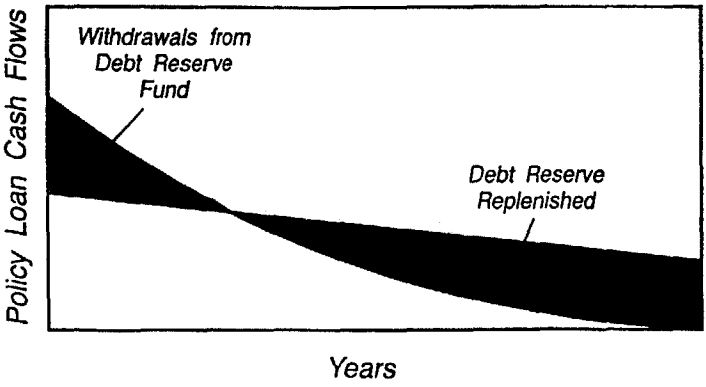
(Faster than Expected Repayments)



GRAPH 4

Debt Reserve Fund Draw-Down and Replenishment

(Slower than Expected Repayments)



The debt reserve fund, provided by equity investors, would take care of the slow pay scenario (Graph 5).

As a further credit enhancement, The Prudential agreed to stand behind a promise that the PHLs would repay at least as fast as provided in a warranty schedule. This warranty schedule was set at a repayment level much slower than was anticipated even in our most adverse scenario, and is not expected to be called upon. It is really just an extreme case standby facility to give extra comfort to the rating agency and investors.

The debt securities had thus taken on the characteristics of a modified pay-thru. The bonds were priced based on the expected cash flows. The bond investors were protected from very fast or very slow repayments by virtue of the Debt Reserve Fund and the reinvestment contract. In effect, their repayments were bounded by what we called our PHL Pay-Thru Envelope (Graph 6).

This is a rather gross oversimplification of the structure of the securities, and Michael Shante will go into much more detail about that aspect of the transaction. At this point, in the fall of 1987, we approached our Board of Directors for an authorization to go ahead with the transaction, if and when we felt that market conditions were right. Jim Tilley will fill you in on many of the details of the marketing effort.

Our collective efforts resulted in the successful issue of over $455 million worth of debt and equity securities of PHL Funding I, Inc., backed by $619 million of PHLs sold to PHL Funding by The Prudential on January 29, 1988. It took us over 30 months from inception to closing, but it was clearly worth the effort. This sale represented about 11% of The Prudential's PHLs. Given the right set of circumstances, we would certainly consider going forward with other similar transactions.

MR. JAMES E. HOHMANN: My objective is to discuss some of the actuarial aspects of PHL securitization. In very general terms, the actuary, in the course of the securitization project, was to provide as much information as possible regarding the behavior of the underlying collateral; that is, the block of PHLs.

Broken down further, there are three major aspects of actuarial involvement:

1. Determine various factors that affect principal repayments on PHLs. Some of these are quite obvious, for example, mortality, lapse, and voluntary repayment. Other are a little more subtle, an example being the administrative accounting methodology with respect to sold and unsold loan balances.

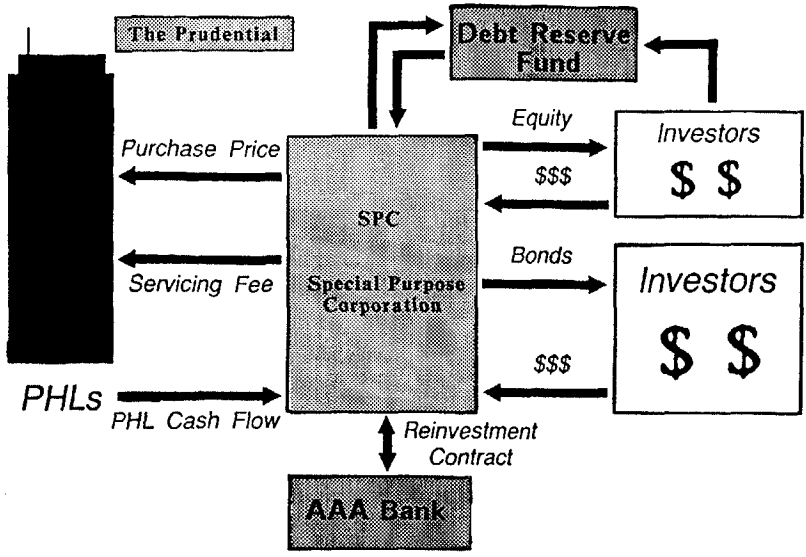
2. For each of the principal factors, assign probability distributions and determine the parameters associated therewith.

3. Assist in the creation of the simulation model of PHL repayment.

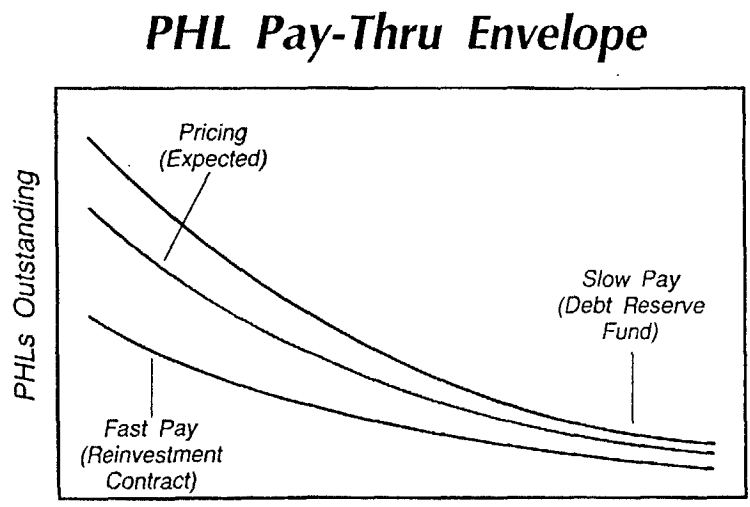
Before getting into the specifics of each of these items, let us begin with a review of some of the characteristics of the underlying collateral.

1. All of the PHLs sold are attached to permanent insurance.
2. All of the PHLs are at 5% interest in the arrears.

GRAPH 5



GRAPH 6



3. All of the insureds were attained ages 50 to 69 at the time of the sale.
4. The vast majority of the loans were durations fifteen and greater at the sale date.
5. The loans varied in size from $100 to $6,000.
6. None of the policy loans involved had a loan to value ratio of greater than 90%.

The primary factors impacting the paydown of PHLs are death, lapse and voluntary repayment. Various sub-factors are also involved and will be mentioned later.

Concerning mortality, our approach was as follows. Because the majority of policies were at durations fifteen and greater, ultimate mortality was assumed. The underlying table was the 1975-1980 Basic Ultimate Table which is the expected basis for The Prudential decrement studies. Our focus on mortality was twofold.

First, using The Prudential studies, we developed what we referred to as mortality alignment factors. These factors were used to conform the 1975-1980 Basic Ultimate Table to Prudential experience as of the loan sale date.

Second, we focused on mortality improvement. Mortality improvement was studied using data available within The Prudential, augmented with 25 years of Society data reflecting mortality improvement at the ultimate policy durations, by age grouping. For purposes of simulation, mortality improvement ratios were projected under an assumed log-normal distribution, with expected values and standard deviations that we developed based on the Society data and The Prudential data.

Like mortality, lapse rates were based on The Prudential decrement studies, supplemented by the study of loaned versus unloaned policy lapses. Lapses were studied over the period of 1978 through 1986, which is significant because of the large variations of interest rates over the period. Even so, the lapse pattern was fairly stable.

We assumed lapse rates on this block of business vary by attained age only as normally distributed with means and standard deviations estimated based on the data studied. The distributional assumption was tested using nonparametric statistical methods. This test confirmed, with a high level of confidence, that a normal distribution was reasonable. I caution that this was for the particular block of business that we were looking at, and by no means am I saying that such a distribution is appropriate in all cases.

In the simulation model, lapse rates were projected using the normal distribution assumption with parameters that varied by attained age.

Our biggest challenge in the setting of assumptions and the building of the Simulation Model was the treatment of voluntary repayments. We knew of no significant industry studies, nor did any significant studies exist at The Prudential with respect to voluntary repayment activity. Not only were data scarce, but voluntary repayment proved to be a more complex decrement than either mortality or lapse.

All three decrements, mortality, lapse and voluntary repayment, can be viewed as comprising a frequency and a severity. If death or lapse occurs, the impact

(i.e., severity) on the policy loan is always total elimination. This can be viewed as a probability distribution where all of the mass resides at one point. Given a voluntary repayment has occurred, however, the severity may be total repayment or partial repayment. Consequently, my discussion of voluntary repayment must focus first on the frequency of repayment and second, on the severity of repayment.

Another factor that affects voluntary repayments differently, from either mortality or lapse, is the administrative accounting procedures. As Dave mentioned earlier, administration and accounting for a PHL sale is very complex.

In particular, one must focus on how to separate sold from unsold balances on PHLs. While the entire PHL was sold on the sale date, policyholders will take out additional loans subsequent to the sale date which leaves one with the dilemma of how to apply cash when it is received on a voluntary repayment downstream. Should it be applied first to the sold balance or first to the unsold balance?

The method used in this transaction was a LIFO method -- last in, first out -- meaning that voluntary repayment dollars would first be applied to repay the loan balances that arose subsequent to the policy loan sale date, and then when subsequent loans had been fully paid off, voluntary repayment dollars would be applied to the "sold loan balances," that is, those which existed at the date of sale. This distinction is not important with respect to mortality and lapse, which completely eliminate the affected loans.

In order to study the questions of voluntary repayments, The Prudential conducted a special study whereby the progress of a block of loans, assumed to have been sold as of January 1, 1979, was tracked through year-end 1986. This study incorporated the LIFO accounting.

The output of the study allowed us to distinguish between total repayments and partial repayments. Therefore, we were able to derive frequency rates of total repayment, frequency rates of partial repayment, and severity rates of partial repayment. In total, the frequency of any type of repayment, including both totals and partials, showed a definite declining pattern by duration measured from the sale date. This pattern is believed to result largely from the LIFO accounting, since as new loans are taken out, an insulating layer of loan balance is created that must be depleted before a voluntary repayment can be applied to sold loan balances.

The results of the voluntary repayment studies were broken down into various categories in a search for some sort of homogeneity. We found that there appeared to be a pattern based on two classifications: (1) attained age, and (2) policy size.

After considerable review of data and discussion, we settled on two attained age groupings and six loan size categories. The loan size categories reflected an adjustment of an inflationary nature to provide for the fact that for a given fixed dollar size it should be easier for an individual to repay it today than it would have been in 1980, for example. The two age groups and six loan sizes led to twelve categories of loans. For each category we studied the frequency of loan repayment, the probability that the given loan repayment was either total or partial, and finally, given that a loan repayment was partial, we studied the portion that was repaid.

As I mentioned earlier, each of these items showed a definitive pattern. The frequency of voluntary repayment was modeled using regression techniques. The probability that a given voluntary repayment was total was modeled by curve fitting techniques and the portion of loan repaid, given that a partial repayment occurred, was held constant. In order to assess the technique and assumptions for reasonableness, we projected the paydown of the January 1, 1979 PHLs using only the expected values of the repayment distributions. To our surprise, we found a fair amount of distortion when compared with actual data.

Upon investigation, we discovered the source of distortion was a skewing of voluntary repayments within loan size band. As it turns out, in all six of the loan size bands, less than average size policy loans did the voluntary repaying. This, of course, is intuitively reasonable. In order to correct this phenomenon, we introduced into the model a set of adjustment factors for skewing with loan size bands. Another alternative we considered before adopting this approach was to expand the number of loan size bands, but we dismissed this, fearing that too many partitions of the data would severely reduce statistical credibility.

Finally, we went back to treat a phenomenon we observed in the voluntary repayment study conducted by The Prudential. That is, we noted increased repayment activity in virtually all loan categories for calendar year 1986. We hypothesized that this phenomenon was due to policyholders anticipating changes in the federal income tax laws whereby the deduction for PHLs would gradually be phased out. Consequently, 1986 was excluded from the development of the regression formulas used to project voluntary repayments in anticipation of a subjective adjustment to reflect the impact of the change in tax law. The form and magnitude of that adjustment was the subject of considerable debate. Among the points raised were the following:

1. Perhaps the voluntary repayment rates will exceed historical levels in all future years as a result of the changed tax laws.

2. Perhaps the increased voluntary repayment rate should be anticipated only during the period in which the deduction was being phased out, and that the historical levels would be seen thereafter.

3. Perhaps the increased repayment activity is behind us. The idea being that policyholders who are going to repay as a result of the changed tax laws have already done so, and those who have not will not.

In order to get an idea of the magnitude of the adjustment, we went through and used the 1985 and prior data in our model to project 1986 results for voluntary repayments. This allowed us to develop a series of ratios for each of the loan categories reflecting the impact of the changed tax law.

After giving a lot of consideration to the characteristics of the policyholders involved, it was decided that a one-year adjustment factor is perhaps the most appropriate under the theory that most of the policyholders who are going to repay their loans as the result of the changed tax law have already done so, and that there are perhaps a few others who will repay when they have to file their first tax return where they don't get full deductibility for policy loan interest.

Having discussed the principal factors of the PHL repayment, the distributional assumptions and parameter setting, I turn now to the Simulation Model.

We used the Monte Carlo technique to simulate 1,000 PHL principal paydown schedules. For each of these 1,000 paydown schedules, the decrement assumptions for each year of the deal, that is, duration from the sale of the loans, were derived by sampling from the respective probability distributions. Each of the over 300,000 policyholders was exposed to the decrements with the result being a distribution of that policyholder's loan repayment dollars among the mortality, lapse, and voluntary repayment decrements.

Because the timing of cash flow was so critical to the deal, assignment of repayment dollars was done on a monthly basis. Therefore, given a policyholder with a $100 loan, for example, one might find that $20 could have been voluntarily repaid in the 10th month of the deal, with perhaps another $15 voluntarily repaid in the 25th month of the deal, and the balance repaid in the 44th month through policyholder lapses.

In order to determine the pay-down for each individual policy, it was necessary to draw a very substantial number of random numbers under various distributions. As one can imagine, a substantial amount of computer time was involved in running the simulation model. However, to have done less in terms of not exposing the individual policyholders to the various decrements would have had significant impact on the utility of the simulation model because it would have artificially reduced the variance associated with the pay-back.

Fortunately, through experimental design techniques, we were able to drastically reduce the amount of computer time from that which would have been required if each policyholder were sequentially exposed to each decrement for each month of the deal.

Given these actuarial decrements and the Monte Carlo Simulation model, Michael will next review how the transaction was actually structured and how various securities were created.

DR. SHANTE: I would like to talk about how we constructed the financial structure of the transaction and how we defined the specifics of various securities that were issued. As I had indicated in my introductory remarks, the transaction was executed by setting up an "Issuer" or an SPC. The actual sequence of events was as follows: The Prudential determined the PHLs that it wanted to sell. Given this "collateral" of PHLs we projected the cash flows by applying various lapse, mortality and voluntary prepayment rates as described by Jim Hohmann. Given these cash flows and various structural details necessary to make the transaction work (and I will discuss them in due time), we determined the maximum amount of securities that could be issued by the Issuer. Part of the proceeds from the sale of these securities were applied to pay certain organizational expenses of the Issuer and to fund various reserve accounts as required. The remaining net proceeds were forwarded to The Prudential as the purchase price of the block of policy loans that were to be sold.

In its simplest form, a structured transaction (or securitization) is a present value type of a calculation. Thus, if the cash flows from the collateral were exactly and deterministically known, if only one class of security (a bond) were to be issued and if that security were priced at par when the market yield on comparable securities was say C%, the maximum amount of this security that

could be issued against the collateral, with no other support or supplemental cash flows from any other source, would be the present value of these cash flows discounted at C%. Let us assume that a total of $F of principal amount of these bonds were issued in a single class pass-through structure. If the cash flows received from the collateral were on an annual basis, the cash flows applied to the bonds outstanding were on an annual basis, and if after the first year a total of $A of cash flow were received from the collateral, it would be allocated as follows: First, an interest of CxF/100 will be paid to the bondholders. The remaining cash of (A-CxF/100) will be applied to reduce the bond principal outstanding from $F to $F-(A-CxF/100). The process is repeated each year until the bonds are fully redeemed.

In practice, however, securitization becomes a more complex process (as we shall soon see) because the cash flows from the collateral are not exactly and deterministically known, because often more than one type of security is issued and even within a given type of security (such as a bond) it is often desirable to issue more than one class (tranche) of securities, because often various reserve funds have to be established to provide for payment of ongoing administrative expenses and to maintain certain liquidity for the benefit of bondholders, and because the rating agencies such as Standard & Poor's (S&P) impose various structural and pricing constraints before they would assign an adequate rating to the securities.

Before I delve into the details of the PHL transaction, let me draw parallels to two other processes that are more familiar to most of us: (1) The pricing of individual life insurance products, and (2) the Collateralized Mortgage Obligations or CMOs.

COMPARISON TO INSURANCE PRODUCTS

The process of securitization can be likened to that of designing, developing and pricing an individual life insurance product (or for that matter any insurance product): We have a stream of incoming cash flows (income) and a stream of outgoing cash flows (expenses). The objective is to design the structure and develop appropriate pricing assumptions to balance the two streams and achieve certain financial objectives given various regulatory and marketing constraints. For insurance products, the income consists of gross premiums and investment income from various reserve funds. For the structured transactions, the income comes from the principal and interest payments from the collateral being securitized and from investment income from various reserve funds. The expenses for insurance products consist of acquisition expenses, premium taxes, administrative expenses and various policy benefits. For structured transactions the expenses consist of organizational expenses, administrative expenses and the required payments of interest and principal to the bondholders. The residual cash flows, if any, are a contribution to surplus for insurance products and a distribution to equity holders (or other subordinated investors) for the structured transaction with two types of securities (bonds and equity or senior and subordinated pieces). For the insurance products certain benefit reserves are necessary and they are determined by some reasonably conservatively standards. For the structured transactions a measure of conservatism is dictated by the rating agencies.

There are, however, significant differences. Perhaps the most important difference is that the Issuer is an SPC which conducts no activity other than to issue securities against a collateral which it has purchased. The Issuer has no assets other than the collateral and the various reserve funds; and it has no ongoing

business activity and therefore no sources of income other than the cash flows from the collateral and investment income from various reserve funds. The Issuer cannot rely upon any outside support or guarantees other than those that might be built in during the initial securitization.

Even though the financial resources (assets and cash flows) of the Issuer were very limited and no outside credit support was to be included, we had wanted to secure the highest rating (AAA) for the bonds to be issued. The securities were issued as an institutional private placement but we felt that in view of the large size of the offering a formal rating would enhance the initial appeal and the secondary market liquidity of the securities. To secure such a rating, to make the securities adequately appealing to various potential institutional investors, and to satisfy the professional and fiduciary concerns of various parties that were involved in structuring and executing the transaction, we had to demonstrate to the rating agencies, to the lawyers, to the investors, and to ourselves, that under almost any adverse circumstance there would be sufficient cash flows available to the indenture trustee to service the debt on every (quarterly) bond payment date; that is, we could pay the coupons on the bonds as promised, and redeem the bonds as scheduled, for the next 54 years that the transaction is expected to be in place.

Actuaries often feel uncomfortable projecting their calculations beyond twenty or so years. For this transaction we had to make projections, on a monthly basis, for 54 years. To make such detailed projections and to demonstrate the feasibility of the transaction, my group built several different computer models to simulate the actuarial decrements, project the cash flows, build a bond and equity structure and demonstrate its workings to all parties involved. Interestingly, a great deal of time and effort was spent in counting days in leap years because if you are a day off in your projections it does not materially affect the operations of an insurance company. However, on the securities side, if you are expected to service the debt today (that is, pay the coupons and redeem the bonds as required by the bond indenture) but you do not have sufficient cash flow today (even though you fully expect to get it tomorrow), technically the bonds are in default. And this kind of a scenario is not acceptable to the rating agencies and to the potential investors.

Thus, generically, the process of securitization is essentially an engineering and balancing of two cash flow streams and as such the process is similar to actuarial asset share models for structuring and pricing insurance products. However, the technicalities and the details are substantially more complex.

COMPARISON TO COLLATERALIZED MORTGAGE OBLIGATIONS (CMOs)

The most frequently securitized assets are the single family mortgages and the corresponding securities issued are known as CMOs. Since its advent in 1983, about $200 billion of CMO securities have been issued. In a typical CMO transaction, an Issuer (a special purpose entity) is organized to purchase the mortgages (the collateral) and is funded by issuing two types of securities: Equity securities (mostly only one class known as residual) and Debt securities which generally are issued in multiple classes (known as tranches) and known as CMO bonds. We were trying to securitize an asset that had never before been securitized and therefore to make it easier for the potential investors to understand the securities to be issued we began by borrowing some of the basic concepts underlying the CMO structure. Thus, we created two types of securities, equity and debt, and the debt securities were tranched into six different classes. However, to make the transaction work, we eventually had to make

significant changes to the CMO structure such that, in the end, the PHL structure included some very significant innovations which are now being borrowed by and incorporated into the CMO structures.

SECURITIES ISSUED

The Issuer for the PHL transaction consisted of two different entities. The debt securities were issued by a corporation called PHL Funding I, Inc. The objective here was to enhance the appeal and marketability of these securities by having them classified as corporate debt. The equity security was issued by a partnership called PHL Limited Partnership I. The PHL Funding I, Inc, and the PHL Limited Partnership I together comprise the Issuer. This split was designed to address certain tax regulations. (These tax issues are not relevant in the CMO structure because the U.S. Congress legislated a special relief for issuance of CMOs by creating a new entity called REMIC for Real Estate Mortgage Investment Conduit. The REMIC issuer structure is available only for securitization of mortgages.)

A total of $10,802,059 of equity securities were issued as partnership certificates and were purchased by four institutional investors. A total of $445,640,845 of PHL bonds were issued in six different classes ("tranches") and were purchased by 37 different institutional investors. The six tranches of bonds summarized in Table 1.

TABLE 1
PHL BONDS, SERIES A

Bond Class	Initial Principal Amount	Coupon	Expected Average Life	Stated Maturity
A-1	$ 80,814,755	8.50%	1.02 Years	January 20, 1990
A-2	70,712,911	9.25	3.10	July 20, 1992
A-3	36,366,640	9.25	5.20	April 20, 1994
A-4	149,507,297	9.25	10.58	April 20, 2005
A-5	105,059,182	9.25	21.53	July 20, 2016
A-6	3,180,060	9.25	33.61	April 20, 2042
Total	$ 445,640,845			

An overriding priority in creating securities in a structured transaction is that for a given collateral (a pool of mortgages or a block of PHLs) the total market value of all securities issued should be maximized. This typically requires that the equity piece be as small as feasible since the market value of equity is the present value of residual cash flows available to the equity holders, discounted at a rate between 12% and 18%, while the market value of bonds is determined by discounting the bond cash flows at substantially lower rates, between 8% and 12% depending on the market conditions. Thus, the tranche sizes and characteristics (such as coupons and average lives) are determined to maximize the total market value of all bonds issued.

TRANCHES

Let me briefly explain the concept of "tranching." In a noncallable bond (such as U.S. Treasury bonds) the entire principal of the bonds is redeemed at a prespecified time. Typical corporate bonds are "callable," that is, their principal can be redeemed, at the option of the issuer, at a certain prespecified price

and after and during a certain prespecified period of time. Typically, the bonds get called if the interest rates have dropped and the issuer can issue new bonds at a lower net cost. Potential investors (bondholders) of course do not quite like this call feature because by being forced to reinvest their funds at lower interest rates their portfolio yields are reduced. Because of this adverse call feature, the prices (yields) of callable bonds are lower (higher) than those of comparable noncallable bonds.

In a typical securitized transaction, the principal amount of the bonds issued is redeemed at a speed which is dependent upon the speed with which the underlying collateral (mortgages for CMOs and PHLs for PHL bonds) pays off. Monthly mortgage payments include interest for that period as well as a partial planned repayment of the principal of the mortgage. In addition, homeowners can always repay the entire mortgage either because the house is sold or because they can refinance at a lower rate. As the mortgages are prepaid at a fast rate, the principal of the CMO bonds is redeemed at a correspondingly fast rate. The CMO bondholders are essentially short a call option on their securities, and to induce them to bear this risk, the market yields on CMO bonds are typically about 100 basis points or more higher than those on noncallable Treasury securities of comparable average lives.

The "tranching" feature was first introduced in CMO structures in an attempt to better identify and segment this prepayment risk and thereby place it with those investors who have an appropriate ability and appetite to bear this risk. In a CMO structure with only one class or tranche of bonds, all bondholders bear an equal risk of prepayments: If 10% of the underlying mortgages are prepaid, 10% of all bonds from all bondholders will be immediately redeemed in a pro-rata manner. Tranching creates different classes of bondholders. Essentially, each tranche is a separate security with its own unique cash flow structure. Each tranche can have its own unique coupon, yield, average life, duration, convexity, maturity and redemption criteria. Different investors can buy different tranches depending on their portfolio needs.

Perhaps it is best to look at a real tranche structure. And for that let us review the tranche structure for the PHL bonds.

PHL BOND STRUCTURE

PHL bonds were issued in six tranches with features as summarized below:

A total of six different tranches were issued with average lives close to 1, 3, 5, 10, 20 and 30 years. These average lives correspond closely to new issue or "on-the-run" Treasuries. Typically, the prices of various tranches are determined such that, given the expected cash flows and the coupons, the yield to the investors, along the expected redemption schedules are certain basis points (typically 80 to 100 basis points) higher than that of on-the-run Treasuries of comparable average lives.

An investor could buy a piece of any one or more of the tranches. To further explain how the tranching process works, consider that an investor purchased a piece of the fifth tranche A-5 (see Table 1). The interest and principal cash flows from the underlying collateral, the PHLs, are passed on to the indenture trustee by the servicer of the PHLs. On each bond payment date (quarterly for the PHL bonds), the trustee reviews the total cash on hand (this includes the PHL cash flows plus some reserve fund accounts as well as some investment income from investment of cash flows between bond payment dates) and applies it

first to pay the coupons then due on all classes of bonds then outstanding and then applies the rest (subject to various priorities and provisions defined in the bond indenture) to redeem the principal of only the first (A-1) tranche until the first tranche is fully redeemed. Even if the collateral pays faster than the pricing assumptions (due for instance to higher than expected refinancing of mortgages in the case of CMOs or higher than expected policy terminations in the case of PHLs) the principal of the tranches A-2 through A-6 will not be redeemed until the first tranche is fully redeemed. Once the tranche A-1 is fully redeemed, the tranche A-2 begins to get redeemed. Similarly, when, and only when, the tranche A-2 is fully redeemed, the tranche A-3 begins to get redeemed. Thus, the holders of later tranches have some, albeit limited, protection against their bonds being redeemed or called prematurely.

The coupons for various tranches are determined such that the prices of various tranches are close to but preferably not in excess of the par value of 100%. Also, the coupons could be payable with any desired frequency and could be payable either on a current basis or could be accrued. In this PHL structure, coupons were payable or accruable on a quarterly basis for all six tranches. The coupons were payable in cash for the first five tranches. The coupons for the last tranch, A-6, were to be accrued until the principal of all of the first five tranches is fully redeemed at which point the coupons on A-6 become payable currently.

Z-BOND

Tranches such as the A-6 tranche for the PHL bonds are often referred to as Z-Bonds. It is somewhat of a misnomer in that it stands for Zero Coupon Bonds. The Z-bond does have a coupon but, until all of the earlier tranches are fully redeemed, the coupon is not payable in cash but rather is accrued into new principal on each bond payment date. Because of this feature these bonds are also referred to as "accrual bonds." Once all of the earlier tranches are fully redeemed, the coupon on the Z-bonds becomes payable in cash on each bond payment date. In this sense it is really a "deferred coupon" bond, although this terminology has not been used on the Street. Interestingly, in the early days of CMO developments, these Z-bonds were even priced as zero coupon bonds and some smart traders found some profitable arbitrages between these "accrual" bonds and the true zero coupon bonds!

ADVANTAGES OF TRANCHING

Next logical question might be: "What do we gain by complicating the transaction structure by issuing so many different tranches rather than just one tranche?" (Generally, the equity piece is always issued as a single class.) There are three major benefits of tranching a given collateral cash flow into multiple tranches of debt:

1. As discussed before, the prepayment risk can be allocated to different investors according to their preferences. Thus, the holders of the earlier tranches bear more of the prepayment risk than the holders of the later tranches because of the sequential redemption of the principal of various tranches. One cannot completely eliminate or deterministically allocate all of the prepayment risk. However, this partial segmentation of the risk helps achieve a more efficient pricing of the collateral.

2. Each tranche can be designed to meet the demand in a specific segment of the investor marketplace. Thus, if the market has a larger appetite for 20-year bonds than for say 15-year bonds, we can change the tranche

structure or size, or both, to meet that demand. By addressing the needs of the marketplace, we are able to achieve a better pricing for the same underlying collateral.

3. Perhaps the most significant benefit of tranching is that it materially increases the value of the collateral. This, primarily, has to do with the average lives of the collateral such as mortgages and PHLs and with the shape of the Treasury yield curve. The normal Treasury yield curve is upward sloping until maturities of about 10 years, and is relatively (though not quite) flat thereafter. Almost all bond issues are priced off the yield curve such that the bond yields are certain basis points higher than the yields on Treasuries of comparable average lives. Thus, a mortgage pool with a 10-year average life will be priced by discounting its cash flows at a rate of say 100 basis points above the yield of a 10-year Treasury. Now consider that we tranche the cash flows from this collateral into two tranches with average lives of 5 and 15 years. The yield of a 15-year Treasury is only slightly higher than that of 10-year Treasury and therefore the loss of present value after pricing (discounting) at this higher rate is minimal. However, the yield of a 5 year Treasury is significantly less than that of the 10-year Treasury and therefore the present value of this piece of cash flows is considerably higher than what would have been achieved by discounting it as a 10-year instrument. On the whole, the sum of the present values (or prices) of 5- and 15-year tranches is more than that of a single 10 year tranche.

UNCERTAINTIES OF PHL CASH FLOWS

One of the major hurdles in structuring this transaction was the inherent relative unpredictability of the cash flows from the PHLs. The investment bankers and the investors are very familiar with CMO bonds; indeed, CMOs represent a relatively clean and simple securitization: Typical collateral for CMOs are pools of single family home mortgages which are guaranteed to various degrees by agencies such as Government National Mortgage Association (GNMA), Federal National Mortgage Association (FNMA) and Federal Home Loan Mortgage Corporation (FHMC). For instance, GNMA guarantees the timely payment of both interest and principal of the mortgages. Because of these guarantees, the CMOs issued against such collateral are readily rated AAA by Moody's and by S&P because, in one form or another, the default risk gets insured by an agency with U.S. Government credit. For PHLs there is no such guarantee. Of course, these PHLs are The Prudential's assets; but, The Prudential did not want to give any guarantees since it had sought to sell these assets (rather than merely pledging them for a collateralized financing).

Another major hurdle was the timing and the predictability of the cash flows from PHLs versus those from mortgages. Payments on mortgages are made on a monthly basis and the principal of the loan is repaid on a planned and predictable basis. Almost any actuarial student with Part III background can take the mortgage amortization formula, project the cash flows and structure bonds against that stream of income. For the PHLs, however, there is no requirement to pay the interest in cash and indeed no requirement to pay back the loan at any time. The unpaid interest is accrued into a new loan and the loan principal is ultimately repaid when the policy is terminated because of a lapse or mortality event. Additionally, the policyholder has the option to prepay the entire policy loan at any time at his or her sole discretion.

In a nutshell, therefore, we had a cash flow stream that was not guaranteed by any agency such as GNMA, a stream that could in principle be prepaid in its entirety at any time, or may never be repaid within a foreseeable future because the policyholder may never lapse the policy and, because of potential technological breakthroughs or advances in the medical sciences, the policyholders may live for a much longer span than expected (if not forever). Indeed, these issues were very seriously discussed among various parties, and especially by the rating agencies, since the ultimate creditworthiness, and therefore the ratings, depend upon the timely availability of adequate cash flow to service the debt.

ALLOCATION OF THE UNCERTAINTIES OF THE PHL CASH FLOWS

In the end, the risks of timing and the amounts of cash flows from the PHLs were allocated among the three major parties in the transaction: The seller of assets (The Prudential), the Issuer (that is, the investors who purchased the equity of the Issuer) and the investors who purchased the PHL Bonds. The overriding priorities in this allocation process were as follows: (1) The risk retained by The Prudential must be quantifiable *de minimus* such that the assets can be deemed to have been sold (that is, the risks and rewards of ownership of the assets have been effectively passed on to the new owners and not materially retained by The Prudential). (2) The potential variability of the average lives of the bonds should be small such that they could be priced efficiently. (3) The equity piece should have enough variability to behave and look like equity but should nonetheless be reasonably profiled so as to be priced as an investment.

The mechanism by which this allocation was accomplished was defined in terms of Minimum and Maximum Cumulative Bond Principal Payment Schedules. In this structure, irrespective of how slow (or fast) the cash flows might emerge from the PHL collateral, the bonds would not be redeemed at a cumulative speed slower (or faster) than that underlying the Minimum (or Maximum) Cumulative Bond Principal Payment Schedule. This effectively defined the minimum and the maximum average lives of the bonds to be issued and Jim Tilley will review these data and their implications in more detail. Because of these well-defined average lives we were able to price these bonds very efficiently.

This indeed was one of the most unique features of this transaction. CMO structures had issued Planned Amortization Class (PAC) bonds in which the bond principal is redeemed along a predefined schedule. What we had created were "Soft PAC" bonds and, in addition, had structured the entire transaction (that is, all tranches) to be soft PAC rather than just a few of the many tranches.

The major effort, of course, was in constructing these schedules and in further developing the structure and demonstrating that under all conceivable scenarios the bonds would be redeemed as scheduled.

To construct these and other schedules we developed a Monte Carlo Simulation model to project cash flows from the PHLs. Lapse, mortality and prepayment rates were developed, as discussed by Jim Hohmann, and each and every loan was exposed to these three decrements to develop a "PHL principal paydown scenario." The Monte Carlo simulation was repeated to generate 1,000 such paydown scenarios. Each of these scenarios consists of amounts of PHL principal repaid each month and the total PHL principal still outstanding at the end of each month. These 1,000 scenarios were averaged to find and define the

Average PHL Principal Payment Schedule. This average schedule was used to price the transaction.

The fourth and final schedule in the transaction was the PHL Repayment Warranty Schedule. This schedule is intended to provide a source of liquidity of last resort.

In the event the PHL collateral repays at very slow speeds, such that there may develop a short fall of cash flows needed to redeem the bonds, The Prudential will advance funds to the Issuer. More precisely, if at any time, on a cumulative basis, the PHL collateral is repaying at a speed slower than that underlying the Warranty Schedule, The Prudential will advance the shortfall of funds to the Issuer. The Warranty Schedule was constructed such that in none of the 1,000 Monte Carlo simulated scenarios was The Prudential called upon to advance any funds to the Issuer. Thus, The Prudential warranty was deemed to be *de minimus*.

The Warranty Schedule was designed to protect the bondholders against a very slow repayment of the PHLs. The other side of the risk profile for the bondholders is the fast pay scenario. To protect the bondholders against a premature call on their securities, we defined the Maximum Cumulative Bond Principal Payment Schedule which was derived from a corresponding Maximum Cumulative PHL Principal Payment Schedule. Even if the underlying collateral repays at a cumulative rate faster than that underlying this Maximum schedule, the bonds would not be redeemed any faster than this Maximum schedule. To make this work we had to have a mechanism whereby if the collateral pays too fast, we can reinvest the excess cash flow in some guaranteed instrument. With some effort we were able to find an AAA-rated bank that gave us a GIC for 54 years at a guaranteed rate of 5.00% for the first five years and 4.50% thereafter. The difficult part was the long term (54 years) of the guarantee and the AAA rating of the bank. It had to be an AAA bank because the securities rating agencies (and Jim Tilley will talk more about it) follow the weakest link theory in assigning rating to securitized transactions.

The equity investors (the owners of the Issuer) assumed the risk of both slow and fast repayments of the collateral. The equity was priced along the Average Schedule to yield certain expected return on their investment. The actual realized return on the investment would be less (more) than the priced return if the PHL collateral repaid slower (faster) than the Average Schedule.

Maximum Bond Value

A question that some of you perhaps have asked by now is: How do we know how many bonds we can issue up front and how many bonds should the trustee redeem at every bond payment date?" As I mentioned earlier, in order to maximize the value of the total PHL collateral, one would like to issue the maximum amount of bonds possible and to minimize the amount of equity securities. The dynamics of the transaction are essentially driven by the amount and structure of the bonds issued. Given the total expected cash flows from the collateral and the structure of the bonds issued, the structure and value of the equity get determined by themselves since the equity piece is the present value of residual cash flows. Thus, one essentially tries to issue the maximum amount of bonds possible.

The maximum amount of bonds that can be issued is typically determined by projecting the principal and interest cash flows from the collateral under the

"worst case" scenario with conservative assumptions as to reinvestment opportunities. Additionally, the cash flows determined under this scenario are discounted at a rate equal to the highest coupon of all tranches of bonds being issued. The actual details are perhaps not quite relevant for this presentation, but the basic objective here is to look at a scenario with the least cash flows with longest possible delays and discount them at the highest coupon rate. This scenario and the conservative methodology for determining the maximum face amount of bonds that can be issued against a given collateral are called "structuring assumptions" and the maximum amount of bonds that can be issued is often called the "bond value" of the collateral.

Once the initial bond value has been determined, it next is allocated to different tranches and the coupons and the average lives of these tranches are defined. This part of the structuring is directed toward maximizing the market value of all bonds issued for a given bond value of the collateral.

On each bond payment date, the trustee evaluates the total collateral still outstanding and determines the bond value as of that date. Given this new bond value, the trustee must redeem enough of the bonds (in the sequential order defined by various tranches) so that the total bonds left outstanding (including the coupons accrued into new principal for all Z-bonds) are equal to this new bond value. If the collateral pays down at a slow (fast) rate, the bonds would be redeemed at a correspondingly slow (fast) rate, except as provided by the Minimum and the Maximum Cumulative Bond Principal Payment Schedules.

For this PHL transaction, the theoretically worst case scenario for slowest paydown of the collateral would be no paydown at all (since the policyholders are never required to repay the loans). However, in combination with the Debt Reserve Fund and the Warranty Schedule, the worst case that needed to be considered for the structuring assumptions was zero paydown of the PHL principal until the PHL principal still outstanding was just higher than that specified in the Minimum Cumulative PHL Principal Payment Schedule (which Schedule, as previously noted, has a declining balance of PHLs outstanding). In this sense, therefore, the bonds were structured against this Minimum Schedule.

The transaction required several different funds and accounts. Following is a brief description of these.

Debt Reserve Fund

The Debt Reserve Fund (DRF) is intended to provide a source of liquidity to the transaction before it becomes necessary to borrow any funds from The Prudential. The objective was to further reduce the *ex ante* probability of having to borrow funds from The Prudential. Thus, the PHL Repayment Warranty Schedule encompassed cumulative repayment speeds which were even slower than those underlying the Minimum Cumulative PHL Principal Payment Schedule. If the PHL collateral repaid slower than that implied by the Minimum schedule, but not slower than the Warranty Schedule, the Issuer is not allowed to borrow from The Prudential but must instead look to the DRF to meet its cash flow needs. The DRF was funded up front when the transaction was initiated and was required to be maintained at certain funding levels throughout the life of the transaction.

A second major function of the DRF was to provide additional liquidity in the event the collateral repaid in a manner whereby the Issuer could be short of cash in some specific test scenarios (see discussion under "Stress Tests").

Collection Account
This account is used to collect all cash flows coming in to the trustee. These cash flows include the principal and interest payments from the PHLs which are passed by the Servicer (The Prudential) to the trustee every month, the Held Funds Interest paid by the Servicer for having withheld the funds for an average of fifteen days before passing them to the trustee, the investment income earned by the trustee on these funds, and all other reserve funds (such as DRF) available to the trustee to pay the bonds. On each quarterly bond payment date, the Collection Account is flushed out and all funds are applied to pay to the bondholders, and to other parties and reserve funds, as provided in the bond indenture.

Required Investment Reserve Fund
If the collateral repays at a cumulative speed faster than that provided in the Maximum Cumulative PHL Principal Payment Schedule there would be an excess of funds available since the bonds cannot be redeemed any faster than the corresponding Maximum Cumulative Bond Principal Payment Schedule. The trustee is required to invest some of these excess funds in the Required Investment Reserve Fund (RIR) rather than distribute them all to the equity holders. The funds in the RIR can be withdrawn to redeem the bonds if at a subsequent time the collateral begins to repay at a slower rate.

Expense Reserve Fund
The Expense Reserve Fund (ERF) is designed to maintain reserves to pay the ongoing administrative expenses of the Issuer. These expenses include legal, accounting and trustee's expenses, as well as other administrative expenses such as postage. The ERF was funded up front at the beginning of the transaction and was scheduled to be maintained at certain levels throughout the life of the transaction. The scheduled amount for the ERF was determined such that the Issuer could meet its expected expenses (some of which were guaranteed and some of which were projected with an assumed inflation rate) in most though not all of the test scenarios.

Equity Suspense Account
The Equity Suspense Account (ESA) was another very innovative idea in this transaction and was necessitated by the mismatch in the frequency at which coupon is payable on the bonds (quarterly) and the frequency with which interest is collected on the collateral (annually).

This issue does not come up in the CMO land and therefore the equivalent of an ESA had never been necessary in the CMOs. For mortgages, the principal and interest is payable every month and therefore there is sufficient cash on hand to pay bond coupons as frequently as monthly. In the PHL land, however, the interest on the collateral is collected annually. (The policyholder is not required to pay any interest in cash.) However, if the annual interest is not paid in cash on the policy anniversary, a new equivalent loan is made to the policyholder and the interest for the past 12 months is passed on to the Issuer (net of servicing fees). An adverse scenario that we came up with was as follows: The total collateral repays at the expected prepayment speeds, but in a very asymmetric manner such that after certain time all policies with anniversaries in the (say) first quarter have been terminated or the corresponding loans repaid otherwise. While the collateral is repaying at a relatively fast pace during the first three months of each calendar year, there is excess cash flow during this first quarter and a corresponding shortfall of cash flow during the other three quarters. Once the policies with anniversaries in the first quarter have been

eliminated from the collateral, and in fact some time before that, the situation is reversed: There is shortfall of cash flow in the first quarter and excess of cash flow in the other three quarters.

The ESA was designed to smooth over these excesses and shortfalls of cash flow during various quarters. Rather than keeping track of excesses and shortfalls for every quarter (a very tenuous process) we established the ESA as follows. Any excess cash flow which normally would be distributed to the equity holders on a given bond payment date must first be deposited in the ESA, and withheld there for a year, before being released from the lien of the bond indenture and passed through to the equity holders. Funds in the ESA are always available to meet scheduled payments to the bondholders as well as to fund other reserve accounts as required by the indenture. Thus, these funds are released from the lien of the indenture only if they are not needed elsewhere for a period of twelve months.

EQUITY SECURITIES

As mentioned earlier, in addition to the PHL bonds issued by PHL Funding I, Inc., this transaction had produced equity securities in the form of partnership certificates in PHL Limited Partnership I. These partnership certificates are entitled to receive all excess or residual cash flows after all other obligations as specified in the indenture have been satisfied. Basically, on each bond payment date, all funds available to the trustee are accounted for in the Collection Account (and, this includes cash flows from the PHL collateral, various reserve funds, investment income on these funds and Warranty Loans, if any). The trustee applies these funds to pay the coupons on all bonds then outstanding, to redeem the bonds as provided, to repay the Warranty Loans and to fund various reserve accounts such as the DRF, the RIR, the ESA, and the ERF as provided for in the indenture. The excess funds, if any, are to be released from the lien of the indenture and paid to the certificate holders (the equity owners), assuming that they have already been withheld in the ESA for a year as discussed before.

The price or the value of the equity certificates is determined by projecting all distributions payable to the equity holders and discounting them at a rate at which potential investors would want to buy those certificates.

An item to keep in mind is that once the funds have been released from the lien of the indenture, and distributed to the equity holders, they can never again be made available to meet any of the Issuer's obligations to the bondholders, even if at a subsequent time the remaining assets or cash flows become insufficient to service the debt.

The final item that I would like to discuss is that of "stress tests."

STRESS TESTS

A major part of our due diligence process in structuring this transaction was to assure various parties, including ourselves, that there were no obvious flaws in the structure or the mechanics of the transaction. To accomplish that we created a large number of PHL prepayment scenarios to stress all and various elements of the transaction and demonstrated that in all of these test scenarios the bonds would indeed be redeemed as scheduled.

One of the more interesting stress tests involved a scenario that represents a classic asset-liability mismatch situation. Consider a PHL prepayment scenario in

which the PHLs continue to repay at the fast rate underlying the Maximum Cumulative PHL Principal Payment Schedule for a certain number of bond payment dates. And then the prepayment rates suddenly become zero, that is, none of the PHLs are prepaid. This will occur only if the lapse rates, the mortality rates and the voluntary prepayment rates were to all become zero for this time period. This may not be a realistic scenario, but this was one way to stress the structure to its limits. In this zero prepayment scenario the only cash flow available to the trustee is the interest on the PHLs until, on a cumulative basis, the total PHL prepayments have slowed down enough that the trustee could borrow from The Prudential against the Warranty Schedule. However, the Issuer could have a cash flow problem long before the Warranty Loans become available: The total cash flow during this zero PHL prepayment period is the net coupon of 4.25% of the collateral then outstanding. However, even if no bonds need to be redeemed during this period, the interest cost of servicing the debt is about 10% of the debt outstanding. Thus, even though the Issuer's assets (the PHL collateral and various reserve funds) exceed the Issuer's liabilities (the bonds outstanding), the Issuer may have to default because it does not have sufficient cash flow to meet its debt obligations.

We addressed this situation by increasing the liquidity of the Issuer. And this in turn was accomplished by increasing the amounts in the DRF levels such that in any and all such scenarios the Issuer could meet all of its obligations to the bondholders.

In the end, we had developed a transaction structure that we believe adequately tested under various stress scenarios and we were able to create securities (debt and equity) that were rated AAA by S&P and that had enough of an investment appeal that we could price them efficiently to maximize the value of the PHL collateral and successfully place them with various institutional investors.

MR. JAMES A. TILLEY: Let me launch directly into the topics that have been assigned to me, all of which relate to the marketing of the various securities created in the transaction just described.

RATING ISSUES

There are several aspects of the transaction that bear on a rating agency's view as to creditworthiness. Rating agencies follow the "weakest link" principle -- namely, that a transaction can get a rating no higher than its least creditworthy component, generally irrespective of the importance of that component to the overall transaction.

For the structure that Michael Shante has described there are four aspects that bear on the credit rating:

1. Structural Soundness --
   Has the transaction been structured in such a way that the policy loan collateral, together with supporting reserve funds, investment contracts and other agreements, will provide sufficient cash flows to pay the required interest and principal on the bonds no matter how the policy loans pay down?

2. Provider of the Investment Agreements --
   How creditworthy is the provider of the various investment agreements (GICs) needed to support the structure, with particular emphasis on the GIC funding the RIR in the event that the policy loans repay very quickly?

3. Providers of Liquidity Support --
   How creditworthy is the seller of the policy loans, acting as a lender of funds to the Issuer in the event that the policy loans repay more slowly than specified in the warranty schedule?

4. Seller-Service of the Policy Loans --
   Given the inability to perfect a security interest in the transfer of the policy loans from the seller to the entity issuing the bonds, what type of claim does the Issuer have against the seller in the event of the bankruptcy of the seller?

Let me speak briefly to each of these in the context of The Prudential transaction for which the result was an AAA rating from S&P. To help S&P analyze the structural soundness for the deal, several "stress tests" were run, under which the policy loan collateral was assumed to repay very, very slowly or very, very quickly or in patterns of alternating slowness and quickness, etc. These were called stress tests because they caused all of the structural elements of the transaction -- the various reserve funds, investment agreements, liquidity support, etc. -- to come into play. The objective of the tests was to demonstrate that there would always be sufficient cash flow to pay interest and principal on the bonds.

In order to secure the AAA rating under the weakest link theory, it was important to find AAA money-center bank to provide the various GICs. This required us to look outside the United States to foreign-based banks. Swiss Bank Corp. was able to provide the most attractive terms.

It is Prudential's credit that matters with respect to the third and fourth aspects described above. Since S&P views Prudential an AAA credit both as to its senior unsecured debt and as to its insurance claims paying ability, the transaction was able to get the desired AAA rating.

The fourth point is interesting, however, in that its analysis causes one to distinguish between debt ratings and claims payment ratings. At first blush, it may seem that Prudential's "right of offset" -- namely, its right to offset outstanding policy loans against the full death benefits or cash surrender values otherwise payable under the policy -- has superior standing in a bankruptcy proceeding to any claims of senior unsecured creditors. While that is probably true so long as the right of offset remains in the hands of Prudential, it is unclear how an insurance commissioner would treat that right once it was sold to a third party. That uncertainty would probably cause a rating agency to base its rating decision on the debt rating of the insurer instead of its claims payment rating.

PRICING AND MARKETING THE BONDS AND EQUITY

Before one can determine how to price the debt and equity securities created in this transaction, it is necessary to understand fully their investment characteristics. Then one can determine the likely universe of buyers and the appropriate method of distribution.

From the beginning of our collective efforts to design this transaction, it was evident that a critical constraint was the marketability of the bonds. Since policy loans had never been securitized, it could be presumed that most investors, even insurance companies, would have little understanding of their characteristics. It also seemed reasonable to assume that the PHL bonds would be

compared to CMOs created from mortgage-backed securities (MBSs), for which considerable data regarding repayment speeds have been accumulated and for which many dealers have created elaborate pricing models.

As all of us began to study the repayment experience of Prudential's policy loans, it was apparent that bonds whose repayments of principal were tied to the actuarial experience of the underlying policy loans would provide a stable pattern of cash flow, especially when measured against CMOs. However, we had our doubts about whether investors would assign full credibility to the historical actuarial analysis, even after that analysis had been given additional scrutiny by independent, outside actuarial experts. Moreover, it could be argued that history might be an imperfect guide to the future especially since the passage of the 1986 Tax Reform Act phasing out the deductibility of policy loan interest might cause an acceleration of policy loan repayments or cash surrenders. For all these reasons, we decided to limit the payment variability of the bonds. Hence the birth of the maximum and minimum cumulative repayment schedules described by Michael Shante.

In the end, The Prudential transaction produced six tranches of bonds. Table 2 shows the shortest and longest possible average lives and the expected average lives of the bonds for each tranche. The term "average life" as used here has the same meaning as for a conventional sinking fund bond for which the principal is repaid in installments until the final maturity of the bond. Associated with any scenario of pay speed for the pool of policy loans sold by Prudential is a sinking fund schedule for each tranche of bonds. Given those sinking fund schedules, one can calculate average lives for each of the tranches. Because different pay speed scenarios can occur, one gets a distribution of average lives. Table 2 shows that the range of the distribution is tight, allowing us to make the safe assumption that the bonds can be priced off their expected average lives.

TABLE 2
PHL BONDS, SERIES A

Bond Class	Initial Principal Amount	Minimum Average Life	Expected Average Life	Maximum Average Life
A-1	$ 80,814,755	0.89	1.02 Years	1.05 Years
A-2	70,712,911	2.87	3.10	3.27
A-3	36,366,640	4.90	5.20	5.44
A-4	149,507,297	10.19	10.58	11.28
A-5	105,059,182	20.89	21.53	22.68
A-6	3,180,060	32.49	33.61	35.93

The PHL bonds are protected from optional call for nearly nineteen years. Thus, the first four classes are fully call protected and the fifth class is largely call protected. The predictability of cash flow and the extent of call protection are characteristics highly desirable to life insurers seeking to purchase assets appropriate to the nature of their particular liabilities. Classes A-2 and A-3 are appropriate for many interest-sensitive products, such as Single Premium Deferred Annuities (SPDAs), Tax Deferred Annuities (TDAs), Single Premium Whole Life (SPWL), various forms of Universal Life (UL) and GICs. Classes A-4, A-5, and A-6 fit the needs of structured settlement and pension plan

closeout annuities. The very short final maturity and average life of the Class A-1 bonds have appeal to thrift institutions due to the short-term nature of their banking
liabilities.

Due to possible "party-in-interest" problems under ERISA, none of the securities created in this transaction were offered to private pension plans. It was the feeling of counsel that suitable relief on this issue could be attained only through a specific prohibited transaction exemption from the Department of Labor. It may make sense to apply for such an exemption because several classes, especially the longest ones, would have special appeal to pension plans for managing their long-term liabilities.

Regulatory concerns surfaced on another front. Issuers often prefer to offer securities in the public markets because of the lower cost of funds achievable. This reasoning applies to the PHL transaction, but a public distribution of securities would have necessitated their registration under the Securities Act of 1933 and would further have imposed onerous, unwanted disclosure and ongoing financial reporting requirements on both the Prudential and the PHL Funding I, Inc., the Issuer. Accordingly, it was decided to pursue the private placement route and avoid all such registration and reporting requirements. The principal disadvantage of placing the bonds privately is reduced liquidity through restrictions on transferability, as for example, that there never be more than 100 beneficial owners of the debt and equity securities. In fact, the indenture restricts the number of holders of bonds to no more than 92, and the Partnership Agreement restricts the number of holders of equity interests to no more than eight, in order to comply with Section 3(c) (1) of the Investment Company Act of 1940.

The pricing of the bonds depends on several factors: quality, average life, stability of cash flow, liquidity and market conditions at the time of offering. As described earlier, the bonds in the Prudential transaction were rated AAA by S&P. It is typical in such an offering for each class of bonds to be priced at a spread off the yield of the U.S. Treasury bond having approximately the same maturity as the expected average life of the bonds. The high degree of stability of the cash flows suggested that the PHL bonds be priced at a tighter spread to Treasuries than Federal agency CMOs having comparable average lives. As to marketability, there were two factors: the large size of the transaction ($445,640,845 of bonds were placed) is favorable but privately placed bonds are generally much less liquid than publicly placed bonds.

When the bonds were marketed in early to mid-December 1987, the domestic debt markets were quite stable, having settled down considerably from their immediate post-October 19 crash jitters. Also, there was very little supply of similar debt securities in the market at the same time to compete for the attention and the appetites of investors.

The method of pricing and distribution first involved soliciting investors' indications of interest to purchase bonds at suggested levels known on the Street as "price talk." The initial demand was so great for these bonds that Prudential and the placement agents decided to tighten the yield spreads on most of the tranches and to double the size of the transactions. These two steps served to match demand and supply very closely, and resulted in pricing at spreads of 90-100 basis points off the short end of the Treasury curve and approximately 150 basis points off the long end of the curve, except for Class A-6.

I have chosen to talk about the bonds before the equity because the entire transaction is driven by the structure and pricing of the debt. However, the bonds were marketed only after the equity interests were placed. Those of you familiar with CMOs know that the equity interests in CMOs are called "residuals" and arise from excess cash flows of the underlying collateral. The same is true in the securitization of policy loans.

As Michael described earlier, the bonds are structured against a "worst case" slow PHL repayment speed assumption, and an assumption that all bonds carry interest at the highest rate applying to any class -- 9.25% in the Prudential transaction. Because Class A-1 bonds carry interest at only 8.50%, excess cash flows (not needed to pay interest and principal on the bonds) will arise from the PHL collateral. Moreover, the excess cash flows will be even larger if the policy loans repay at speeds faster than the worst case assumption. The economic value of these residual cash flows is realized for the seller of the PHLs by finding investors to purchase them.

Ownership of the PHL residuals for The Prudential transaction is in the form of interests in a limited partnership. In aggregate, four of these institutional investors and one managing general partner purchased all the equity interests for a price of $10,802,059. Their purchase decisions were largely based on the expected duration of the cash flows, about 5.5 years, and the pre-tax rate of return on their investment. The simulation model described by Jim and Michael was used to derive a distribution of pre-tax returns that could be expected on the basis of historical repayment experience for the policy loans sold. Graph 7 shows, an average return of better than 16% with a standard deviation of less than 2% gives an attractive risk/reward trade-off.

GRAPH 7