Monoline Insurance & Financial Guaranty Reserving

James P. McNichols, ACAS, MAAA

MONOLINE INSURANCE

& FINANCIAL GUARANTY RESERVING

James P. McNichols, ACAS, MAAA

Abstract

'Twas brillig, and the slithy toves
Did gyre and gimble in the wabe;
All mimsy were the borogoves,
And mome raths outgrave

- *Jabberwocky,* Lewis Carroll (1872)

Mr. Carroll's penultimate foray into language and verse that beautifully skates the thin ice between comprehensibility and nonsense had a certain relevance in my early days in the financial guaranty business. This was all I could think of during my first financial guaranty credit underwriting committee meeting. The thesis and content of the credit risk/return debate seemed vaguely within reach but the tenor and rules were entirely alien. It was soon evident that understanding this business model would not just be a matter of deciphering similar functions and concepts by transitive conversion. It was clear that an entirely different arena was in play with foreign registers and constraints.

1. INTRODUCTION

This paper describes a practical approach to reserving financial guaranty risks. It is intended as a primer for property/casualty actuaries in the basic risk principles and business models of financial guaranty insurance. It is requisite to review the underwriting

and pricing theory and other practices of this trade. An additional goal is to highlight several areas that will likely benefit from the application of traditional and alternative actuarial techniques.

2. BACKGROUND

A. Insurance

The financial guaranty industry began in Milwaukee, Wisconsin in 1971 when MGIC Investment Corp. convinced an Alaska municipality to purchase an insurance guaranty policy from a highly rated insurer to "wrap" (i.e. guarantee) the principal and interest on its first ever debt issue ($650,000) of general obligation bonds for a medical arts building and an adjacent sewage treatment facility. The incentive for the local government was to reduce its overall borrowing costs. They were right. It did.

A small number of credit insurers emerged that would provide an indemnity against the default risk of investment grade rated public finance debt issuance. They became known as monoline financial guaranty ("F/G") insurers since they only underwrote this unique risk (and in some jurisdictions were precluded from underwriting anything else). The operating thesis was that given sufficient security from existing revenue flows and considering the taxing authority available in support of many public finance debt issues, no municipal bond as defined would ever ultimately fail to pay interest or principal. Rather, a debt restructuring would likely be negotiated and any potential insurance loss

would simply be limited to the *cost of carry* (i.e., bridge financing during the negotiation phase).

The financial guaranty industry has since grown into a major source of credit enhancement. Financial guarantee insurance provides investors with guaranteed payment of timely interest and ultimate principal in the event that a debt issuer is unable to meet its financial obligations. The insurance guarantee is irrevocable and unconditional (and waives all defenses, including fraud) and results in the guarantor stepping into the shoes of the issuer in that it guarantees payments in accordance with the original transaction schedule on a timely basis. In the event the issuer fails to pay the coupon and/or principal on a timely basis the investor has recourse to the F/G insurer who will pay the timely interest and/or ultimate principal in accordance with the terms of the affected bond. This is a significant departure from the P&C business whereby a claim is made and negotiations begin as to what extent the claim is deemed valid. In F/G insurance you pay the investor now and argue with the issuer later. Absent that type of insurer performance, (known as a "capital market" standard), investors would have no incentive to buy "wrapped" bonds.

The established primary financial guarantors are rated AAA (or their equivalent) by each of Standard & Poors, Moodys and Fitch[1] and, by virtue of the guarantee, securities they wrap inherit their AAA rating.

[1] Standard & Poors, The McGraw-Hill Companies.
Moodys Investors Service.
Fitch IBCA, Duff & Phelps, a subsidiary of Fimalac.

Such AAA ratings provide the issuer with reduced borrowing costs (as the pricing benefits outweigh the cost of the guarantee) and better marketability of the bonds. As a general rule, monolines target roughly 2/3rds of the available spread as the required insurance premium. Investors benefit from enhanced security and liquidity of the insured bonds. They also benefit from the credit monitoring expertise of the guarantor and the comfort that the insurer is sharing the risk by lending its credit quality to the issue.

The most important strengths of the primary monoline insurers are their ratings. As a consequence, they work closely with the rating agencies to preserve them. Capital adequacy and solvency obviously play a key role in the rating agencies' credit assessments. In addition, rating agencies require that all potential transactions be of investment grade quality (i.e., at least BBB- or equivalent) before any insurance wrap is considered. Therefore, each transaction generally receives a "shadow" (non-public) rating by at least two of the three major rating agencies and, thus, a full deal rating agency review.

One of the more noteworthy regulations for the monolines is the New York Financial Guaranty Insurance Law (Article 69). The law establishes, amongst other things, the single risk limits applicable to all obligations issued by a single entity and backed by a single revenue source. Such limits are specific to the type of insured obligation (for example, municipal ("Muni") or structured-finance ("S-F") bonds (i.e. ABS, CMBS, CDO, etc...)). The limits compare the insured net par outstanding (for S-F) or average annual debt service (for Muni), as applicable, for a single risk to the insurer's qualified

statutory capital, which is defined as the insurer's policyholders' surplus and contingency reserves.

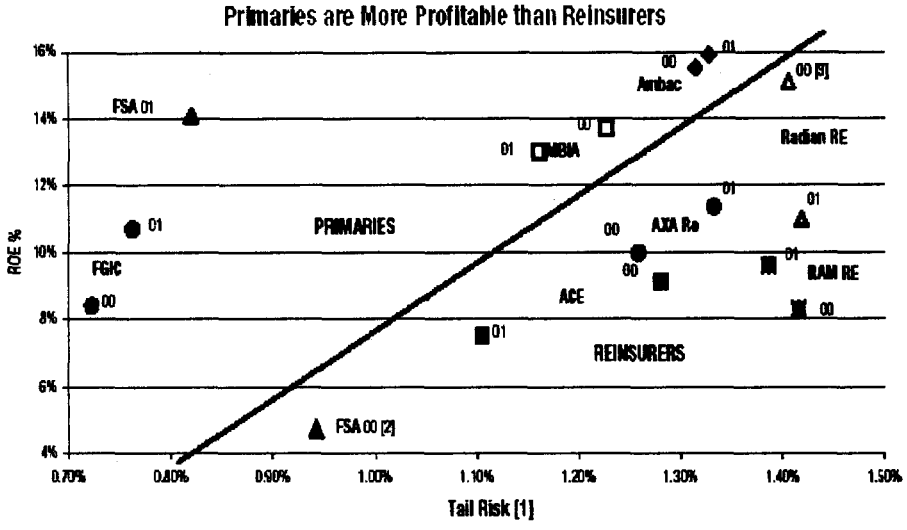
B. Reinsurance

Once the monoline insurance market began to mature, the primaries had a need for reliable and committed sources of reinsurance. Through simple quota share treaty support they could effectively leverage their capital bases. A small number of AAA monoline reinsurers emerged. These were basically passive, low cost operations that followed the fortunes of the primary insurers and embraced the concept of underwriting the underwriter.

Over time, however, the relationship between primary and reinsurer has changed and their interests became misaligned. F/G insurers had used reinsurance for risk management and portfolio shaping purposes. Currently, the F/G reinsurers are viewed as one possible option from several alternatives to effect capital and risk management solutions, putting the established reinsurers at a competitive disadvantage.

Graph 1 below demonstrates the dichotomy that currently exists in the relationship between the primary insurers and F/G reinsurers. As the primary insurers increased their capital leverage, at expense levels less than they charge, the reinsurers margin of safety was directly eroded. This results in a bi-modal distribution whereby the insurers systemically retain a better risk/return distribution.

Graph 1



1) Tail risk defined as loss at 99.9 percentile as a percentage of adjusted net par.
2) FSA's weak 2000 ROE reflected restructuring charges following the acquisition by Dexia.

Moody's[2] has recently published a monograph on the state of the F/G reinsurance market which provides an excellent overview of the risk/return thesis and other key issues affecting this business segment.

3. DIFFERENCES FROM PROPERTY & CASUALTY INSURANCE

The following highlights and explains several key areas. Throughout this paper the terms guarantor, insurer, monoline, F/G insurer, and the primary are all used interchangeably to reference a primary monoline financial guaranty insurance company.

[2] Moody's Investors Service "The End of the Monoline Financial Guaranty Reinsurance Sector?" (Special Comment December 2002)

A. Written and Earned Premiums

Muni risk exposures have relatively long terms (i.e. tenors) until final maturity. Most Muni bonds have final maturities that extend 20 to 30 years. Insurance premiums in the Muni area are in the form of non-refundable, upfront premiums, meaning that the full amount of the premium is paid at the time of the issuance of the guaranteed bonds. Under regulatory and GAAP constraints, the written premiums that have been paid become "earned" or recognized over a long time, according to a specific risk amortization schedule. The purpose of this accounting is to link the premiums paid to the average life of the "wrapped" obligation in order to provide for the fiscal stability of the F/G primary insurance company. A portfolio of Muni bonds will typically demonstrate aggregate straight-line amortization characteristics as the mixture of means tends to distribute uniformly across the book. Consequently, an in-force portfolio with average maturity of 20 years will have an average life of roughly 10 years (or one-half the legal term).

The total portfolio of pre-paid Muni deals results in a large unearned premium reserve (UEPR) which is recognized as earned premium over time as these long tenor obligations amortize. Changes in growth rate and earnings rate of the UEPR are critical estimates for the management of these books of public finance bonds. The UEPR is recognized as hard capital (i.e. cash or cash equivalent) for rating agency capital adequacy modeling since there are no conditions to its recognition except the passage of time. The actual recognition of the UEPR in reality is faster than the estimated accrual largely due to the incidence of bond refinancings during periods of lower interest rates.

If premiums are not paid in full at the beginning of the transaction, then they pay in installments (e.g., monthly or quarterly in arrears) over the life of the insured credit obligation. This is the typical method of payment for S-F deals. S-F deals usually have much shorter tenors, typically ranging from 3 to 12 years. While this money has not yet been received by the F/G primary insurance company, it represents a contractual annuity-like stream of money that will become paid in capital over time.

There is some risk in the F/G market that these future written premiums will not materialize. To mitigate this risk in structured finance deals, the flow of funds from the assets may be arranged so that the payment of premiums will come out of the available cash once payments to bondholders and other priority claims are made. In other words, the risk premium is obtained from siphoning off a portion from the available cash flow within the structured "waterfall" of payments.

B. Adjusted Gross Premium ("AGP")

The present value of the future installment premiums is an important statistic and when added to earned premium to date results in AGP for a given origination year. That is, cumulative premium earned to date plus the present value of future installment premium equals AGP. The estimated total AGP for an in-force risk portfolio contributes to the balance sheet capital strength. It is considered a highly secured receivable and almost the entire amount is contributed as soft capital in rating analyst capital adequacy models. Subtracting from AGP the present value of expected underwriting and operating costs, as well as the estimated ultimate loss costs, results in an estimate of the economic value

added. Typically, F/G underwriters are subject to budgeted amounts of expected AGP production per year. It is an efficient yardstick of deal production since it directly impacts growth in future earnings.

C. Adjusted Book Value

The stated Book Value ("BV") of an F/G insurer equals Capital & Surplus.
Adjusted Book Value (ABV) = BV + (PV of Future Installments) + UEPR.
It is growth in ABV that Market rating analyst's view as a credible proxy for growth in future earnings.

For mature portfolios the annuity-like earnings stream that derives from the in-force portfolio yields a stable growth in earnings pattern. Thus, it is not uncommon for mature F/G insurers to predict in advance up to 90% of subsequent period earned income. This type of stability in earnings growth promotes high relative multiples of the market value of equity over the book value of equity for publicly traded insurers.

D. Principal and Interest

All debt obligations are denominated in terms of principal (Par) and interest (Coupon) payments. There is usually a set schedule for the amortization of the debt but in several areas such as Asset Backed Securities ("ABS") the amortization schedule is variable and depends upon pre-payment levels, actual default experience and realized excess spread amounts within the structure. For ABS, an expected principal and interest (P&I)

schedule is established at inceptions and revised as appropriate if material volatility is observed.

Par Outstanding is the most common denominator used when disclosing notional risk exposure amounts or calculating capital charges. Principal & Interest ("P&I") is more often the reference numerator when calculating the relative leverage implicit in the portfolio.

E. Leverage

Total P&I divided by Total Hard Capital equals Leverage.

For example assume a monoline insurer with $15 billion par outstanding exposure, split $10 billion Muni and $5 billion S-F risk, and total interest obligations equal to $7 billion, (thus P&I equals $22 billion). If the insurer holds hard capital of $200 million then it retains a book that is Leveraged 110 to 1 (i.e. P&I / Hard Capital = $22 billion/ $200 million = 110).

Monolines are able to operate at much higher leverage amounts than many other financial markets owing to the fundamentally low-risk nature of their insured portfolio as well as the limited liquidity requirements they face. A typical book of Muni risks will run at leverage levels of 175 to 225 times hard capital and S-F books at 125 to 150 times. High leverage can be assumed because of the low credit risk assumed.

Table 1 below summarizes the Operating Leverage Statistics of the four largest established Primary Insurers as of Sept. 30, 2002

Table 1

	Qualified Statutory Capital	Debt Service Insured Ratio
Ambac	$3,597,000,000	146
MBIA	$5,326,000,000	143
FSA	$1,728,000,000	204
FGIC	$2,094,000,000	153
Weighted Average		153

Source: Bank of America Securities, Research Brief, Bond Insurance Monthly, January 2003

The risk/return strategies among the primaries have diverged since the business diversified away from its Muni origin in the late 1980's. At that time they all had similar risk portfolios at similar levels of leverage.

This highly leveraged capital model is not unique to financial guarantors. Nonlife insurance products are, in effect, derivatives (swaps and put options) that can accumulate risk to the seller in a highly leveraged manner. The guarantor leveraged capital model is also similar to catastrophe-exposed homeowners' insurers that do not buy catastrophe reinsurance or purchase reinsurance from companies facing similar risks.

F. Risk Amortization

Tracking the amortization of the in-force par risk is important to monoline insurers for a few reasons. First, it allows the insurer to monitor premium payments and forecast future embedded economic value. Secondly, it determines the premium earnings rate for GAAP

income purposes. Also, it provides a credible input into the estimation of the likely loss emergence pattern.

P&C insurance companies book premium received and earned in that underwriting period, but tail losses (and specifically latent loss liabilities) can emerge at distant future dates with little predictability. However, in the F/G business, as the credit obligation decreases with time, we observe an unbiased estimator of decreased loss potential which absolutely terminates (i.e., no tail risk exists) at final maturity. As such, demographic sorts by asset class of the average life statistics on F/G risk portfolios provides excellent surrogate "*a priori*" indicators of loss emergence probability. Herein lies the concept of **predictive latency**. As the observations from a given origination year increase with the passage of time, we obtain improved knowledge of the remaining loss potential. It partially relates to the increased credibility that derives from observing actual experience to date. However, it is different from latent P&C risks where tail risk predominates the uncertainty associated with estimates of the remaining unreported loss. Conversely, F/G risk falls away precipitously as the issues mature. The ultimate performance of the portfolio of structured debt obligations becomes more and more certain as the par risk outstanding unwinds.

Based on current information and prior knowledge, Philbrick's[3] approach would expect the credibility attached to the current observations to increase with:

- Increasing number of observations (i.e. the par risk continues to burn off);

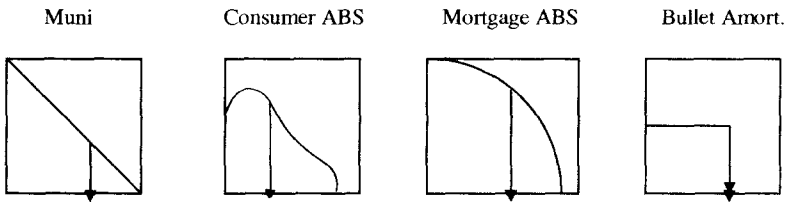
[3] Philbrick, Stephen W. An Examination of Credibility Concepts. PCAS LXVIII, 1981

- Decreasing process variance (i.e., the remaining probable losses are more closely bunched together than at time = zero); and
- Increasing variance of the hypothetical means (i.e., the remaining probable losses by product type produce means that are farther apart than at time = zero.)

G. Outstanding Average Life

Typical examples of risk amortization patterns and their corresponding average life estimates are provided in Figure 1 below.

Figure 1



Average life = Sum {(par payments) x (time index)} / Sum {(par payments)}.

This par weighted index of the undiscounted midpoint of the risk amortization period is an important statistic. The present value of average life yields risk duration.

Average Outstanding Life =

$$\frac{\text{Sum \{(remaining par payments) x (time index)\}}}{\text{Sum \{(remaining par payments)\}.}}$$

The present value of average outstanding life is analogous to the concept of curtate expectation from life contingencies (except that rate q(x) is replaced by a risk amortization rate). That is, given the observed performance of the credit to date, we actually have better information regarding its loss propensity over the remaining life than we did at risk inception. For example, given that you have survived to age 45, your curtate expectation for future longevity is reset to 40 more years. This risk-adjusted life expectancy estimate of 85 years exceeds the original life expectancy of say, 75 years established at birth (time = zero). Also, the confidence in the curtate expectation has increased. Similarly, in F/G risk, given the structure has performed as expected to the current observation point (i.e., survived), the confidence associated with the remaining expected default (i.e., death) potential has increased relative to that expected at inception. This is the inference of predictive latency.

H. Loss Payment Acceleration

In the event of a default on a F/G obligation, monolines are required only to pay timely interest and ultimate principal. That is to say, the F/G insurer is only required to pay interest and amortization payments on the defaulted obligation as they come due. New York insurance law does not permit the company to guarantee obligations that accelerate in the event of default. Article 69 of New York's Insurance Law regulates "financial guaranty insurance," which is defined in section 6901(a), as insurance

where a loss is payable upon failure of any obligor on or issuer of any debt instrument or other monetary obligation (including equity securities guarantied under a surety bond, insurance policy or indemnity contract) *to pay when due to be paid by the obligor or scheduled at the time insured to be received by the holder* of the obligation, principal, interest, premium, dividend or purchase price of or on, or other amounts due or payable with respect to, such instrument or obligation, when such failure is the result of a financial default or insolvency or, provided that such payment source is investment grade, any other failure to make payment, regardless of whether such obligation is incurred directly or as guarantor by or on behalf of another obligor that has also defaulted.

This prohibition against guaranteeing accelerating obligations is very significant for F/G insurers since the leverage present in their capital structure limits their ability to cover large losses on short notice. That is, monoline insurers are not geared for unpredictable liquidity calls.

I. Credit Default Swaps

Accounting standard SFAS 133 defines a derivative thus:

A derivative instrument is a financial instrument or other contract with all three of the following characteristics:

a. It has (1) one or more underlyings and (2) one or more notional amounts or payment provisions or both. Those terms determine the amount of the settlement or settlements... and in some cases, whether or not a settlement is required.

b. It requires no initial net investment or an initial net investment that is smaller than would be required for other types of contracts that would be expected to have a similar response to changes in market factors.

c. Its terms require or permit net settlement, it can readily be settled net by a means outside the contract, or it provides for delivery of an asset that puts the recipient in a position not substantially different from net settlement.

There are several general types of derivatives which include forwards, futures, options, swaps, caps, floors and collars. It is the interest rate, currency and credit default swap categories which F/G insurers have entered.

In a swap, both parties exchange recurring payments with the idea of exchanging one stream of payments for another. The credit default risk inherent in collateralized debt obligation (pools of corporate bonds or loans) transactions is often swapped through an International Swaps & Derivatives Association (ISDA) contract. This has become an area of investor focus, as has the underlying accounting for these transactions. In general, credit default swaps and the guarantees on collateralized debt obligations are considered derivative instruments per SFAS 133 for accounting purposes. As such, they must be marked to market, with the resulting economic gain or loss flowing through net income.

J. Mark to Market ("MTM") Accounting for Financial Instruments

MTM is an accounting method that relates to how traders calculate their trading gains and losses (the amount calculated) and how these gains and losses are reported (characterized) on a trader's income statement. MTM refers to the procedure F/G insurers follow at quarterly close, when they mark all open derivative positions to market prices evaluated at the last day of the close period. In effect a sale is imputed of all open positions (long and short positions). MTM is sort of like the "accrual method of accounting" in the sense that the "economic" reality (in deference to the cash reality) is reported on the income statement in the form of "realized" and "unrealized" gains and losses.

It is understandable that the monolines view the MTM income adjustment as temporary. Indeed, many MTM adjustments caused by widening market spreads on performing S-F credits "zero out" when the guarantee expires. Why then, F/G insurers argue, do they need to introduce volatility to the loss reserves and premium earnings where it does not in fact exist unless there is a permanent impairment in value? They assert that if the structures perform, then the interim mark provides a simple proxy for current market pricing and yields artificial profits as the deals mature. The monoline insurers do not view the underwriting risk any differently than if the risk had been executed as an F/G insurance policy. Consequently, they hold the open positions to maturity and thus any interim "imputed" adjustment is not particularly relevant to potential ultimate losses.

The primary insurers also assert that the mark-to-market should not be viewed as a consensus market measure of the required loss reserves on those policies. The capital market presumption with which the primary insurers do not agree is that changes in surrogate index market spreads across a portfolio of such trades provides an efficient predictive estimator for the risk adjusted capital charge implicit in these structured pools of largely corporate credit risk. As will be discussed further in the reserving section, the events that precede default on any credit enhanced bond are likely non-random and highly correlated. Suffice it to say that, at best, this would be an inefficient estimator of any such risk charge. At the discrete level (case specific) the individual MTM adjustment as described is not a credible estimate for expected case specific reserve liability. In the event that an S-F deal becomes distressed to a near loss likelihood, the best estimate of future liability depends upon the outcomes of several dependent, non-random events.

For example, given an S-F pool of corporate debt that is sufficiently distressed by a prolonged period of elevated corporate defaults, there are usually at least three parties that would prefer to remedy the debt issuance rather than force declaration of a default. These are the debt issuer, the investment banker/broker and the F/G insurer. In the case of the debt issuer it is clear that having to claim under the F/G insurance policy will impair its subsequent costs of borrowing. The investment banker that brokered the deal seeks to avoid impairment to its reputation from having structured a deal that failed. The insurer has an obligation to pay timely interest and ultimate principal but is concerned about whether investors who purchase its wrapped paper may demand a higher spread if it becomes known that it has recently underwritten some defaulted credit. Consequently,

a whole myriad of workout proposals may be tabled and agreed in advance of declaring any default. These economic forces converge such that the case specific claims process for most F/G insurance is dependent and non-random.

K. SURVEILLANCE

As indicated earlier, the monolines only consider underwriting credit risks that are of investment grade quality. At inception, the probability of default on Muni and S-F bonds is very low and in fact in most cases the cumulative chance of loss is less than 1 in 100. However, some deals do underperform and the stress can trip performance triggers within the structure. This migration in credit quality is cause for concern to the primary monoline. These insurers have surveillance professionals whose job it is to monitor the on-going performance of each credit. Although the specific scales vary, a credit impairment hierarchy exists to segment the portfolio as follows:

1. Performing credits with little or no need to actively monitor.
2. Performing credits with complex triggers that necessitate active monitoring.
3. Underperforming credits but with sound structure and active monitoring. These are called Caution List Credits.
4. Underperforming credits with a distressed structure and active remediation status. These are called Watch List Credits.
5. Distressed credits in which a default is imminent and/or losses are probable and estimable. These are called Loss List Credits.

4. UNDERWRITING

Credit risk is the common exposure throughout the monoline business and the entire range of financial guaranty products. However, in Muni and across S-F transactions it manifests in differing ways. The underwriting resources in this market typically come from a banking credit and/or capital markets trading background. As such the credit risk structuring rules and risk selection criteria derive from understanding the risks and designing or structuring the mitigants to each discrete risk under consideration. The following summarizes the key factors by type of product.

A. Municipal Bonds

These can be either general obligation bonds ("GO") (i.e. municipalities backed by the tax raising ability of the local government) or revenue bonds (where P&I is paid from cash flows of a specific project or site such as a highway toll, sewage plant, hospital, school board, etc.). Some of the larger debt issuers include California, NY, and their local governments and agencies. Average life is usually greater than 15 years but there is a low risk of default and high recovery upon default. All risks are investment grade (unless subsequent credit migration to BB+/Ba1 or lower which would result in immediate placement on the surveillance watch list).

The major types of Credit Risks include:

1. State obligor or municipality (function of tax paying ability of residents).

2. Revenue bond (function of volume or usage at a specific site).

The Surveillance Monitoring includes:

1. S&P Rating, Moody's Rating, capital charge, internal rating.
2. Single name exposure as a percent of capital base. Exposure could also be monitored by state, type, rating, term.

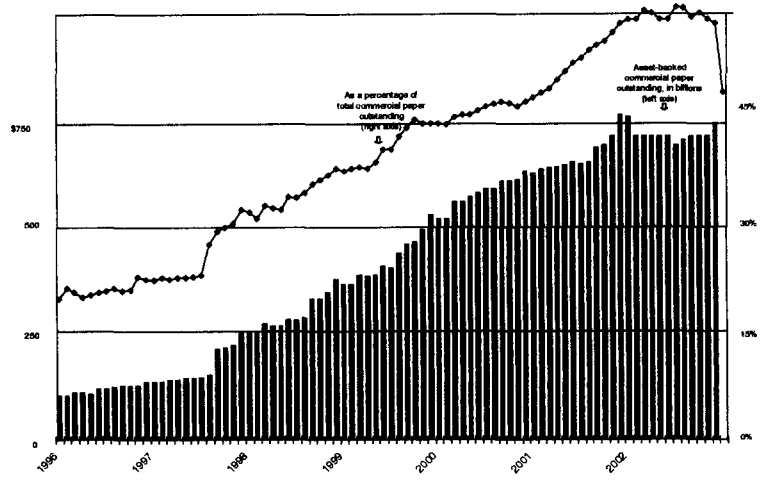
B. Asset Backed Securities

Generally defined as a financial guaranty of P&I obligations (bonds) backed by pools of illiquid assets such as credit card loans, residential mortgages, auto loans, equipment leases (including aircraft), small business loans, timeshare loans, etc.

In theory, the credit risk of the loan originator/loan servicer is structured out of the deal; in practice, the transition to a replacement servicer is not always smooth and some decline in asset value during transition to a replacement servicer is possible. This is generally a US-based business, but is expanding to Europe, Australia, Japan, South Korea and Latin America.

Graph 3 below summarizes the size of the market in Asset-backed commercial paper as compared to total commercial paper outstanding.

Graph 3



Wall Street Journal, December 20, 2002

C. Collateralized Debt Obligations

Financial guaranty of debt obligations (bonds) backed by a diversified pool of corporate loans or corporate bonds (which individually may be either investment grade or non-investment grade). Issuers include both investment management firms seeking to grow assets under management, normally through capital market issuances; and financial institutions seeking to hedge their corporate exposures and/or to lower required bank capital allocated to such exposures, normally through a "synthetic" transaction evidencing the risk transfer through a credit default swap. Assets may also include ABS bonds, catastrophe (P&C risk) bonds, other Collateralized Debt Obligation ("CDO") debt, venture capital loans or private equity, and emerging market corporate or sovereign

debt. These pools of securities are not likely to contain muni bonds, since their tax-free lower yields do not provide sufficient rate arbitrage. These instruments function like a leveraged version of an institutionally financed debt mutual fund. Through diversification, over-collateralization, subordination and cash trapping triggers embedded within the structure of the excess cash, investment grade ratings of the CDO debt are possible, even if the underlying collateral is below investment grade. There is a wide array of associated risks and other issues which include:

1. Single name risk within the CDO, although there is no loss payment until the first loss protection is eroded; depending on the structure, the deductible could cover numerous individual defaults.
2. Asset manager could be a bank (originator) or a portfolio manager – there is no direct risk other than a performance risk. Assets are held by a collateral manager or trustee.
3. Some trading of individual names is possible so the risk portfolio will change dynamically and reporting lag is variable.
4. CDO debt is rated. Each asset within the CDO is rated or shadow rated by at least one rating agency.
5. Assets within the CDO are monitored by rating (cash flow structure) or by price and liquidity (market value structures.
6. Aggregates are managed by industry and by geography to avoid concentration risks.

These credit types are monitored by name of CDO, the single name obligors within each pool, capital charge, type/rating.

D. Project Finance/Infrastructure Finance

Financial guaranty of P&I on debt used to finance essential infrastructure projects in the areas of power generation, highway toll roads, water treatment, etc. This may include quasi-utility supported type obligations. Typically structured to be non-recourse or limited recourse to a corporate sponsor but not near the same degree of isolation from bankruptcy risk of the sponsor as is implicit in ABS deals.

A matrix of credit risks relate to this guaranty including corporate risks/entities – off-take purchasers (customer of project), suppliers of raw materials, maintenance company, developer during construction, insurance company for insurance proceeds, etc. Extensive structuring makes these deals much more akin to ABS but implicitly Project Finance exposure is single risk so typically it often is grouped in Muni risk terms together with the banking/ legal/ sovereign risks.

E. Future Flow

Financial guaranty of P&I on financial-based flows of debt obligations backed by future cash receipts collected offshore which result from the sale, typically of a homogeneous export commodity (e.g. oil, copper and gas) or certain financial transactions (airline ticket receivables, credit card receivables, wire remittances etc.). Sponsor/servicer is typically a local blue chip corporate in a near-investment grade sovereign country, which can use future flow structuring to achieve an investment grade-rates transaction, which a

monoline in turn can enhance to AAA. Transactions employ offshore, bankruptcy remote special purpose entities ("SPE's"). This eliminates sovereign interference. Purchasers or financial counterparties sign irrevocable payment instructions, agreeing to pay US dollars directly to the offshore trustee. The structures are designed to permit debt issued at a higher rating level than that of the country in which the issuer is located. That is, the intent is to pierce the "sovereign ceiling" of the country rating through a structured credit.

There is performance risk on the sponsor rather than a direct credit risk. In other words, even if the sponsor is bankrupt, so long as it continues to sell products, cash will be generated to service the debt. Offshore purchaser of the exported product is under a long term contract.

F. Other Products

There are several emerging product areas which include:

- Sub-prime credit card receivables
- CDOs with municipal collateral
- Alternative student loans
- Business owner/operator loans
- Various types of leases
- Trade receivables
- Structured liquidity guarantees
- Structured investment vehicles

5. PRICING

The pricing of F/G products is not actuarially derived but rather based on capturing the majority of the available spread between the yield the issuer must pay with and without a surety wrap. In the ABS market it is estimated that roughly 1/3 of all transactions are wrapped by AAA monolines. Investors view surety wraps as appropriate for volatile collateral or that without a long performance history. Investors must also be careful to factor in early call risk that is often deemed to be low but is not nonexistent.

Monoline pricing constraints are clearly different from P&C since the monoline's highest priority is maintenance of its AAA ratings. Subject to this 3rd party constraint F/G insurers seek to maximize profit and optimize return on equity (ROE). Thus, the pricing paradigm for F/G insurers focuses on incremental risk capital requirements and the associated ROE. The business is ultimately a function of risk management (i.e. underwriting) and capital management.

Capital charges are attempts to measure transaction risk *within the context of a portfolio.* Consequently, the sum of the individual capital charges is not a reasonable proxy for the resulting capital allocation on the total risk portfolio. As used by Standard and Poor's[4] in the capital adequacy testing of bond insurers, capital charges forecast the level of losses that would be expected in a worst-case scenario. These worst-case scenario losses (net of reinsurance) are one input in the capital adequacy model. The other major inputs include new business growth, premiums written, net income, premiums earned, operating

[4] S&P Bond Insurance Book 2002, Understanding the Bond Insurance Capital Adequacy Model, pp 34-41.

expenses, investment income, asset sales, policyholders surplus, contingency reserves, asset carrying value, and dividends to holding company.

The primary output of the model is the ending statutory capital that in turn yields the margin of safety ratio. A margin of safety of 1.25 times signifies that ending capital (i.e. in a hypothetical wind-down scenario) exceeded losses by 25%. Stated another way, losses could have been 25% larger without driving the statutory capital below zero. The stated minimum margin of safety for 'AAA' rated bond insurers is 1.25 times and 1.00 times for 'AA' rated insurers.

In order to calculate a deal specific "return on equity" estimate, monoline insurers have developed an elegant shortcut to running the entire stress model each time a new transaction enters the existing risk portfolio. Rather, they begin with the capital charge but adjust it for the offsets provided by income flows and claims paying ability. The algebra reduces to an interaction among the debt service, cap charge, and risk leverage. The derivation of this formula as well as other credit risk and market risk pricing concepts are not the focus of this reserving paper. A subsequent pricing paper may provide analyses of the theory and practice of portfolio credit models and review actuarial approaches that apply.

There are several areas on the structured finance side that benefit from the application of traditional actuarial methods. In particular, consumer ABS products involve numerous cash flow and asset value distributions. Data availability and credibility are usually high.

Structuring depends heavily on time series analyses of historical pool performance. These mean regressive wave indications are used as a reference when setting the critical values of deal performance triggers to be embedded into the structure. The goal is to create a structure that demonstrates that the deal could withstand some multiple of the expected stress levels and still hold up under such pressure. These protection multiples often dictate the rating agency viewpoint. In the example we are about to review the letter ratings are determined as follows.

AAA	3.75 or greater times expected
AA	3 .00- 3.75 times expected
A	2.50 – 3.00 times expected
BBB	2 .00 – 2.50 times expected

Protection multiples and letter ratings are directly related but vary by asset class. Capital charge and letter ratings are inversely related. Higher ratings yield lower capital charges. A lower capital charge benefits the ROE estimate and improves the chances that the deal can be approved by the credit underwriting committee.

The following, Table 2, provides an example of calculating the protection multiple on a hypothetical pool of consumer ABS loans.

Seller/Servicer Bank - Consumer Receivables Securitization Pools Table 2
Calculation of Coverage Multiples by Issue and on a Cross-Collateralized Aggregate Portfolio Basis
Evaluated @12/31/02

Issue	Age	Expected Future Losses on Original Par	Expected Losses on Unamortized Par	Breakeven on Unamortized	Actuarial Coverage Multiple	Corresponding Letter Rating
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1999-B	45	0.6%	4.0%	19.76%	4.94	AAA
1999-C	42	0.7%	4.7%	18.59%	3.98	AAA
1999-D	39	0.7%	3.5%	17.22%	4.92	AAA
2000-A	36	1.0%	3.8%	17.45%	4.54	AAA
2000-B	33	1.1%	3.8%	16.81%	4.43	AAA
2000-C	30	1.4%	4.1%	16.61%	4.03	AAA
2000-D	27	1.7%	4.1%	16.36%	3.95	AAA
2001-A	24	2.1%	4.5%	16.60%	3.72	AA
2001-B	21	2.4%	4.4%	16.50%	3.71	AA
2001-C	18	2.9%	5.0%	18.09%	3.62	AA
2001-D	15	3.5%	4.9%	18.19%	3.74	AA
2002-A	12	4.3%	5.5%	18.59%	3.37	AA
2002-B	9	5.4%	6.7%	18.79%	2.82	A
2002-C	6	6.2%	6.9%	17.73%	2.57	A
2002-D	3	7.0%	7.4%	16.21%	2.20	BBB
				Cross-Collateralized Portfolio =>	3.20	AA

Notes:
(1) Outstanding in-force Securitizations @12/31/02.
(2) number of months since the term securitization incepted.
(3) = Exhibit 2, Sheet 1, [Col. (6) - Col. (4)].
(4) = (3) / {Exhibit 2, Sheet 2, Col. (6)}.
(5) from Exhibit 2, Sheet 1, column (8).
(6) = (5) / (4).

Exhibit 3 provides historical default frequency and loss severity amounts, expressed as a function of original par, in Sheet 3. Traditional actuarial development approaches are applied including the curve fitting steps from Sheet 2. Sheet 1 summarizes the ultimate estimates. This core frequency and severity analysis is basic but produces key assumptions for the calculation of the protection multiple.

Applying the summary portfolio statistics from Exhibit 2 on the seasoned pool performance to date allows the calculation of the protection multiples. All calculations and formulae are provided in the notes to the exhibits.

The progression toward higher letter ratings as each deal matures is to be expected. This is a critical differentiator from P&C risk in that the risk of loss is rapidly diminished as performing deals mature toward their average life. In addition, ABS structures often have minimum levels of credit enhancement which grow rapidly (as a % of par outstanding) as par declines. Of course, if you could cross-collateralize the individual issues into one collateralized bond obligation, then your protection multiple would be greater than that for any newly issued individual bond. The cross allows gains to inure to the benefit of losses across bond deals and offers a significant and measurable amount of additional security.

6. RESERVING

A. Historical

In the early years of the F/G industry, GAAP accounting prohibited mono-line insurers from establishing IBNR reserves, otherwise known as unallocated or non-specific reserves. The rationale was fairly straightforward and relied on the observation that once a municipal bond went into default, it would become a known "discrete" event in the financial markets and the F/G insurer would simply establish an appropriate case reserve estimate based on current information.[5]

Since market inception in the early 1970's average credit default rates on investment grade rated municipal bonds have been extremely low; in fact, lower than the default rate on AAA rated corporate bonds. General obligation and essential service bonds have been particularly safe investments. Compared to corporate bond experience, rated municipal bond defaults have been much less common and recoveries in the event of default have been much higher.

A recent Moody's default study indicates that out of 28,000 municipal issuers rated over the past 30 years, only 18 (0.06%) have defaulted on their public debt obligations, compared to 819 (11.7%) defaults out of 7,000 rated single corporate issuers (Note:

[5] McKnight, M.B.,"Reserving for Financial Guaranty Products," Casualty Actuarial Society *Forum*, Fall 2001, 256-269

Monoline insurers do not underwrite default risk coverage to individual corporations, with the exception of regulated utilities, but rather to structured pools of corporate loans and debt).

A main tenet of the early market reserve treatment was that there could not be any "pure" IBNR claim; therefore, there is no requirement to establish an unpaid liability provision for that which has not occurred. There can be future development on known claims, but these reserve movements would be reflected in future periods by adjusting the case reserve as information improved on the expected recovery rate.

This approach assumed discrete loss emergence when in fact loss emergence on financial guaranty risk derives from a continuous process. On a portfolio basis, at T = O it is expected that losses will occur. *A priori*, however it is unknown which individual bonds will produce losses. At any point, after inception, socio-economic and dynamic market forces are in play, and each guarantee has a loss propensity that fluctuates in a process not unlike the movements of mark-to-market estimates on a basket of highly liquid currency options, for example.

Surveillance monitors the risk of loss on all deals and highlights those that have tripped performance triggers or have had their subordination (deductible) levels materially eroded. These transactions are placed on caution lists and considerable internal resources monitor the performance of the underlying credit. If it further migrates to a watch list, remediation activity is considered. This is the inflection point whereby the expected loss outcome ceases to be determined by independent and/or fortuitous events. Negotiations

incept in a partisan or tripartite manner to attempt to reasonably avoid incurring losses. This defines a biased, non-random variable that will not likely improve any estimate of true mean loss by type of product.

Clearly, at inception higher rated credits (i.e. AA/AAA) are less likely to require loss payments than those starting at lower ratings (i.e. BBB). Nevertheless, independent and covariant forces of inflation, tax rates, interest rates, unemployment, etc., conspire to produce losses in all guarantee types. The frequency and severity characteristics vary widely by product type but the losses are embedded within the in-force book at time = 0, in other words, inception of the origination year.

For many years the F/G insurers were predominantly underwriting municipal bonds, insuring general obligation and project-specific financings for municipalities. The Muni guarantee business had minimal losses and was profitable for many years because municipalities rarely default and almost never repudiate their debts. Since the monolines were rarely required to pay bond interest payments, and typically only for brief periods of time, the business was inherently low risk and had limited liquidity requirements. In other words the early underwriting of F/G insurance on GO and essential service bonds was equivalent to "zero loss" underwriting.

The IBNR (or general) reserves were established as a function of new debt service (i.e. P&I) underwritten and the average rate was around 2 to 4 basis points on total P&I. This level had been established based on a study of historic bond defaults experienced by the F/G insurers and the composition of their portfolio.

Table 3 below summarizes the Loss Reserve Positions of the four largest established Primary Insurers @ Sept. 30, 2002.

Table 3

	Unallocated Loss Reserve	Net Par Outstanding	Reserve as % of Net Par Outstanding
Ambac	$120,000,000	$354,017,000,000	0.034% or 3.4 bps
MBIA	$283,000,000	$483,374,000,000	0.059% or 5.9 bps
FSA	$108,000,000	$257,932,000,000	0.042% or 4.2 bps
FGIC	$23,000,000	$181,535,000,000	0.013% or 1.3 bps
Weighted Average			0.042% or 4.2 bps

Source: Bank of America Securities, Research Brief, Bond Insurance Monthly, January 2003

Due to saturation of market penetration in the basic types of Muni bonds, the monolines expanded into non-taxpayer supported, project based, public finance transactions like hospitals, stadiums, and toll roads which suffer from similar risks to those incurred in private enterprise. Unlike traditional municipal guarantees that rely on a city's or state's taxing authority, tax-exempt project finance relies solely on a project's cash flows and its long-term operating performance to meet its obligations.

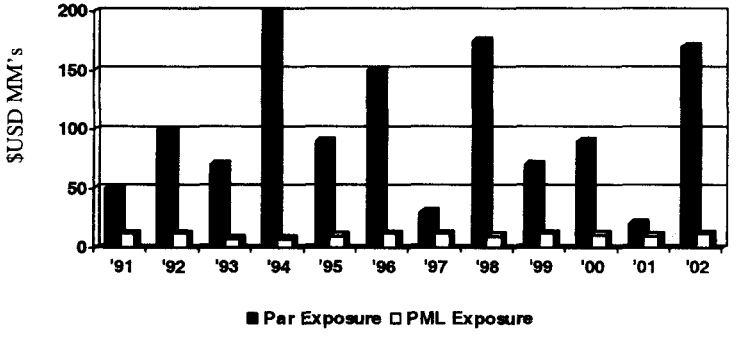
Consequently the mix of business was changing dramatically and viewing notional Par Outstanding as the common denominator of the risk metric was becoming no longer valid. The better measure of loss value at risk could be derived from the Adjusted Gross Premium.

Graph 2 below demonstrates an incongruity by using Par O/S as proxy common denominator in any measure of value at risk. Monoline insurers underwrite to different leverage targets that are themselves ever changing as a result of differing business strategies in dynamic markets. That is, each origination year defines a unique mixture of

mean loss propensities. The notional par insured amounts rise and fall dramatically from year to year. Better estimators of capital at risk are available and earned premium will likely better reflect changes in underlying risk.

Graph 2

Par O/S vs. Value at Risk



B. Recent Developments

In the mid to late 90's the F/G monoline insurers expanded rapidly into domestic and global structured finance guarantees on asset classes including sub-prime home equity mortgages, manufactured housing finance, aircraft leases and equipment trusts, bonds backed by hotel taxes, commercial mortgage-backed securities (CMBS), credit card receivables, auto loans, rental fleets, health care equipment financings, student loans, investor-owned utilities, credit default swaps, collateralized debt obligations backed by high yield and investment grade bonds (CDOs), synthetic CDOs (portfolios of credit-default swaps that are then securitized and guaranteed), emerging market CDOs, and other project finance.

The F/G insurers today hold a markedly different book than that retained in the early Muni era. Corporations and consumers, the underlying borrowers of structured finance portfolios, are more likely than cities to default on their obligations and do, in fact, repudiate their debts in the bankruptcy process. Corporations also, of course, have no ability to access taxpayer funds to repay their liabilities.

The result of all of this is that whilst the concept of zero loss underwriting may still be valid for a few traditional classes of Muni bonds, the F/G insurers have gravitated to an in-force risk portfolio that contains higher potential default frequency and loss severity characteristics with more uncertain correlations than those observed in the past. Recently, the largest monoline insurer altered its longstanding reserving methodology and moved to an earned premium based metric.

C. Basic Actuarial Approach

An actuarial postulate that losses exists at time = 0 within the in-force book of a portfolio of financial guaranty risks is the same as that applied on a book of mortality risk on a pool of insured lives. The only difference is the relative credibility assigned to the hypothetical means[6]. In life insurance, mortality tables can be applied to determine, with minimal mean estimation error, how many deaths (defaults) the pool will experience in

[6] Hypothetical mean refers to the average frequency, average severity, or average aggregate claim amount (i.e. pure premium) of an individual combination of risk characteristics. Philbrick [1981]

subsequent periods. In neither case, can we indicate with any certainty which individual risks will incur a loss.

In the case of mortality risk, the credibility associated with the mean frequency and severity estimates is relatively high whereas, for financial guaranty, the confidence around the mean frequency and severity estimates is relatively low. As such, the unpaid loss reserves in life insurance can reasonably be selected at the conditional expectation (i.e., the 50^{th} percentile from the cumulative distribution function).

Due to the greater relative uncertainty associated with the estimates of mean frequency and severity in financial guaranty products, the variance by asset type hypothetical means produces lower credibility in the estimated aggregate loss distribution. The more skewed form of the financial guaranty loss distribution produces an expected value of the process variance that is significantly higher than its mortality risk counterpart. Therefore it is more prudent when establishing the expected losses to book at higher relative confidence levels. This type of reserve risk loading for parameter uncertainty is common to all risk classes that require actuarial estimates of unpaid liabilities.

Table 4 below provides an informal force-ranking of the relative credibility under various insurance risks underwritten by large P&C multi-lines that also assume financial guaranty risk and the associated reserving methods.

Table 4

Risk Type	Aggregate Loss Distribution Credibility Ranking	Reserving Methods
Primary Workers Comp.	Extremely High	LDF
Life Insurance	Very High	Mortality Tables
Personal Automobile	High	LDF
Commercial Liability	Medium	LDF, B-F
Umbrella Liability	Medium	LDF, B-F
XS Property	Low/Medium	B-F, S-B
XS Umbrella Liability	Low/Medium	B-F, S-B
Financial Guaranty	Low	S-B
XS Casualty Reins.	Very Low	ELR, S-B
Wind & Quake Cats	Extremely Low	ELR

Today, low credibility risk portfolios, such as excess casualty reinsurance and hurricane & earthquake cats, have a widely accepted methodology for IBNR reserves. This is a portfolio-wide Bayesian approach. The reserves have been established on the basis that the portfolio of risk will incur a long-term mean level of losses. In recent years, GAAP accounting has accepted the practice of establishing unpaid liability reserves for the traditional mono-line insurers. However, in the current movement toward accounting transparency (largely affecting life products, pensions and investments) there is a renewed debate as to which actuarial method and analysis will best apply. Bayesian approaches deal with this "credibility debate" directly through mathematical modeling. Accounting methods do not want to work with uncertainty but rather seek a point estimate.

Financial guaranty premium is earned in lock-step with the par amortization and via capital market mechanisms it tends to self-correct for arbitrage from credit spreads and leverage. Capital market risk pricing is typically efficient thereby producing a premium

stream that inherently reflects the imputed market risk. Given sufficient prior knowledge and substantial technical and computational resources, we would construct a predictive distribution for aggregate claims during each subsequent period, based upon prior aggregate claim parameters. An innovative alternative that does not explicitly require prior information to calculate the credibility, and does not require as many resources, has been suggested by Bühlmann.

Appropriately determined mathematical models are extremely good descriptors of size-of-loss distributions. They are often more convenient than the actual or empirical distributions when changes are necessary, for example, to predict future conditions. Bayesian methods can be used to introduce subjective ideas about the model. That is, actuaries are encouraged to introduce any sound a priori beliefs into the inference.

A reserve estimation technique that overcomes some of the problems with the Bornhuetter-Ferguson method was independently derived by James Stanard[7] and Hans Bühlmann[8]. Like the LDF and B-F methods, Stanard-Bühlmann uses an aggregate loss emergence pattern that is estimated via the amortization of the risk obligation. The key innovation is that the initial expected loss ratio across the book is estimated from the composite industry loss experience, instead of being arbitrarily selected based upon informed management judgment.

[7] Weissner, Edward W. "Evaluation of IBNR on a low frequency book where the emergence pattern is incomplete". *Casualty Loss Reserve Seminar Transcript*, 1981.
[8] Bühlmann, H., *Mathematical methods in risk theory. New York: Springer-Verlag.*

A clear advantage of the S-B technique over the ELR method is that as actual losses emerge, the portfolio reserve estimate adapts to yield the credibility weighted mix of the mean losses and the prior expectation. The portfolio reserve level will gradually rise and fall with time driven by the underlying risk characteristics influencing the loss emergence pattern. This provides a natural mechanism that determines when and to what extent accrued reserves for maturing origination years may be released to pay losses or to income in the absence of losses. The S-B determined IBNR reserve provision may be viewed as a rolling annuity provision whose aggregate accrual rate tracks with the inherent risk of the book. It is as close to a fair value estimate of the unpaid liabilities you may hope to obtain, given the shortcomings of the data and the imposed constraints of biased, dependant, and non-random claims events.

i) Analysis

In risk portfolios like excess property/casualty reinsurance and financial guaranty, the observed loss ratio from several successive years observations may be zero but other non-zero results may occur that vary widely to pure loss ratios as high as 100% or more.

Stanard and Bühlmann argued that by establishing an in-force portfolio reserve that mimics the inherent industry composite ratio over several years, the *a priori* reserve estimate strikes the appropriate balance between stability and responsiveness. As the risks amortize and actual losses emerge the portfolio reserve level is self-adjusting according to the barometer of current conditions. This strikes the appropriate balance between Stat and GAAP accounting pressures. The balance sheet (stability) and income

statement (responsiveness) are stated with minimal accounting distortion driven by the absence or presence of sporadic individual loss events.

ii) Initial Expected Loss Ratio

Table 5 below summarizes the ultimate loss estimates (000's omitted) from the Annual Statement- Schedule P, results from the financial guaranty insurers for the 1990's.

Table 5

	Earned Premium		Ultimate Loss&ALAE		Ult. Loss & ALAE Ratio	
	Direct	Ceded	Direct	Ceded	Direct	Ceded
1990	$ 275,805	$ 51,863	$ 30,112	$ 1,991	10.9%	3.8%
1991	455,560	115,294	33,509	11,845	7.4%	10.3%
1992	582,146	166,810	108,725	55,236	18.7%	33.1%
1993	807,661	195,584	4,690	283	0.6%	0.1%
1994	698,865	162,916	165,910	94,603	23.7%	58.1%
1995	594,420	144,338	18,156	5,365	3.1%	3.7%
1996	725,974	168,923	288	131	0.0%	0.1%
1997	826,034	182,550	33,123	2,395	4.0%	1.3%
1998	1,071,590	228,864	480,756	68,423	44.9%	29.9%
1999	1,244,612	297,198	74,956	36,818	6.0%	12.4%
Total	$ 7,282,667	$ 1,714,340	$ 950,225	$ 277,090	**13.0%**	**16.2%**

Source: Annual Statement for the year 2000, Schedule P – Part 1 – Summary for MBIA, Ambac, FSA, FGIC.

It is not unexpected that the aggregate 10 year ceded ratio would exceed its corresponding direct ratio (here by roughly 1/4). Whether this is a function of adverse selection or excessive ceding commission is problematic. That an industry-wide portfolio of reinsurance bears a higher loss ratio than its direct portfolio is not entirely surprising.

The mean ten year observed ceded loss ratio of 16.2% derives from a continuous loss distribution with a large coefficient of variation ("CV" = Std. Dev/Mean). This is reasonable since we are dealing with extremely low frequency/high severity exposures.

Since we have only ten observations, the sample error associated with the 16.2% mean estimate is also relatively high. In a primary worker's compensation comparison, the expected error around the mean loss ratio estimate is relatively low. As such, selecting the 50^{th} percentile fitted ratio as a proxy for the true mean ratio is reasonable; however, for financial guaranty risk it is more prudent to select an *a priori* ratio at higher confidence levels.

The sample loss ratio data were drawn from an industry with initial conditions largely insuring lower risk municipal bonds during a strong prolonged growth economy. This would tend to produce actual loss ratios lower than that embedded within the current in-force book.

For the reasons stated above, the initial expected loss ratio for current market risk portfolios should probably be set a level greater than historical average of 12% to 16% of AGP.

iii) Loss Emergence Pattern

For the Stanard-Bühlmann method the "percent of ultimate" pattern is assumed to remain relatively stable within product type. Stable "percentages of ultimate" is the assumption

that we use to determine the outstanding losses. It is not necessarily the assumption we use to determine the pattern[9].

It has been demonstrated that the potential default frequency and loss severity characteristics of the traditional Muni exposure and S-F exposure are likely different. As such, each origination year will possess a unique aggregate loss emergence pattern that derives from the composite mix of these two basic business exposures. While it is tempting to bifurcate the analysis, there exists no credible basis from which to determine whether neither, either or both risk types will contribute to actual loss. Consequently, the loss emergence pattern is constructed as a hybrid of both. After all, mixture of means is not an encumbrance to this approach. We will not attempt to apportion IBNR back to type of product.

In the absence of any credible loss development history (like schedule P or other historical average loss development metric) one could establish the loss emergence pattern to be concurrent with the amortization of the par outstanding exposure.

This provides a fairly latent pattern that would expect very little if any loss emergence in the early years. The resulting approach would be more akin to an ELR method in that almost all of the accrued IBNR would remain as reserve in the early years and in the absence of any observed loss activity in later years large chunks of IBNR reserve would be released to income. A major shortcoming is that it lacks an objective mechanism whereby IBNR is accrued and subsequently released to pay losses or to income in the absence of expected loss payments.

[9] Feldblum, Sholom, "The Stanard-Bühlmann Reserving Procedure – A Practitioner's Guide"

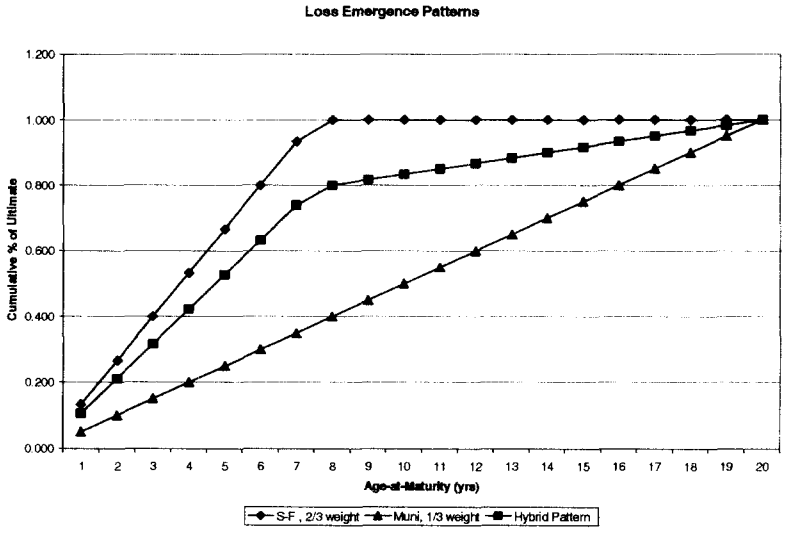
Analysis of the risk demographic by origination year demonstrates that while the proportionate mix of Muni vs. S-F may fluctuate from year to year the average outstanding life parameter within each product type remains fairly stable between origination years. The S-F segment will typically have an aggregate average life of 5 to 10 years and the muni book with 15 to 20 years.

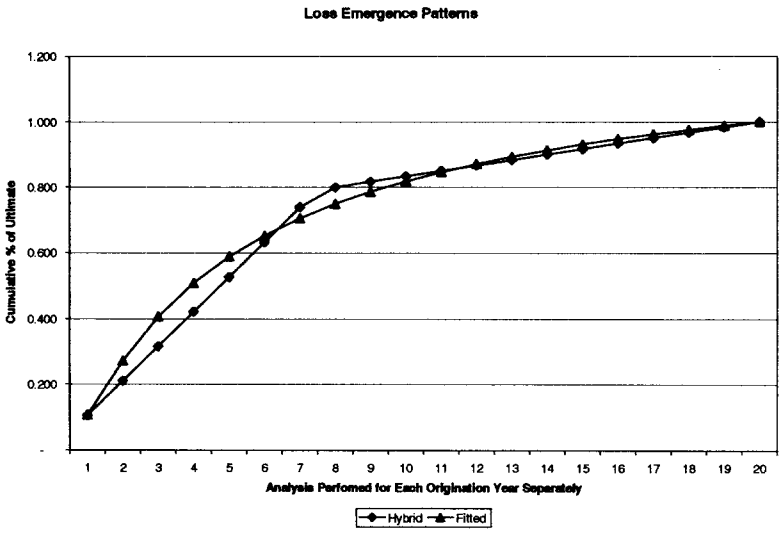
Based on discussions with surveillance and credit officers from various monolines and rating agency analysts there appears an emerging consensus that the loss emergence for S-F classes tends to be front-loaded. For example, in consumer ABS there are clear warning signs sooner rather than later in those instances whereby the credit is underperforming. Early underperformance does not necessarily predict that incurred loss will result. The structure of the deal may often mitigate an actual loss event. Conversely, if S-F deals perform more or less as expected in the early stages, the protection multiples usually increase with time and the loss propensity drops off precipitously. Similarly, municipal default statistics demonstrate a propensity toward increased relative defaults in the early years and less in the later years. This has an intuitive appeal in that once a municipality has geared its revenue flows to meet its debt borrowing obligations and these are performing as expected, it becomes increasingly unlikely that the existing debt burden cannot be adequately serviced in the future from the same revenue base.

Accordingly it appears reasonable to estimate the loss emergence pattern by reflecting the proportionate mix of Muni vs. S-F. This results in an expectation that loss activity will emerge sooner than that indicated by the scheduled par amortization schedule.

Graph 3 showing (1) the composite pattern and (2) the fitted pattern used in the example.

Graph 3





An expected pattern is calculated as the par weighted average of the S-F and Muni books. The individual plots reflect the separate amortization tendencies toward a target outstanding life parameter. The hybrid pattern is fitted to an inverse power curve to produce a more continuous emergence pattern.

iv) Stanard-Bühlmann IBNR Estimate

Table 6 below summarises the calculations required to obtain a Stanard-Bühlmann estimate of IBNR for a hypothetical F/G risk portfolio.

Projected IBNR Reserve Analysis @12/31/10 Table 6

Calculation of Stanard-Bühlmann (S-B) IBNR Estimate

Origin. Year	Earned Premium	Incurred Losses	Incurred Loss Lag	S-B IBNR Estimate	IBNR via LDF Method	IBNR via ELR Method	S-B based Ultimate Loss Ratio	LDF based Ultimate Loss Ratio	ELR based Ultimate Loss Ratio
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2001	$100,000,000	$20,000,000	1.000	$0	$0	$5,000,000	20.0%	20.0%	25.0%
2002	$180,000,000	$5,000,000	0.900	$4,500,000	$555,556	$40,000,000	5.3%	3.1%	25.0%
2003	$240,000,000	$20,000,000	0.800	$12,000,000	$5,000,000	$40,000,000	13.3%	10.4%	25.0%
2004	$294,000,000	$25,000,000	0.700	$22,050,000	$10,714,286	$48,500,000	16.0%	12.1%	25.0%
2005	$327,000,000	$0	0.600	$32,700,000	$0	$81,750,000	10.0%	0.0%	25.0%
2006	$341,000,000	$125,000,000	0.500	$42,625,000	$125,000,000	($39,750,000)	49.2%	73.3%	25.0%
2007	$300,300,000	$0	0.400	$45,045,000	$0	$75,075,000	15.0%	0.0%	25.0%
2008	$247,750,000	$15,000,000	0.300	$43,356,250	$35,000,000	$46,937,500	23.6%	20.2%	25.0%
2009	$181,680,000	$0	0.200	$36,336,000	$0	$45,420,000	20.0%	0.0%	25.0%
2010	$99,920,000	$0	0.100	$22,482,000	$0	$24,980,000	22.5%	0.0%	25.0%
Total	$2,311,650,000	$210,000,000		$261,094,250	$176,269,842	$367,912,500	20.4%	16.7%	25.0%

Notes:

(2) Cumulative premium earned on insurance policies and structured credit derivatives from Exhibit 4.

(3) from Exh. 4.

(4) assumed for simplicity to emerge 10% each year.

(5) = [(2) x 0.25] x [1 - (4)]. Initial Expected Loss Ratio assumed = 25%.

(6) = [(3) / (4)] – (3).

(7) = [(2) x 0.25] - (3).

(8) = [(3) + (5)] / (2).

(9) = [(3) + (6)] / (2).

(10) = [(3) + (7)] / (2).

At any given evaluation point, the S-B method will strike a balance between the inelastic ELR method and the highly elastic LDF method. However, the more meaningful advantages of the S-B method for F/G are demonstrated when we review the estimates on individual origination years and the overall portfolio over successive evaluation intervals.

All the requisite information to construct the table above is provided in Exhibit 7. Also all of the hypothetical data supporting the following discussion may be found in Exhibits 4 through 7 depending upon the specific scenario.

Exhibit 4 – Assumes no losses are ever reported.

Exhibit 5 – Assumes that reported losses always emerge as expected.

Exhibit 6 – Assumes that reported losses are observed at three times the expected case.

Exhibit 7 - Assumes hypothetical sparse and erratic reported losses.

Otherwise given for each scenario;

1. A 25% industry-wide *a priori* expected loss ratio.
2. A 10 year linear emergence pattern. This is for the sake of simplicity but any inferences derived are valid for other curve-linear emergence patterns.
3. Expected (over the life) notional premium for the first origination year equal to $100 MM. Premium growth for successive origination years at 100%, 50%, 40%, 30%, 25%, and 10% thereafter.

Each exhibit tracks ten years of the following key statistics for each origination year separately and for the overall risk portfolio combined:

A. Estimated Ultimate Loss Ratio

B. Cumulative Incurred Loss

C. Cumulative Earned Premium

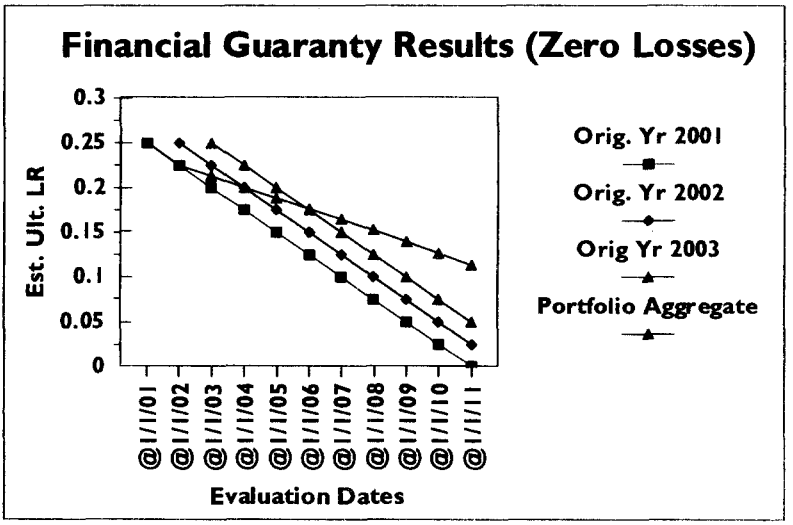
D. Reported Loss Ratio

E. Cumulative Estimated IBNR

F. Expected Emergence of Reported Losses

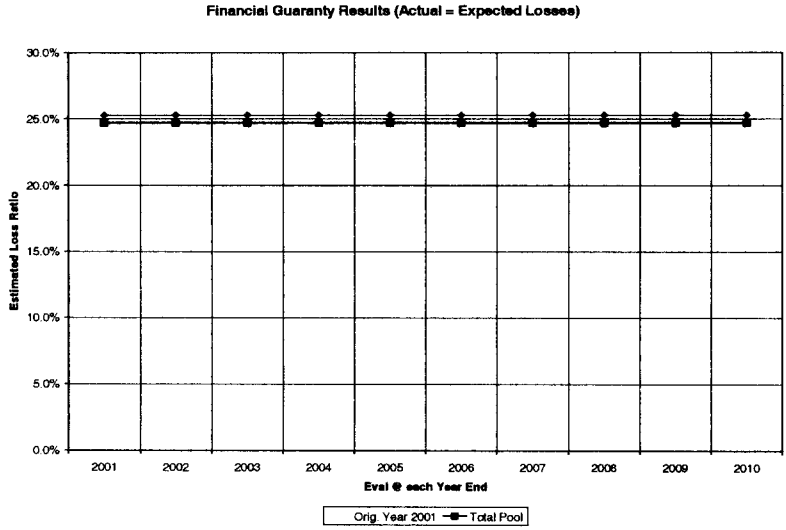
Graph 4 below plots the movements in estimated ultimate loss ratios for the early origination years and the overall portfolio assuming no losses are ever reported.

Graph 4

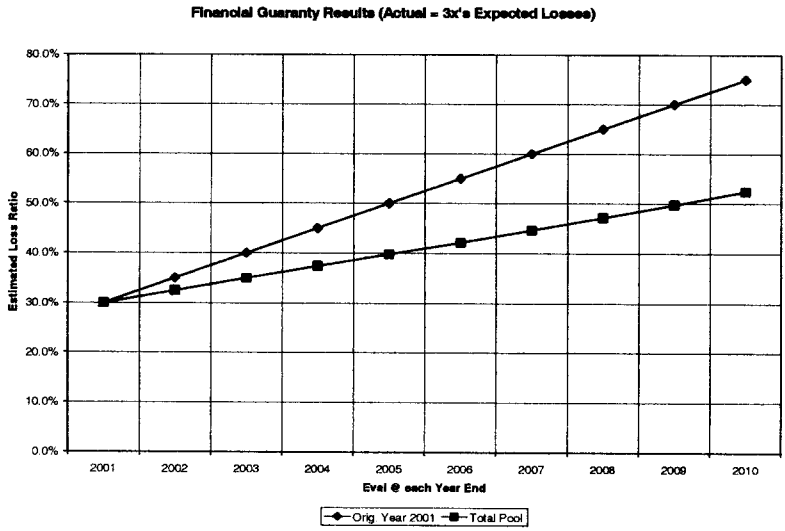


The next two graphs, 5 and 6, plot the first origination year and aggregate portfolio estimates assuming losses always emerge as expected and at 3 times the expected rate, respectively.

Graph 5

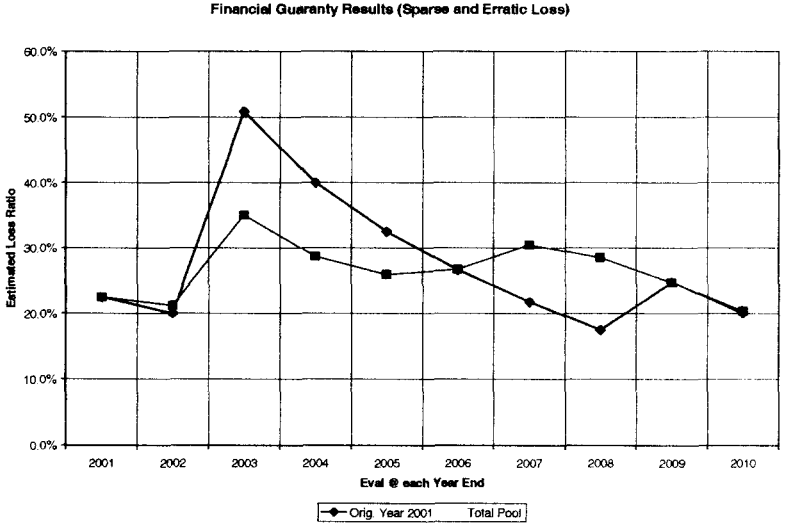


Graph 6



A cursory review of the graphs for each of these three scenarios yields an intuitive result. That is, if the industry wide *a priori* loss ratio is materially in error, the resulting portfolio ratios will gravitate toward the true mean. Conversely, if actual losses emerge as expected, then the 25% estimate level persists. This would encourage periodic review of the base case aggregate loss ratio but as we will see in the next chart, it does not necessitate constant tinkering based only upon the absence or presence of a few claims.

Graph 7



Graph 7 above with sparse and erratic default events is instructive. While the individual origination year loss ratio indications may fluctuate over time the overall portfolio results will move gradually toward the long term mean loss level. As such the portfolio reserve

levels will likely remain within a reasonable range and not overreact to reported events nor be too inertial to disregard zero loss activity.

It may be tempting to posit an accelerated earning of a portion of the future guaranteed premium on an individual origination year when reported losses spike in advance of the "expected" loss emergence. However, there are at least two good reasons not to take that approach.

1. This is largely an installment premium business and one would be accelerating the earning of premiums that have not yet been received.

2. Even if this was a prepaid premium business, by accelerating premium recognition to smooth the loss ratio from spike events would presuppose knowledge about the remaining loss experience which does not creditably exist.

In other words, using IBNR and premium that relates to the subsequent risk emergence period to shore up near-term results implicitly presumes that subsequent loss experience will be more favorable than initially assumed. Clearly, this would not be valid and in the event that the subsequent loss activity was adverse, it would create even more volatile swings in subsequent financial reporting.

7. SUMMARY & CONCLUSIONS

The reserve practice endorsed for the financial guaranty industry is inherently structured as a portfolio wide Bayesian approach. The two critical assumptions (*a priori* loss ratio and loss emergence pattern) need be revised only to the extent that credible suppositions and observations derive from the prevailing market based conditions.

A few aspects of F/G insurance enhance the applicability of the Stanard-Bühlmann IBNR reserve method.

1. The absence of any liability tail risk after maturity.
2. Installment premiums, AGP measures and the gradual recognition of earned premium and annuity type IBNR accrual rate.
3. The effect of predictive latency and its corollary: increased credibility in pure premium estimates as the portfolios mature.

Acknowledgment

Several colleagues and business partners were very helpful in discussing and reviewing this paper at different stages including David Stevens, Wynne Morriss, Peter Giacone, Rick Kastellec, Rick Lines, Tom Currie, Melodie Wakefield, Sean Symons, Sylvia Tavares and Tom Weidman. Thank you also to Sally Browne (Editing), Sarah Carr (Analytics), and Lorraine King (Research).

Exhibits

1. ABS example: Calculation of Coverage Multiples
2. ABS example: Summary Sample ABS Portfolio Statistics
3. ABS example: Estimated Ultimate Defaults and Losses
4. S-B IBNR example: No Losses
5. S-B IBNR example: Actual Losses = Expected
6. S-B IBNR example: Actual Losses = 3 x's Expected
7. S-B IBNR example: Hypothetical Sparse & Erratic Losses

Reserve Method Definitions

Expected Loss Ratio ("ELR") Method. This technique assumes that the estimated ultimate losses are equal to the product of the earned premium and an initial expected loss ratio (IELR). It has the advantage of simplicity and stability but it ignores actual results as they emerge.

Loss Development Factor ("LDF") Method. This method is a common reserving method in which ultimate losses are estimated by applying loss development factors to those losses which already emerged. The development factors are based on historical reporting patterns of the company or composite industry experience or some other credibility weighted average.

Bornhuetter-Ferguson ("B-F") Technique. The B-F method is commonly used when loss experience is relatively immature and /or lacks sufficient credibility for the application of other methods. The B-F method is essentially a blend of the two methods described above. It combines the two methods by splitting expected losses into two pieces- namely expected reported and expected unreported. Estimated ultimate losses are then derived by adding the actual reported losses to the expected unreported losses. Two parameters need to be determined in order to apply this method - the IELR and the expected reporting pattern. This method is described in the proceedings of the Casualty Actuarial Society, Volume LIX, 1972 ("The Actuary and IBNR" by R.L. Bornhuetter and R.E. Ferguson).

Stanard-Bühlmann ("S-B") Technique. An estimation method which overcomes some of the problems with the LDF method and the B-F technique was independently derived by James Stanard and by Hans Bühlmann (internal Swiss Re publication). As with the LDF method and B-F technique, the Stanard-Bühlmann technique uses an aggregate known loss lag pattern which may be estimated via the LDF method. The key innovation is that the ultimate expected loss ratio for all years combined is estimated from a composite loss experience measure, instead of being selected arbitrarily.

Seller/Servicer Bank - Consumer Receiveables Securitization Pools Exhibit 1
Calculation of Coverage Multiples by Issue and on a Cross-Collateralized Aggregate Portfolio Basis
Evaluated @12/31/02

Issue	Age	Expected Future Losses on Original	Expected Losses on Unamortized	Breakeven on Unamortized	Actuarial Coverage Multiple	Corresponding Letter Rating
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1999-B	45	0.6%	4.0%	19.76%	4.94	AAA
1999-C	42	0.7%	4.7%	18.59%	3.98	AAA
1999-D	39	0.7%	3.5%	17.22%	4.92	AAA
2000-A	36	1.0%	3.8%	17.45%	4.54	AAA
2000-B	33	1.1%	3.8%	16.81%	4.43	AAA
2000-C	30	1.4%	4.1%	16.61%	4.03	AAA
2000-D	27	1.7%	4.1%	16.36%	3.95	AAA
2001-A	24	2.1%	4.5%	16.60%	3.72	AA
2001-B	21	2.4%	4.4%	16.50%	3.71	AA
2001-C	18	2.9%	5.0%	18.09%	3.62	AA
2001-D	15	3.5%	4.9%	18.19%	3.74	AA
2002-A	12	4.3%	5.5%	18.59%	3.37	AA
2002-B	9	5.4%	6.7%	18.79%	2.82	A
2002-C	6	6.2%	6.9%	17.73%	2.57	A
2002-D	3	7.0%	7.4%	16.21%	2.20	BBB
				Cross Collaterized Portfolio Factor =>	3.20	AA

Notes:

(1) Outstanding in-force Securitizations @12/31/02.

(2) number of months since the term securitization incepted.

(3) = Exhibit 2, Sheet 1, [Col. (6) - Col. (4)].

(4) = (3) / {Exhibit 2, Sheet 2, Col. (6)}.

(5) from Exhibit 2, Sheet 1, column (8).

(6) = (5) / (4).

Seller/Servicer Bank - Consumer Receivables Securitization Pools
Expected Defaults, Losses and Breakeven on Unamortized
Evaluated @12/31/02

Exhibit 2
Sheet 1

Issue	Age-at-Maturity	Inc'd Defaults as % of Original	Inc'd Losses as % of Original	Actuarial Estimate Lifetime Cumulative Defaults	Actuarial Estimate Lifetime Cumulative Losses	Actuarial Estimate Percent of Ultimate Losses	Breakeven on Unamortized
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1999-B	45	12.7%	6.5%	13.7%	7.1%	91.5%	19.76%
1999-C	42	12.1%	6.1%	13.3%	6.8%	89.7%	18.59%
1999-D	39	10.0%	6.1%	11.2%	6.8%	89.7%	17.22%
2000-A	36	10.5%	6.3%	12.1%	7.3%	86.3%	17.45%
2000-B	33	10.2%	6.0%	12.2%	7.1%	84.5%	16.81%
2000-C	30	11.5%	5.4%	14.2%	6.8%	79.4%	16.61%
2000-D	27	9.6%	5.3%	12.7%	7.0%	75.7%	16.36%
2001-A	24	7.7%	4.7%	11.4%	6.8%	69.1%	16.60%
2001-B	21	8.2%	3.9%	13.0%	6.3%	61.9%	16.50%
2001-C	18	7.3%	3.8%	12.9%	6.7%	56.7%	18.09%
2001-D	15	6.5%	3.3%	13.4%	6.8%	48.5%	18.19%
2002-A	12	5.2%	2.6%	13.6%	6.9%	37.7%	18.59%
2002-B	9	3.7%	2.1%	13.7%	7.5%	28.0%	18.79%
2002-C	6	2.6%	1.2%	14.1%	7.4%	16.2%	17.73%
2002-D	3	1.2%	0.4%	14.2%	7.4%	5.4%	16.21%

Notes:

(1) Outstanding in-force Securitizations @12/31/02. Insurai
(2) number of months since the term securitization incepted.
(3) from Exhibit 3, Sheet 1a, Column (3).
(4) from Exhibit 3, Sheet 1b, Column (3).
(5) from Exhibit 3, Sheet 1a, Column (8).
(6) from Exhibit 3, Sheet 1b, Column (8).
(7) = (4) / (6).
(8) Provided by Seller/Servicer Bank.

Seller/Servicer Bank - Consumer Receivables Securitization Pools
Summary Portfolio Statistics
Evaluated @12/31/02

Issue	Age at Maturity	Initial Par	Outstanding Par	Receivable Pool Factor	Outstanding Collateral	Spread Account Cash Balance	O-C	Total Subord.
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1999-B	45	327,000	44,591	15.0%	49,050	10.0%	10.0%	20.0%
1999-C	42	363,000	49,500	15.0%	54,450	10.0%	10.0%	20.0%
1999-D	39	393,000	72,778	20.0%	78,600	8.0%	10.0%	18.0%
2000-A	36	416,000	104,000	26.0%	108,160	4.0%	10.0%	14.0%
2000-B	33	443,000	122,352	29.0%	128,470	5.0%	10.0%	15.0%
2000-C	30	471,000	152,514	34.0%	160,140	5.0%	10.0%	15.0%
2000-D	27	515,000	201,095	41.0%	211,150	5.0%	9.5%	14.5%
2001-A	24	567,000	253,800	47.0%	266,490	5.0%	9.5%	14.5%
2001-B	21	637,000	327,600	54.0%	343,980	5.0%	9.0%	14.0%
2001-C	18	688,000	380,038	58.0%	399,040	5.0%	9.0%	14.0%
2001-D	15	737,000	505,371	72.0%	530,640	5.0%	7.3%	12.3%
2002-A	12	798,000	598,500	78.0%	622,440	4.0%	5.3%	9.3%
2002-B	9	848,000	666,874	81.0%	686,880	3.0%	6.3%	9.3%
2002-C	6	857,000	756,176	90.0%	771,300	2.0%	3.7%	5.7%
2002-D	3	976,000	918,020	95.0%	927,200	1.0%	1.3%	2.3%
Total		9,036,000	5,153,210		5,337,990			

Notes:

(1) Outstanding in-force Securitizations @12/31/02. Insurance risk terminates when pool factor decreases below 10%.
(2) number of months since the term securitization incepted.
(3) Provided by the Seller/Servicer.
(4) Provided by the Seller/Servicer.
(5) Provided by the Seller/Servicer.
(6) = (3) x (5).
(7) Provided by the Seller/Servicer.
(8) Provided by the Seller/Servicer.
(9) = (7) + (8).

Seller/Servicer Bank - Consumer Receivables Securitisation Pools
Estimated Ultimate Cumulative Defaults as a Percent of Initial Par
Evaluated @12/31/02

Exhibit 3
Sheet 1a

Issue	Initial Par	Reported Defaults	Age-at-Maturity (mos.)	Unreported Defaults Factor	LDF Method Estimated Ultimate	S-B Method Estimated Ultimate	Selected Estimated Ultimate
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1997-A	100,000	13.18%	45	1.08	14.2%	14.2%	14.2%
1997-B	112,000	12.33%	45	1.08	13.3%	13.4%	13.3%
1997-C	119,000	12.75%	45	1.08	13.8%	13.8%	13.8%
1997-D	124,000	11.05%	45	1.08	11.9%	12.1%	12.0%
1997-A	140,000	11.26%	45	1.08	12.2%	12.3%	12.2%
1997-B	160,000	10.68%	45	1.08	11.5%	11.7%	11.6%
1997-C	175,000	11.16%	45	1.08	12.1%	12.2%	12.1%
1997-D	185,000	11.05%	45	1.08	11.9%	12.1%	12.0%
1998-A	185,000	11.93%	45	1.08	12.9%	13.0%	12.9%
1998-B	213,000	12.74%	45	1.08	13.8%	13.8%	13.8%
1998-C	229,000	13.68%	45	1.08	14.8%	14.7%	14.7%
1998-D	256,000	12.49%	45	1.08	13.5%	13.5%	13.5%
1999-A	291,000	12.36%	45	1.08	13.3%	13.4%	13.4%
1999-B	327,000	12.70%	45	1.08	13.7%	13.7%	13.7%
1999-C	363,000	12.12%	42	1.09	13.2%	13.3%	13.3%
1999-D	393,000	9.95%	39	1.11	11.0%	11.3%	11.2%
2000-A	416,000	10.52%	36	1.14	12.0%	12.3%	12.1%
2000-B	443,000	10.22%	33	1.18	12.1%	12.4%	12.2%
2000-C	471,000	11.54%	30	1.24	14.3%	14.2%	14.2%
2000-D	515,000	9.59%	27	1.31	12.6%	12.9%	12.7%
2001-A	567,000	7.67%	24	1.43	11.0%	11.9%	11.4%
2001-B	637,000	8.15%	21	1.57	12.8%	13.2%	13.0%
2001-C	688,000	7.26%	18	1.73	12.5%	13.2%	12.9%
2001-D	737,000	6.46%	15	2.04	13.2%	13.6%	13.4%
2002-A	798,000	5.17%	12	2.60	13.4%	13.8%	13.6%
2002-B	848,000	3.67%	9	3.51	12.9%	13.7%	13.7%
2002-C	857,000	2.59%	6	5.62	14.5%	14.1%	14.1%
2002-D	976,000	1.19%	3	14.04	16.7%	14.2%	14.2%

Notes:

(1) Provided by Seller/Servicer Bank
(2) Provided by Seller/Servicer Bank
(3) From Development Triangle , Exhibit 3, Sheet 3a.
(4) From Development Triangle , Exhibit 3, Sheet 3a.
(5) From Development Triangle , Exhibit 3, Sheet 3a.
(6) = (3) x (5).
(7) = {[(1 - (1/ Col. (5))] x 14% } + Col (3). S-B a priori= 14.00%
(8) Based on Cols. (6) & (7).

Seller/ Servicer Bank - Consumer Receivables Securitisations Pools
Estimated Ultimate Cumulative Losses as a Percent of Initial Par
Evaluated @12/31/02

Exhibit 3
Sheet 1b

Issue	Initial Par	Reported Losses	Age-at-Maturity (mos.)	Unreported Loss Factor	LDF Method Estimated Ultimate	S-B Method Estimated Ultimate	Selected Estimated Ultimate
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1997-A	100,000	6.1%	45	1.09	6.6%	6.7%	6.7%
1997-B	112,000	6.0%	45	1.09	6.5%	6.6%	6.5%
1997-C	119,000	5.3%	45	1.09	5.7%	5.9%	5.8%
1997-D	124,000	6.2%	45	1.09	6.7%	6.8%	6.7%
1997-A	140,000	7.0%	45	1.09	7.6%	7.6%	7.6%
1997-B	160,000	6.1%	45	1.09	6.7%	6.7%	6.7%
1997-C	175,000	4.6%	45	1.09	5.0%	5.2%	5.1%
1997-D	185,000	5.7%	45	1.09	6.2%	6.3%	6.3%
1998-A	185,000	6.3%	45	1.09	6.8%	6.9%	6.8%
1998-B	213,000	4.9%	45	1.09	5.3%	5.5%	5.4%
1998-C	229,000	6.2%	45	1.09	6.7%	6.8%	6.7%
1998-D	256,000	5.2%	45	1.09	5.7%	5.8%	5.7%
1999-A	291,000	5.8%	45	1.09	6.3%	6.4%	6.4%
1999-B	327,000	6.5%	45	1.09	7.1%	7.1%	7.1%
1999-C	363,000	6.1%	42	1.10	6.7%	6.8%	6.8%
1999-D	393,000	6.1%	39	1.12	6.8%	6.9%	6.8%
2000-A	416,000	6.3%	36	1.15	7.3%	7.3%	7.3%
2000-B	443,000	6.0%	33	1.19	7.1%	7.2%	7.1%
2000-C	471,000	5.4%	30	1.25	6.8%	6.9%	6.8%
2000-D	515,000	5.3%	27	1.31	7.0%	7.1%	7.0%
2001-A	567,000	4.7%	24	1.41	6.6%	6.9%	6.8%
2001-B	637,000	3.9%	21	1.54	6.1%	6.6%	6.3%
2001-C	688,000	3.8%	18	1.69	6.5%	6.9%	6.7%
2001-D	737,000	3.3%	15	2.03	6.6%	7.1%	6.8%
2002-A	798,000	2.6%	12	2.54	6.7%	7.2%	6.9%
2002-B	848,000	2.1%	9	3.48	7.4%	7.5%	7.5%
2002-C	857,000	1.2%	6	5.57	6.7%	7.4%	7.4%
2002-D	976,000	0.4%	3	14.48	5.5%	7.4%	7.4%

Notes:

(1) Provided by Seller/Servicer Bank
(2) Provided by Seller/Servicer Bank
(3) From Development Triangle , Exhibit 3, Sheet 3b.
(4) From Development Triangle , Exhibit 3, Sheet 3b.
(5) From Development Triangle , Exhibit 3, Sheet 3b.
(6) = (3) x (5).
(7) = {[(1 - (1/ Col. (5))] x 7.5%} + Col (3). S-B a priori= 7.50%
(8) Based on Cols. (6) & (7).

Seller/Servicer Bank
Consumer Receivables Securitization Pools
Cumulative Defaults as a Percent of Initial Par
Evaluated @12/31/02

Exponential Power Curve Fitting Analysis Detail

Regression Output:

Constant	-1.631
Std Err of Y Est	0.317
R Squared	0.923
No. of Observations	13
Degrees of Freedom	11
X Coefficient(s)	-1.750
Std Err of Coef.	0.153

Transformation Formulae

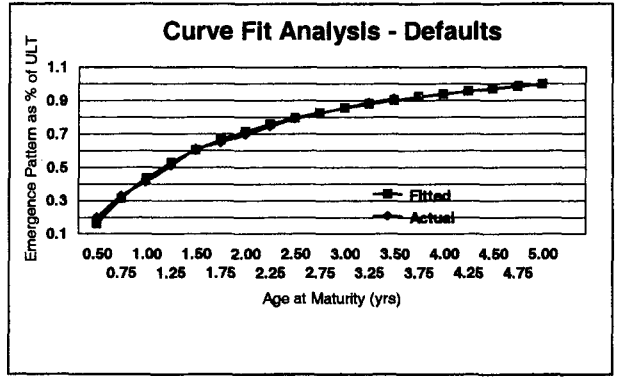
$$y = e^{a x^b}$$

$$\ln(y) = a x^b$$

$$\ln(\ln(y)) = \ln(a) + b \ln(x)$$

$$Y = A + b X$$

Time(t)	LOGe(t)	Actual Ln(ln((f))	Actual LDF(f)	Fitted LDF(f)	Fitted CDF	Fitted % of ULT	Actual % of ULT
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
0.50	-0.693	-0.808	1.562	1.932	6.128	16.3%	20.2%
0.75	-0.288	-1.290	1.317	1.382	3.172	31.5%	33.1%
1.00	0.000	-1.393	1.282	1.216	2.295	43.6%	41.3%
1.25	0.223	-1.759	1.188	1.142	1.887	53.0%	50.9%
1.50	0.405	-2.506	1.085	1.101	1.653	60.5%	61.4%
1.75	0.560	-2.304	1.105	1.076	1.501	66.6%	64.9%
2.00	0.693	-2.462	1.089	1.060	1.395	71.7%	69.8%
2.25	0.811	-2.721	1.068	1.048	1.316	76.0%	74.6%
2.50	0.916	-3.123	1.045	1.040	1.255	79.7%	79.3%
2.75	1.012	-3.342	1.036	1.034	1.207	82.9%	82.7%
3.00	1.099	-3.625	1.027	1.029	1.167	85.7%	85.9%
3.25	1.179	-4.143	1.016	1.025	1.134	88.2%	89.0%
3.50	1.253	-4.276	1.014	1.022	1.106	90.4%	91.1%
3.75				1.020	1.082	92.4%	
4.00				1.017	1.062	94.2%	
4.25				1.016	1.043	95.8%	
4.50				1.014	1.027	97.3%	
4.75				1.013	1.013	98.7%	
5.00				1.012	1.000	100.0%	



Notes:
(1) evaluation age-at-maturity (yrs).
(2) = LOGe (col (1)). Independent regression variable.
(3) = LOGe(LOGe (col (4))). Dependent regression variable.
(4) Par weighted average LDF from Exhibit 3, Sheet 3a.
(5) = e^{e^ (-1.631) x col(1)^(-1.750)}.
(6) Reverse cumulative product of Col (5).
(7) Inverse of Col (6).
(8) Inverse of the reverse cumulative product of Col (4).

Seller/Servicer Bank
Consumer Receivables Securitization Pools
Cumulative Losses as a Percent of Initial Par
Evaluated @12/31/02

Exponential Power Curve Fitting Analysis Detail

Regression Output:

Constant	-1.629
Std Err of Y Est	0.358
R Squared	0.900
No. of Observations	13
Degrees of Freedom	11
X Coefficient(s)	-1.717
Std Err of Coef.	0.173

Transformation Formulae

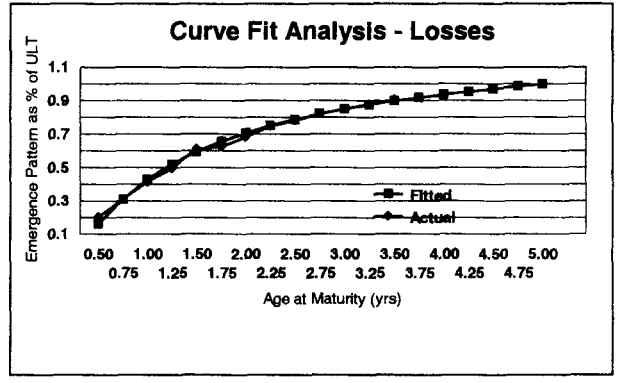
$$y = e^{ax^b}$$

$$\ln(y) = ax^b$$

$$\ln(\ln(y)) = \ln(a) + b\ln(x)$$

$$Y = A + bX$$

Time(t)	LOGe(t)	Actual Ln(ln((f))	Actual LDF(f)	Fitted LDF(f)	Fitted CDF	Fitted % of ULT	Actual % of ULT
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
0.50	-0.693	-0.885	1.511	1.906	6.136	16.3%	20.6%
0.75	-0.288	-1.160	1.368	1.379	3.220	31.1%	31.3%
1.00	0.000	-1.465	1.260	1.217	2.334	42.8%	41.4%
1.25	0.223	-1.679	1.205	1.143	1.919	52.1%	49.4%
1.50	0.405	-2.707	1.069	1.103	1.678	59.6%	61.5%
1.75	0.560	-2.073	1.134	1.078	1.522	65.7%	62.4%
2.00	0.693	-2.351	1.100	1.061	1.412	70.8%	68.3%
2.25	0.811	-2.963	1.053	1.050	1.330	75.2%	74.9%
2.50	0.916	-2.963	1.053	1.042	1.267	78.9%	78.1%
2.75	1.012	-3.428	1.033	1.035	1.217	82.2%	82.4%
3.00	1.099	-3.589	1.028	1.030	1.175	85.1%	85.3%
3.25	1.179	-3.874	1.021	1.026	1.141	87.7%	88.1%
3.50	1.253	-4.349	1.013	1.023	1.112	90.0%	90.8%
3.75				1.020	1.087	92.0%	
4.00				1.018	1.065	93.9%	
4.25				1.016	1.046	95.6%	
4.50				1.015	1.029	97.2%	
4.75				1.014	1.014	98.7%	
5.00				1.012	1.000	100.0%	



Notes:
(1) evaluation age-at-maturity (yrs).
(2) = LOGe (col (1)). Independent regression variable.
(3) = LOGe(LOGe (col (4))). Dependent regression variable.
(4) Par weighted average LDF from Exhibit 3, Sheet 3b.
(5) = e^[e^ (-1.629) x col(1)^(-1.717)].
(6) Reverse cumulative product of Col (5).
(7) Inverse of Col (6).
(8) Inverse of the reverse cumulative product of Col (4).

Seller/Servicer Bank - Consumer Receivables Securitization Pools
Cumulative Defaults as a Percent of Initial Par
Evaluated @12/31/02

Exhibit 3
Sheet 3a

Issue	Initial Par	@ 3 Mos.	@ 6 Mos.	@ 9 Mos.	@ 12 Mos.	@ 15 Mos.	@ 18 Mos.	@ 21 Mos.	@ 24 Mos.	@ 27 Mos.	@ 30 Mos.	@ 33 Mos.	@ 36 Mos.	@ 39 Mos.	@ 42 Mos.	@ 45 Mos.
1997-A	100,000	0.98	2.47	3.33	4.82	6.55	7.49	8.40	9.86	11.19	11.32	12.28	12.57	13.06	13.08	13.18
1997-B	112,000	1.05	2.40	4.20	5.48	5.95	7.09	7.84	8.51	9.45	10.11	10.99	11.71	11.90	12.00	12.33
1997-C	119,000	1.15	2.43	3.73	4.74	6.45	7.31	8.28	9.17	10.63	11.01	11.28	11.64	11.97	12.41	12.75
1997-D	124,000	0.90	2.11	3.45	4.56	5.79	7.73	8.12	8.60	9.37	9.64	10.37	10.54	10.95	11.02	11.05
1997-A	140,000	1.03	2.30	4.20	4.71	6.35	7.69	8.05	9.20	10.16	10.20	10.57	10.67	10.97	11.20	11.26
1997-B	160,000	0.88	2.60	3.65	5.12	5.98	7.91	7.52	7.86	8.91	9.05	9.53	10.05	10.19	10.57	10.68
1997-C	175,000	1.13	2.76	3.98	5.07	5.82	7.06	7.51	8.20	9.11	9.69	10.01	10.24	10.75	10.90	11.16
1997-D	185,000	1.23	2.91	3.85	4.62	5.95	7.74	8.16	8.40	8.99	9.99	10.31	10.80	10.95	10.94	11.05
1998-A	185,000	1.18	2.25	3.63	4.85	6.54	7.55	8.40	9.63	10.33	10.52	10.62	11.18	11.48	11.77	11.93
1998-B	213,000	1.21	2.97	3.47	4.83	6.24	7.52	8.46	8.99	9.97	10.54	11.37	12.07	12.36	12.51	12.74
1998-C	229,000	1.06	2.31	4.00	5.13	6.66	7.07	8.30	9.72	10.97	11.72	12.34	12.77	13.37	13.49	13.68
1998-D	256,000	1.12	2.40	3.38	4.81	6.70	7.48	8.26	8.76	10.18	11.12	11.68	11.88	12.00	12.47	12.49
1999-A	291,000	0.75	2.97	3.55	5.17	6.43	7.06	7.52	8.75	9.64	10.54	11.53	11.79	11.89	12.12	12.36
1999-B	327,000	0.95	2.24	4.18	5.06	6.26	7.26	7.96	9.53	10.26	11.10	11.33	12.01	12.43	12.57	12.70
1999-C	363,000	0.86	2.98	3.25	4.95	6.07	7.20	8.43	9.90	10.48	10.85	11.34	11.69	12.11	12.12	
1999-D	393,000	0.87	2.24	4.16	5.47	5.90	7.09	7.75	7.88	8.38	8.90	9.20	9.70	9.95		
2000-A	416,000	1.16	2.19	3.66	4.53	6.57	7.32	8.16	8.51	8.97	9.96	10.43	10.52			
2000-B	443,000	1.05	2.19	4.19	4.95	6.54	7.86	7.96	9.48	9.66	10.06	10.22				
2000-C	471,000	0.94	2.14	3.64	4.61	5.78	7.26	8.14	9.57	10.25	11.54					
2000-D	515,000	0.92	2.20	3.69	4.73	6.17	7.16	7.89	8.52	9.59						
2001-A	567,000	0.98	2.92	3.31	5.11	5.85	7.37	7.53	7.67							
2001-B	637,000	1.24	2.20	3.74	4.81	6.09	7.64	8.15								
2001-C	688,000	1.09	2.70	3.36	4.80	6.52	7.26									
2001-D	737,000	0.87	2.18	4.22	4.71	6.46										
2002-A	798,000	0.93	2.33	4.01	5.17											
2002-B	848,000	1.11	2.61	3.67												
2002-C	857,000	0.92	2.59													
2002-D	976,000	1.19														

Seller/Servicer Bank - Consumer Receivables
Cumulative Defaults - Age to Age Development Factor Analysis

Issue	Initial Par	6/3	9/6	12/9	15/12	18/15	21/18	24/21	27/24	30/27	33/30	36/33	39/36	42/39	45/42	45 to Ult
1997-A	100,000	2.51	1.35	1.45	1.36	1.14	1.12	1.17	1.14	1.01	1.08	1.02	1.04	1.00	1.01	
1997-B	112,000	2.27	1.75	1.30	1.09	1.19	1.11	1.09	1.11	1.07	1.09	1.07	1.02	1.01	1.03	
1997-C	119,000	2.12	1.54	1.27	1.36	1.13	1.13	1.11	1.16	1.04	1.02	1.03	1.03	1.04	1.03	
1997-D	124,000	2.33	1.64	1.32	1.27	1.33	1.05	1.06	1.09	1.03	1.08	1.02	1.04	1.01	1.00	
1997-A	140,000	2.24	1.82	1.12	1.35	1.21	1.05	1.14	1.10	1.00	1.04	1.01	1.03	1.02	1.01	
1997-B	160,000	2.95	1.40	1.40	1.17	1.32	0.95	1.04	1.13	1.02	1.05	1.05	1.02	1.04	1.01	
1997-C	175,000	2.45	1.23	1.50	1.15	1.21	1.06	1.09	1.11	1.06	1.03	1.02	1.05	1.01	1.02	
1997-D	185,000	2.37	1.32	1.20	1.29	1.30	1.05	1.03	1.07	1.11	1.03	1.05	1.01	1.00	1.01	
1998-A	185,000	1.91	1.61	1.33	1.35	1.16	1.11	1.15	1.07	1.02	1.01	1.05	1.03	1.03	1.01	
1998-B	213,000	2.46	1.17	1.39	1.29	1.21	1.12	1.06	1.11	1.06	1.08	1.06	1.02	1.01	1.02	
1998-C	229,000	2.18	1.73	1.28	1.30	1.06	1.17	1.17	1.13	1.07	1.05	1.03	1.05	1.01	1.01	
1998-D	256,000	2.14	1.41	1.42	1.39	1.12	1.10	1.06	1.16	1.09	1.05	1.02	1.01	1.04	1.00	
1999-A	291,000	3.96	1.19	1.46	1.24	1.10	1.07	1.16	1.10	1.09	1.09	1.02	1.01	1.02	1.02	
1999-B	327,000	2.36	1.86	1.21	1.24	1.16	1.10	1.20	1.08	1.08	1.02	1.06	1.04	1.01	1.01	
1999-C	363,000	3.46	1.09	1.52	1.23	1.18	1.17	1.17	1.06	1.04	1.05	1.03	1.04	1.00		
1999-D	393,000	2.56	1.86	1.31	1.08	1.20	1.09	1.02	1.06	1.06	1.03	1.05	1.09			
2000-A	416,000	1.88	1.67	1.24	1.45	1.11	1.11	1.04	1.05	1.11	1.05	1.01				
2000-B	443,000	2.09	1.91	1.18	1.32	1.20	1.01	1.19	1.02	1.04	1.02					
2000-C	471,000	2.28	1.70	1.27	1.25	1.26	1.12	1.18	1.07	1.13						
2000-D	515,000	2.39	1.68	1.28	1.30	1.16	1.10	1.08	1.13							
2001-A	567,000	2.98	1.13	1.54	1.15	1.26	1.02	1.02								
2001-B	637,000	1.77	1.70	1.29	1.27	1.25	1.07									
2001-C	688,000	2.48	1.25	1.43	1.36	1.11										
2001-D	737,000	2.50	1.99	1.12	1.37											
2002-A	798,000	2.51	1.73	1.29												
2002-B	848,000	2.36	1.40													
2002-C	857,000	2.80														
2002-D	976,000															
Linear	Average	2.456	1.542	1.325	1.276	1.191	1.087	1.106	1.098	1.059	1.049	1.036	1.027	1.016	1.014	
Weighted	Average	2.415	1.514	1.317	1.272	1.188	1.086	1.107	1.098	1.059	1.049	1.036	1.028	1.016	1.014	
Par Weight	Average	2.472	1.562	1.317	1.282	1.188	1.085	1.105	1.089	1.068	1.045	1.036	1.027	1.016	1.014	
Fitted	Average		1.932	1.382	1.216	1.142	1.101	1.076	1.060	1.048	1.040	1.034	1.029	1.025	1.022	1.082
Selected	Age/Age	2.500	1.600	1.350	1.275	1.180	1.100	1.100	1.090	1.060	1.045	1.035	1.030	1.015	1.012	1.080
Selected	Age/Ult	14.037	5.615	3.509	2.599	2.039	1.728	1.571	1.428	1.310	1.236	1.183	1.143	1.109	1.093	1.080
Emergence	Pattern	7.1%	17.8%	28.5%	38.5%	49.0%	57.9%	63.7%	70.0%	76.3%	80.9%	84.6%	87.5%	90.1%	91.5%	92.6%

Seller/Servicer Bank - Consumer Receivables Securitization Pools
Cumulative Losses as a Percent of Initial Par
Evaluated @12/31/02

Exhibit 3
Sheet 3b

Issue	Initial Par	@ 3 Mos.	@ 6 Mos.	@ 9 Mos.	@ 12 Mos.	@ 15 Mos.	@ 18 Mos.	@ 21 Mos.	@ 24 Mos.	@ 27 Mos.	@ 30 Mos.	@ 33 Mos.	@ 36 Mos.	@ 39 Mos.	@ 42 Mos.	@ 45 Mos.
1997-A	100,000	0.50	1.45	1.75	2.66	3.26	3.60	3.89	4.60	4.74	5.32	5.55	5.75	5.86	6.05	6.09
1997-B	112,000	0.53	1.26	1.68	2.67	3.23	3.65	3.99	4.23	4.77	5.33	5.51	5.57	5.67	5.79	5.95
1997-C	119,000	0.61	1.27	1.95	2.33	3.07	3.80	3.87	4.56	4.70	4.78	4.80	5.00	5.14	5.24	5.26
1997-D	124,000	0.48	1.03	1.67	2.50	2.96	3.74	3.91	4.27	4.74	5.05	5.41	5.76	6.02	6.10	6.16
1997-A	140,000	0.48	1.41	2.06	2.28	3.28	3.89	3.94	4.74	5.16	5.73	6.27	6.71	6.94	6.97	7.01
1997-B	160,000	0.48	1.02	1.73	2.49	3.00	3.84	3.79	4.49	5.15	5.25	5.56	5.80	5.96	6.03	6.12
1997-C	175,000	0.53	1.03	1.80	2.43	3.34	3.98	3.76	3.78	3.96	4.28	4.34	4.39	4.39	4.43	4.56
1997-D	185,000	0.59	1.27	1.79	2.35	3.37	3.60	4.21	4.40	5.07	5.17	5.25	5.30	5.48	5.68	5.74
1998-A	185,000	0.60	1.05	1.86	2.65	3.24	3.88	4.25	4.51	5.25	5.52	5.75	6.07	6.17	6.26	6.27
1998-B	213,000	0.52	1.21	1.86	2.32	3.29	3.61	3.96	4.04	4.34	4.49	4.52	4.55	4.71	4.80	4.88
1998-C	229,000	0.60	1.17	1.77	2.72	3.24	3.80	4.22	4.94	5.09	5.33	5.70	5.77	5.98	6.08	6.15
1998-D	256,000	0.41	1.37	2.01	2.67	3.32	3.53	3.87	3.94	4.11	4.50	4.78	4.82	4.95	5.13	5.21
1999-A	291,000	0.50	1.29	1.83	2.75	3.12	3.99	3.76	4.10	4.65	4.72	5.08	5.44	5.72	5.73	5.81
1999-B	327,000	0.40	1.27	1.92	2.70	3.09	3.72	4.14	4.75	5.07	5.65	6.01	6.23	6.27	6.40	6.48
1999-C	363,000	0.48	1.43	1.92	2.45	3.27	3.92	3.84	4.28	4.89	5.06	5.54	5.73	5.89	6.12	
1999-D	393,000	0.60	1.23	1.89	2.39	3.05	3.82	4.12	4.95	5.46	5.69	5.80	5.88	6.08		
2000-A	416,000	0.54	1.15	1.79	2.34	3.21	3.54	4.14	4.73	5.33	5.60	6.03	6.34			
2000-B	443,000	0.61	1.39	2.06	2.56	2.90	3.93	4.10	4.88	5.39	5.69	5.95				
2000-C	471,000	0.53	1.45	1.68	2.64	2.93	3.96	3.92	4.77	5.39	5.44					
2000-D	515,000	0.52	1.49	2.00	2.34	2.94	3.86	4.22	4.92	5.30						
2001-A	567,000	0.38	1.38	1.90	2.46	3.33	3.68	4.22	4.69							
2001-B	637,000	0.41	1.25	1.71	2.73	3.31	3.68	3.94								
2001-C	688,000	0.38	1.03	1.90	2.41	3.07	3.81									
2001-D	737,000	0.43	1.44	1.89	2.51	3.25										
2002-A	798,000	0.54	1.01	1.77	2.64											
2002-B	848,000	0.38	1.24	2.12												
2002-C	857,000	0.41	1.20													
2002-D	976,000	0.38														

Seller/Servicer Bank - Consumer Receivables Securitization Pools
Cumulative Losses - Age to Age Development Factor Analysis

Issue	Initial Par	6/3	9/6	12/9	15/12	18/15	21/18	24/21	27/24	30/27	33/30	36/33	39/36	42/39	45/42	45 to Ult
1997-A	100,000	2.93	1.21	1.52	1.23	1.10	1.08	1.18	1.03	1.12	1.04	1.04	1.02	1.03	1.01	
1997-B	112,000	2.37	1.33	1.59	1.21	1.13	1.09	1.06	1.13	1.12	1.03	1.01	1.02	1.02	1.03	
1997-C	119,000	2.09	1.53	1.19	1.32	1.24	1.02	1.18	1.03	1.02	1.00	1.04	1.03	1.02	1.00	
1997-D	124,000	2.15	1.61	1.50	1.18	1.26	1.04	1.09	1.11	1.07	1.07	1.06	1.04	1.01	1.01	
1997-A	140,000	2.95	1.46	1.11	1.44	1.19	1.01	1.20	1.09	1.11	1.09	1.07	1.03	1.00	1.01	
1997-B	160,000	2.13	1.69	1.44	1.20	1.28	0.99	1.19	1.15	1.02	1.06	1.04	1.03	1.01	1.01	
1997-C	175,000	1.95	1.75	1.35	1.38	1.19	0.95	1.01	1.05	1.08	1.01	1.01	1.00	1.01	1.04	
1997-D	185,000	2.14	1.41	1.31	1.44	1.07	1.17	1.05	1.15	1.02	1.02	1.01	1.03	1.04	1.01	
1998-A	185,000	1.75	1.78	1.42	1.22	1.20	1.09	1.06	1.16	1.05	1.04	1.05	1.02	1.01	1.00	
1998-B	213,000	2.33	1.53	1.25	1.42	1.10	1.10	1.02	1.08	1.03	1.01	1.01	1.04	1.02	1.02	
1998-C	229,000	1.96	1.51	1.54	1.19	1.17	1.11	1.17	1.02	1.06	1.07	1.01	1.04	1.02	1.01	
1998-D	256,000	3.31	1.46	1.33	1.24	1.06	1.10	1.02	1.04	1.10	1.06	1.01	1.03	1.04	1.02	
1999-A	291,000	2.59	1.41	1.50	1.14	1.28	0.94	1.09	1.14	1.01	1.08	1.07	1.05	1.00	1.01	
1999-B	327,000	3.17	1.51	1.40	1.15	1.20	1.11	1.15	1.07	1.11	1.06	1.04	1.01	1.02	1.01	
1999-C	363,000	2.98	1.35	1.28	1.33	1.20	0.98	1.11	1.14	1.04	1.09	1.03	1.03	1.04		
1999-D	393,000	2.05	1.53	1.26	1.28	1.25	1.08	1.20	1.10	1.04	1.02	1.01	1.03			
2000-A	416,000	2.12	1.56	1.31	1.37	1.10	1.17	1.14	1.13	1.05	1.08	1.05				
2000-B	443,000	2.27	1.48	1.24	1.13	1.36	1.04	1.19	1.11	1.06	1.04					
2000-C	471,000	2.72	1.16	1.57	1.11	1.35	0.99	1.22	1.13	1.01						
2000-D	515,000	2.86	1.35	1.17	1.26	1.31	1.09	1.17	1.08							
2001-A	567,000	3.66	1.37	1.29	1.35	1.11	1.15	1.11								
2001-B	637,000	3.02	1.37	1.60	1.21	1.11	1.07									
2001 C	688,000	2.73	1.83	1.27	1.27	1.24										
2001-D	737,000	3.33	1.31	1.33	1.29											
2002-A	798,000	1.87	1.75	1.49												
2002-B	848,000	3.26	1.72													
2002-C	857,000	2.91														
2002-D	976,000															
Linear	Average	2.578	1.500	1.370	1.265	1.196	1.063	1.124	1.096	1.059	1.049	1.034	1.028	1.020	1.013	
Weighted	Average	2.513	1.482	1.363	1.261	1.192	1.061	1.124	1.096	1.058	1.050	1.035	1.028	1.020	1.012	
Par Weight	Average	2.713	1.511	1.368	1.260	1.205	1.069	1.134	1.100	1.053	1.053	1.033	1.028	1.021	1.013	
Fitted	Average		1.906	1.379	1.217	1.143	1.103	1.078	1.061	1.050	1.042	1.035	1.030	1.026	1.023	1.087
Selected	Age/Age	2.600	1.600	1.370	1.250	1.200	1.100	1.090	1.075	1.055	1.045	1.033	1.030	1.020	1.010	1.087
Selected	Age/Ult	14.481	5.570	3.481	2.541	2.033	1.694	1.540	1.413	1.314	1.246	1.192	1.154	1.120	1.098	1.088
Emergence	Pattern	6.9%	18.0%	28.7%	39.4%	49.2%	59.0%	64.9%	70.8%	76.1%	80.3%	83.9%	86.7%	89.3%	91.0%	92.0%

S-B IBNR Example
Scenario: No Losses

Exhibit 4
Sheet 1

Estimated Ultimate Loss Ratio

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10
2001	22.5%	20.0%	17.5%	15.0%	12.5%	10.0%	7.5%	5.0%	2.5%	0.0%
2002		22.5%	20.0%	17.5%	15.0%	12.5%	10.0%	7.5%	5.0%	2.5%
2003			22.5%	20.0%	17.5%	15.0%	12.5%	10.0%	7.5%	5.0%
2004				22.5%	20.0%	17.5%	15.0%	12.5%	10.0%	7.5%
2005					22.5%	20.0%	17.5%	15.0%	12.5%	10.0%
2006						22.5%	20.0%	17.5%	15.0%	12.5%
2007							22.5%	20.0%	17.5%	15.0%
2008								22.5%	20.0%	17.5%
2009									22.5%	20.0%
2010										22.5%
Aggregate Portfolio=>	22.5%	21.3%	20.0%	18.8%	17.6%	16.4%	15.2%	13.9%	12.6%	11.3%

Cumulative Incurred Loss

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10
2001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2002		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2003			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2004				0.000	0.000	0.000	0.000	0.000	0.000	0.000
2005					0.000	0.000	0.000	0.000	0.000	0.000
2006						0.000	0.000	0.000	0.000	0.000
2007							0.000	0.000	0.000	0.000
2008								0.000	0.000	0.000
2009									0.000	0.000
2010										0.000

Cumulative Earned Premium

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10	Ultimate Earned Premium
2001	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	100.00	100.0
2002		20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.0
2003			30.00	60.00	90.00	120.00	150.00	180.00	210.00	240.00	300.0
2004				42.00	84.00	126.00	168.00	210.00	252.00	294.00	420.0
2005					54.60	109.20	163.80	218.40	273.00	327.60	546.0
2006						68.25	136.50	204.75	273.00	341.25	682.5
2007							75.08	150.15	225.23	300.30	750.8
2008								82.58	165.17	247.75	825.8
2009									90.84	181.68	908.4
2010										99.92	999.2

Reported Loss Ratio

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10
2001	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2002		0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2003			0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2004				0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2005					0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2006						0.0%	0.0%	0.0%	0.0%	0.0%
2007							0.0%	0.0%	0.0%	0.0%
2008								0.0%	0.0%	0.0%
2009									0.0%	0.0%
2010										0.0%

Cumulative Estimated IBNR

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10
2001	2.250	4.000	5.250	6.000	6.250	6.000	5.250	4.000	2.250	0.000
2002		4.500	8.000	10.500	12.000	12.500	12.000	10.500	8.000	4.500
2003			6.750	12.000	15.750	18.000	18.750	18.000	15.750	12.000
2004				9.450	16.800	22.050	25.200	26.250	25.200	22.050
2005					12.285	21.840	28.665	32.760	34.125	32.760
2006						15.356	27.300	35.831	40.950	42.656
2007							16.892	30.030	39.414	45.045
2008								18.581	33.033	43.356
2009									20.439	36.336
2010										22.483

Expected Emergence of Reported Losses

Cumulative Loss Emergence ==>	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10
	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10
2001	0.250	1.000	2.250	4.000	6.250	9.000	12.250	16.000	20.250	25.000
2002		0.500	2.000	4.500	8.000	12.500	18.000	24.500	32.000	40.500
2003			0.750	3.000	6.750	12.000	18.750	27.000	36.750	48.000
2004				1.050	4.200	9.450	16.800	26.250	37.800	51.450
2005					1.365	5.460	12.285	21.840	34.125	49.140
2006						1.706	6.825	15.356	27.300	42.656
2007							1.877	7.508	16.892	30.030
2008								2.065	8.258	18.581
2009									2.271	9.084
2010										2.498

S-B IBNR Example
Scenario: Actual Losses = Expected

Exhibit 5
Sheet 1

Estimated Ultimate Loss Ratio

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10
2001	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
2002		25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
2003			25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
2004				25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
2005					25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
2006						25.0%	25.0%	25.0%	25.0%	25.0%
2007							25.0%	25.0%	25.0%	25.0%
2008								25.0%	25.0%	25.0%
2009									25.0%	25.0%
2010										25.0%
Aggregate Portfolio=>	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%

Cumulative Incurred Loss

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10
2001	0.250	1.000	2.250	4.000	6.250	9.000	12.250	16.000	20.250	25.000
2002		0.500	2.000	4.500	8.000	12.500	18.000	24.500	32.000	40.500
2003			0.750	3.000	6.750	12.000	18.750	27.000	36.750	48.000
2004				1.050	4.200	9.450	16.800	26.250	37.800	51.450
2005					1.365	5.460	12.285	21.840	34.125	49.140
2006						1.706	6.825	15.356	27.300	42.656
2007							1.877	7.508	16.892	30.030
2008								2.065	8.258	18.581
2009									2.271	9.084
2010										2.498

Cumulative Earned Premium

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10	Ultimate Earned Premium
2001	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	100.00	100.0
2002		20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.0
2003			30.00	60.00	90.00	120.00	150.00	180.00	210.00	240.00	300.0
2004				42.00	84.00	126.00	168.00	210.00	252.00	294.00	420.0
2005					54.60	109.20	163.80	218.40	273.00	327.60	546.0
2006						68.25	136.50	204.75	273.00	341.25	682.5
2007							75.08	150.15	225.23	300.30	750.8
2008								82.58	165.17	247.75	825.8
2009									90.84	181.68	908.4
2010										99.92	999.2

Reported Loss Ratio

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10
2001	2.5%	5.0%	7.5%	10.0%	12.5%	15.0%	17.5%	20.0%	22.5%	25.0%
2002		2.5%	5.0%	7.5%	10.0%	12.5%	15.0%	17.5%	20.0%	22.5%
2003			2.5%	5.0%	7.5%	10.0%	12.5%	15.0%	17.5%	20.0%
2004				2.5%	5.0%	7.5%	10.0%	12.5%	15.0%	17.5%
2005					2.5%	5.0%	7.5%	10.0%	12.5%	15.0%
2006						2.5%	5.0%	7.5%	10.0%	12.5%
2007							2.5%	5.0%	7.5%	10.0%
2008								2.5%	5.0%	7.5%
2009									2.5%	5.0%
2010										2.5%

Cumulative Estimated IBNR

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10
2001	2.250	4.000	5.250	6.000	6.250	6.000	5.250	4.000	2.250	0.000
2002		4.500	8.000	10.500	12.000	12.500	12.000	10.500	8.000	4.500
2003			6.750	12.000	15.750	18.000	18.750	18.000	15.750	12.000
2004				9.450	16.800	22.050	25.200	26.250	25.200	22.050
2005					12.285	21.840	28.665	32.760	34.125	32.760
2006						15.356	27.300	35.831	40.950	42.656
2007							16.892	30.030	39.414	45.045
2008								18.581	33.033	43.356
2009									20.439	36.336
2010										22.483

Expected Emergence of Reported Losses

Cumulative Loss Emergence ==>	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10
	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10
2001	0.250	1.000	2.250	4.000	6.250	9.000	12.250	16.000	20.250	25.000
2002		0.500	2.000	4.500	8.000	12.500	18.000	24.500	32.000	40.500
2003			0.750	3.000	6.750	12.000	18.750	27.000	36.750	48.000
2004				1.050	4.200	9.450	16.800	26.250	37.800	51.450
2005					1.365	5.460	12.285	21.840	34.125	49.140
2006						1.706	6.825	15.356	27.300	42.656
2007							1.877	7.508	16.892	30.030
2008								2.065	8.258	18.581
2009									2.271	9.084
2010										2.498

S-B IBNR Example
Scenario: Actual Losses = 3 x's Expected

Estimated Ultimate Loss Ratio

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10
2001	30.0%	35.0%	40.0%	45.0%	50.0%	55.0%	60.0%	65.0%	70.0%	75.0%
2002		30.0%	35.0%	40.0%	45.0%	50.0%	55.0%	60.0%	65.0%	70.0%
2003			30.0%	35.0%	40.0%	45.0%	50.0%	55.0%	60.0%	65.0%
2004				30.0%	35.0%	40.0%	45.0%	50.0%	55.0%	60.0%
2005					30.0%	35.0%	40.0%	45.0%	50.0%	55.0%
2006						30.0%	35.0%	40.0%	45.0%	50.0%
2007							30.0%	35.0%	40.0%	45.0%
2008								30.0%	35.0%	40.0%
2009									30.0%	35.0%
2010										30.0%
Aggregate Portfolio=>	30.0%	32.5%	35.0%	37.4%	39.8%	42.2%	44.6%	47.2%	49.8%	52.4%

Cumulative Incurred Loss

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10
2001	0.750	3.000	6.750	12.000	18.750	27.000	36.750	48.000	60.750	75.000
2002		1.500	6.000	13.500	24.000	37.500	54.000	73.500	96.000	121.500
2003			2.250	9.000	20.250	36.000	56.250	81.000	110.250	144.000
2004				3.150	12.600	28.350	50.400	78.750	113.400	154.350
2005					4.095	16.380	36.855	65.520	102.375	147.420
2006						5.119	20.475	46.069	81.900	127.969
2007							5.631	22.523	50.676	90.090
2008								6.194	24.775	55.743
2009									6.813	27.252
2010										7.494

Cumulative Earned Premium

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10	Ultimate Earned Premium
2001	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	100.00	100.0
2002		20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.0
2003			30.00	60.00	90.00	120.00	150.00	180.00	210.00	240.00	300.0
2004				42.00	84.00	126.00	168.00	210.00	252.00	294.00	420.0
2005					54.60	109.20	163.80	218.40	273.00	327.60	546.0
2006						68.25	136.50	204.75	273.00	341.25	682.5
2007							75.08	150.15	225.23	300.30	750.8
2008								82.58	165.17	247.75	825.8
2009									90.84	181.68	908.4
2010										99.92	999.2

S-B IBNR Example
Scenario: Actual Losses = 3 x's Expected

Exhibit 6
Sheet 2

Reported Loss Ratio

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10
2001	7.5%	15.0%	22.5%	30.0%	37.5%	45.0%	52.5%	60.0%	67.5%	75.0%
2002		7.5%	15.0%	22.5%	30.0%	37.5%	45.0%	52.5%	60.0%	67.5%
2003			7.5%	15.0%	22.5%	30.0%	37.5%	45.0%	52.5%	60.0%
2004				7.5%	15.0%	22.5%	30.0%	37.5%	45.0%	52.5%
2005					7.5%	15.0%	22.5%	30.0%	37.5%	45.0%
2006						7.5%	15.0%	22.5%	30.0%	37.5%
2007							7.5%	15.0%	22.5%	30.0%
2008								7.5%	15.0%	22.5%
2009									7.5%	15.0%
2010										7.5%

Cumulative Estimated IBNR

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10
2001	2.250	4.000	5.250	6.000	6.250	6.000	5.250	4.000	2.250	0.000
2002		4.500	8.000	10.500	12.000	12.500	12.000	10.500	8.000	4.500
2003			6.750	12.000	15.750	18.000	18.750	18.000	15.750	12.000
2004				9.450	16.800	22.050	25.200	26.250	25.200	22.050
2005					12.285	21.840	28.665	32.760	34.125	32.760
2006						15.356	27.300	35.831	40.950	42.656
2007							16.892	30.030	39.414	45.045
2008								18.581	33.033	43.356
2009									20.439	36.336
2010										22.483

Expected Emergence of Reported Losses

Cumulative Loss Emergence ==>	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10
	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10
2001	0.250	1.000	2.250	4.000	6.250	9.000	12.250	16.000	20.250	25.000
2002		0.500	2.000	4.500	8.000	12.500	18.000	24.500	32.000	40.500
2003			0.750	3.000	6.750	12.000	18.750	27.000	36.750	48.000
2004				1.050	4.200	9.450	16.800	26.250	37.800	51.450
2005					1.365	5.460	12.285	21.840	34.125	49.140
2006						1.706	6.825	15.356	27.300	42.656
2007							1.877	7.508	16.892	30.030
2008								2.065	8.258	18.581
2009									2.271	9.084
2010										2.498

S-B IBNR Example
Scenario: Hypothetical Sparse & Erratic Losses

Exhibit 7
Sheet 1

Estimated Ultimate Loss Ratio

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10
2001	22.5%	20.0%	50.8%	40.0%	32.5%	26.7%	21.8%	17.5%	24.7%	20.0%
2002		22.5%	20.0%	17.5%	21.3%	17.5%	14.2%	11.1%	8.1%	5.3%
2003			39.2%	36.7%	34.2%	31.7%	25.8%	21.1%	17.0%	13.3%
2004				22.5%	20.0%	37.3%	29.9%	24.4%	19.9%	16.0%
2005					22.5%	20.0%	17.5%	15.0%	12.5%	10.0%
2006						22.5%	74.9%	78.6%	60.8%	49.1%
2007							22.5%	20.0%	17.5%	15.0%
2008								22.5%	29.1%	23.6%
2009									22.5%	20.0%
2010										22.5%
Aggregate Portfolio=>	22.5%	21.3%	35.0%	28.7%	26.0%	26.7%	30.5%	28.5%	24.7%	20.4%

Cumulative Incurred Loss

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10
2001	0.000	0.000	10.000	10.000	10.000	10.000	10.000	10.000	20.000	20.000
2002		0.000	0.000	0.000	5.000	5.000	5.000	5.000	5.000	5.000
2003			5.000	10.000	15.000	20.000	20.000	20.000	20.000	20.000
2004				0.000	0.000	25.000	25.000	25.000	25.000	25.000
2005					0.000	0.000	0.000	0.000	0.000	0.000
2006						0.000	75.000	125.000	125.000	125.000
2007							0.000	0.000	0.000	0.000
2008								0.000	15.000	15.000
2009									0.000	0.000
2010										0.000

Cumulative Earned Premium

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10	Ultimate Earned Premium
2001	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	100.00	100.0
2002		20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00	180.00	200.0
2003			30.00	60.00	90.00	120.00	150.00	180.00	210.00	240.00	300.0
2004				42.00	84.00	126.00	168.00	210.00	252.00	294.00	420.0
2005					54.60	109.20	163.80	218.40	273.00	327.60	546.0
2006						68.25	136.50	204.75	273.00	341.25	682.5
2007							75.08	150.15	225.23	300.30	750.8
2008								82.58	165.17	247.75	825.8
2009									90.84	181.68	908.4
2010										99.92	999.2

Reported Loss Ratio

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10
2001	0.0%	0.0%	33.3%	25.0%	20.0%	16.7%	14.3%	12.5%	22.2%	20.0%
2002		0.0%	0.0%	0.0%	6.3%	5.0%	4.2%	3.6%	3.1%	2.8%
2003			16.7%	16.7%	16.7%	16.7%	13.3%	11.1%	9.5%	8.3%
2004				0.0%	0.0%	19.8%	14.9%	11.9%	9.9%	8.5%
2005					0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
2006						0.0%	54.9%	61.1%	45.8%	36.6%
2007							0.0%	0.0%	0.0%	0.0%
2008								0.0%	9.1%	6.1%
2009									0.0%	0.0%
2010										0.0%

Cumulative Estimated IBNR

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10
2001	2.250	4.000	5.250	6.000	6.250	6.000	5.250	4.000	2.250	0.000
2002		4.500	8.000	10.500	12.000	12.500	12.000	10.500	8.000	4.500
2003			6.750	12.000	15.750	18.000	18.750	18.000	15.750	12.000
2004				9.450	16.800	22.050	25.200	26.250	25.200	22.050
2005					12.285	21.840	28.665	32.760	34.125	32.760
2006						15.356	27.300	35.831	40.950	42.656
2007							16.892	30.030	39.414	45.045
2008								18.581	33.033	43.356
2009									20.439	36.336
2010										22.483

Expected Emergence of Reported Losses

Cumulative Loss Emergence ==>	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10
	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%

Orig. Yr.	Evaluated @ 12/01	Evaluated @ 12/02	Evaluated @ 12/03	Evaluated @ 12/04	Evaluated @ 12/05	Evaluated @ 12/06	Evaluated @ 12/07	Evaluated @ 12/08	Evaluated @ 12/09	Evaluated @ 12/10
2001	0.250	1.000	2.250	4.000	6.250	9.000	12.250	16.000	20.250	25.000
2002		0.500	2.000	4.500	8.000	12.500	18.000	24.500	32.000	40.500
2003			0.750	3.000	6.750	12.000	18.750	27.000	36.750	48.000
2004				1.050	4.200	9.450	16.800	26.250	37.800	51.450
2005					1.365	5.460	12.285	21.840	34.125	49.140
2006						1.706	6.825	15.356	27.300	42.656
2007							1.877	7.508	16.892	30.030
2008								2.065	8.258	18.581
2009									2.271	9.084
2010										2.498