

ANALYSIS OF MORTGAGE SERVICING PORTFOLIOS

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Financial institutions have come to view consumer lending as a series of distinct businesses. Origination, servicing (loan administration), and portfolio lending are increasingly treated as unique, separable functions. This has led to a boom in the securitization of consumer loans such as autos, boats, and credit card receivables. It also has led to securitization of a much larger percentage of mortgage loans and further specialization in the origination and servicing functions.

With this trend have come more sale and transfer of servicing rights and an increase in the number of participants, making the market of servicing more liquid and efficient. At the same time, upheavals in mortgage banking and the thrift sectors, the imposition of new capital guidelines, and a growing real estate crisis have put extreme downward pressure on servicing prices, altering the competitive relationships within the servicing industry.

SERVICING RIGHTS

Every consumer loan and commercial loan that is originated must be serviced throughout its lifetime. Servicing involves the collection, recordkeeping, remittance, late-fee payment, foreclosure procedures, and other functions necessary to maintain the integrity of the loan until it is fully paid.

If a bank or thrift originates a loan and keeps it in portfolio, the servicing associated with that loan is not separately identified, but once a loan is sold, the servicing component takes on an identity of its own. Loans can be sold with servicing retained (the originator retains the servicing) or with servicing released (the servicing is sold with the loan). Once servicing is separated from a loan, it

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is treated like any other financial asset and may be sold individually or as part of a portfolio of servicing rights.

The buyer of a servicing-rights portfolio must have the appropriate facilities and personnel to perform all the servicing functions, or the buyer must contract for them. In exchange for performing these functions, the servicer receives a servicing fee, which is a fixed percentage of the monthly interest payment on each loan, and other income. In some instances, loans are sold with retained servicing fees that are much larger than the traditional servicing fee. This "excess servicing," which is much like an IO strip, can be split from the servicing rights and sold separately. Although some aspects of excess servicing are discussed in this article, our main focus is on the valuation of a portfolio of complete mortgage servicing rights.

PRINCIPAL PARTICIPANTS

The servicing industry is made up of three principal groups — mortgage bankers, thrifts, and commercial banks. In the early years of the industry, mortgage bankers typically securitized or sold virtually all the loans they originated and retained the servicing rights. They depended on origination fees and servicing income as their major sources of revenue. Banks

EXHIBIT 1 ■ Market Share by Group for Top 100 Servicing Companies

Year	Bank Related	Thrift Related	All Other	Total
A. Volume by Group (\$mm)				
1989	300.7	143.1	261.8	705.6
1988	248.0	160.6	222.9	631.5
1987	198.6	167.1	201.9	567.6
1986	156.2	125.4	179.6	461.2
1985	149.8	103.6	144.4	397.8
1984	157.8	82.6	100.9	341.3
1983	145.4	60.5	95.0	300.9
1982	116.9	29.6	96.6	243.1
B. Percentage by Group (%)				
1989	42.6	20.3	37.1	
1988	39.3	25.4	35.3	
1987	35.0	29.4	35.6	
1986	33.9	27.2	38.9	
1985	37.7	26.0	36.3	
1984	46.2	24.2	29.6	
1983	48.3	20.1	31.6	
1982	48.1	12.2	39.7	

Source: *The American Banker*.

and thrifts, on the other hand, kept most of the loans they originated, and their servicing activities mainly supported the portfolio lending function. Over the years, however, banks and thrifts have developed their own mortgage banking functions, and the distinctions among the three groups have become blurred, at least as far as servicing is concerned.

The American Banker publishes an annual survey of the top 100 firms that service mortgage loans for investors. (The large mortgage portfolios originated and held in portfolio by banks and thrifts are not included in the survey data.) Exhibit 1 shows a summary of the survey results for the past eight years.

Note that by the early 1980s, banks and thrifts together accounted for over 60% of the servicing for investors. Exhibit 1 also highlights the nearly threefold expansion in servicing — from \$243.1 billion to \$705.6 billion — that occurred between 1982 and 1989, and shows how the market share of the three main groups changed during that period.

Thrifts

Accounting and regulatory changes in the early 1980s made purchased servicing exceedingly attractive to thrifts. Many thrifts created special subsidiaries and built up extensive servicing portfolios. From 1982 to 1987, the thrift share of total servicing for investors grew from 12.2% to 29.4%.

Following passage of the Financial Institutions Reform, Recovery and Enforcement Act (FIRREA), many insolvent thrifts were taken over by the Resolution Trust Corporation (RTC), and their servicing portfolios are now being liquidated. Other thrifts struggling to meet the new, stricter capital guidelines are being forced to downsize, and are selling off assets including purchased servicing rights because of the onerous capital treatment servicing rights have received.

Thrifts that are in sound financial health now have an excellent opportunity to expand their share of the servicing market. Regulatory guidelines, however, may limit the degree to which the healthy thrifts can grow their servicing portfolios. On balance, the thrift industry is currently a large net seller of servicing.

Banks

Commercial banks lost a great deal of their commercial and industrial lending business to alternative forms of financing during the late 1970s/early

1980s. To offset this lost business, many banks expanded their consumer lending and financial services activities. In particular, many commercial banks increased their presence in the mortgage industry by stepping up the pace of mortgage origination and building large servicing portfolios.

Banks are strong competitors in the servicing industry because of their extensive experience with data processing and credit issues, two skills crucial to managing a servicing portfolio. Although banks, like thrifts, face regulatory restrictions and mounting loan loss problems that may dampen their appetite for purchased servicing, they will remain key players in this market.

Mortgage Bankers

Mortgage bankers not associated with a depository institution are not constrained by the tougher thrift and bank regulatory environment. However, their business has been impacted by reduced volume caused by the end of the 1986-1987 refinancing boom and by new accounting standards. Because originated servicing cannot be recognized on the balance sheet but purchased servicing can, many mortgage bankers are selling their originated servicing and replacing it with purchased servicing. Some mortgage bankers have begun selling servicing rights in order to boost current income, while others are specializing in originations and are selling servicing rights along with loans. Some have become wholesale servicers; they have eliminated their origination activities and now only purchase servicing from other originators.

Major companies outside the mortgage industry, both financial and non-financial, have acquired large servicing portfolios or entire servicing companies. These firms believe the prospect for profitable growth is greater in the servicing field than in their traditional lines of business. Because these companies are not constrained by depository regulations, and several are large, well-financed organizations, they seem likely to increase their market share in the years ahead.

RECENT TRENDS

Servicing as an industry is going through a period of unprecedented change. Some of the most important recent developments are:

- Computerization. Methods of price evaluation have

been upgraded by computer software programs, more or less standardizing the pricing process for servicing rights. The computer systems that perform the actual servicing function have advanced to the point that they can efficiently process tape-to-tape transfers, ultimately adding the liquidity to the market.

- Regulation. In late 1988, new capital regulations for thrifts imposed a 10% market "haircut" on purchased mortgage servicing. In early 1990, the FDIC proposed to limit purchased mortgage servicing to 25% of Tier 1 (core) capital. For thrifts, the combined impact of these regulations was so burdensome that they became net sellers of purchased mortgage servicing rights (PMSR). However, final regulations have yet to be issued, and the regulators are reviewing their position on this issue.
- Legislative. The legislative climate relative to the transfer of mortgage servicing rights has become increasingly consumer-oriented. Provisions in the National Affordable Housing Act of 1990 mandate certain penalties and fees for improper servicing transfers. In addition, the Act prohibits the charging of late fees for a two-month period after a transfer.
- Resolution Trust Corporation. The Resolution Trust Corporation (RTC), the liquidator of failed savings and loans, has over \$100 billion of servicing rights to sell. This supply will be sold over an extended period through auction. A two-tier market has developed — one for servicing supplied by a healthy originator that can offer meaningful representations and warranties, and the other for servicing offered by the RTC. The servicing offered by the RTC is perceived as being of lower quality and thus is offered at lower pricing levels.
- New Entrants. Servicing was trading at such low levels in 1990 that it attracted capital from non-traditional sources. For example, individuals and funds created specifically for the purpose of buying servicing were bidders. In addition, many total-rate-of-return investors explored the interest-only component of the servicing stream as an investment. Finally, the high yields offered by the purchase of servicing rights attracted investors from the high-yield corporate sector.

VALUATION OF SERVICING PORTFOLIOS

Investors and servicers have begun to use increasingly sophisticated cash flow models to value

servicing rights in an approach similar to the one used in mortgage-pricing analysis. Cash flows are projected for each of the various components of servicing income and expense. Once the cash flows are estimated, it is possible to calculate either an IRR, given a price for the servicing rights, or a fair price, given a target IRR.

The resulting price or yield, however, does not have the same degree of certainty as a yield calculated for a mortgage security. A servicing model is a model of a business, not just a projection of the security's interest and principal payments.

Numerous income and expense variables must be estimated in a servicing model, some for as long as thirty years into the future. Our mortgage servicing model incorporates the most important of these income and expense variables.

A vast number of different servicing arrangements exist, including numerous options offered by the federal housing agencies. The sharing of the income, expense, and risk components among owner, agency, insurer, and servicer varies greatly from program to program, and within programs, from option to option.

Income Components

SERVICING FEES: The major income component of servicing rights is the servicing fee, which is a fixed percentage of the outstanding balance that is paid each month to the institution responsible for servicing the loan. This fee, plus any third-party guarantee or insurance, represents the difference between a pool's weighted-average coupon (WAC) and its pass-through rate.

On a GNMA-I pool, for example, the servicing fee is fixed at 0.44%, which, when the agency fee of 0.06% is added, equals the 0.50% difference between the coupon and gross WAC. On FHLMC and FNMA securities, the servicing fee is not fixed but typically ranges from 0.25% to 0.75%, while on AA pass-throughs, the fee normally ranges from 0.375% to 0.75%.

Some AA pass-throughs are created with exceptionally large servicing fees, on the order of 0.75% to 1.00%. The amount of the servicing fee beyond a normal range of 0.40% to 0.60% is referred to as "excess servicing" and, in some instances, can be stripped from the underlying servicing and sold separately.

ESCROW EARNINGS: Typically, the second most important component of servicing income is net inter-

est earned on funds held in escrow. To protect the lending institution's interest in the mortgaged property, homeowners are required to pay real estate taxes and insurance into an escrow account to insure prompt payment of these expenses as they come due.

The escrow account is established at closing and is maintained by monthly payments that accompany principal and interest payments. The amount of escrow required is determined by the size and frequency of the tax and insurance payments. The servicer earns market rates on the escrow account and in some states it is required to pay out a statutory rate on the order of 2% to 5% to the homeowner. The value that a servicer places on these deposits will vary based on reserve requirements and available uses of the funds.

PRINCIPAL AND INTEREST FLOAT: The servicer earns interest on the homeowner's principal and interest payments from the time they are received until they are forwarded to the appropriate agency or directly to the owner of the mortgage. The length of the float period varies for the different housing agency programs and for whole loans, but the longer the period, the greater the positive cash flow from the float. A higher loan coupon produces a larger float, but it also leads to faster prepayments, which ultimately reduce cash flow.

LATE FEES: Mortgage payments are usually due on the first of the month, with a fifteen-day grace period. If the payment is received after the grace period, the mortgagor is subject to a late penalty fee. Note, however, that an increase in late-fee income is offset partially by lost float income and, possibly, by interest expense on any principal and interest advances that may be required. A higher delinquency rate leads to higher late payment fees, but higher delinquencies also increase the probability of higher foreclosure rates.

OTHER ANCILLARY INCOME: Other sources of income can be derived from such items as insurance solicitations, tax contract fees, assumption fees, and prepayment penalties.

Expense Components

SERVICING COSTS: Servicing a portfolio of mortgage loans is a labor-intensive and systems-intensive operation. Fairly good estimates of historic servicing costs are available. Annual servicing costs currently range

from \$65 to \$105 per loan. However, pricing a servicing portfolio requires forecasting costs for the life of the portfolio, often for the next thirty years. In addition to an estimate of current costs, one needs a forecast of how these costs will increase in the future.

The servicing business lends itself to economies of scale and there is a trend toward consolidation in the industry. Large, low-cost servicers have significantly increased their market share in recent years.

FORECLOSURE COSTS: Who bears the credit exposure for a securitized mortgage loan depends on the particular program and the preference of the issuer/servicer. FHA bears the entire risk on loans it insures, and the VA bears the risk up to a certain point on loans it guarantees. For conventional loans, FNMA and FHLMC offer servicers an optional program whereby, for a larger fee, the agencies absorb the default risk.

Even if servicers do not bear the direct foreclosure costs, a default subjects them to lost interest and substantial administrative expense. When the servicer is responsible for foreclosure costs, the greatest risk is a period of housing deflation when the equity many homeowners have in their homes falls below the remaining mortgage balance.

In addition, the servicer usually bears the risk of honoring the representations and warranties it gives to the investor. These relate to the underwriting standards and the origination standards of the loans and, if violated, could lead to a repurchase of the loans by the servicer, which would ultimately bear the credit risk in default. This is frequently referred to as phantom recourse.

PRINCIPAL AND INTEREST ADVANCES: To the extent that mortgagors fail to meet their payment schedules, the servicer may be required to pass on to the appropriate agency or owner of the mortgage monthly principal and interest payments. The servicer experiences an interest cost in providing these advances and, if it holds the credit exposure, risks the possibility of an outright loss if the homeowner defaults and the advances are not recoverable from the sale of the property.

In the case of some agency servicing agreements, the servicer is required to pass through interest until the remittance date even if a loan is paid off on an earlier day during the remittance cycle. The servicer earns a money market rate on the prepaid loan,

which, depending on the shape of the yield curve, may be greater or less than the interest rate passed through.

Prepayments and Defaults

Prepayments and defaults have a strong impact on income and expense variables. In most mortgage analysis, defaults are not estimated independently, but simply are included as part of a prepayment projection. An investor who owns a mortgage-backed security (MBS) is largely indifferent to whether prepayments result from a refinancing, a household move, or a default. Owners of a servicing portfolio, however, are quite concerned about the level of defaults, especially if they are liable for all or a portion of the losses associated with a default. In servicing models, therefore, defaults are treated separately from prepayments, although they are included in the overall prepayment rate.

PREPAYMENTS: A prepayment forecast is extremely important in valuing servicing because the major servicing income components are tied to either the balances outstanding or the number of loans remaining in the portfolio. When prepayments increase, the remaining balances and the number of loans decline at a faster rate, reducing the income generated by the servicing portfolio. The main income components are impacted in the following manner:

- **Servicing Fee Income.** The servicing fee itself remains fixed when rates move, but fee income declines in exact proportion to the decline in total outstanding balances brought about by faster prepayments.
- **Escrow Account Earnings.** In a falling interest rate/rising prepayment rate environment, escrow earnings are adversely affected in two ways. Total escrow balances are reduced because more loans are prepaid, and falling short rates reduce the net interest earned on the remaining balances.
- **Principal and Interest Float.** Earnings from float respond to changes in rates and prepayments much like escrow earnings. In a falling rate environment, the amount of float falls as rising prepayments reduce the number of loans in the portfolio. Simultaneously, the rate earned on the float declines with other short rates.

Our servicing model uses a prepayment model to forecast prepayments for the different mortgages in a servicing portfolio.¹ The prepayment model is driven

by several key variables, including the type of mortgage (GNMA, conventional conforming, non-conforming, ARMs, etc.), the spread between the coupon on the loans and the current mortgage rate, and the seasoning of the loans.

DEFAULTS: Default rates are closely related to the amount of equity a homeowner has in the property. If the equity falls below the remaining balance on the loan, the homeowner has a strong incentive to default rather than to continue paying on the loan. This problem can become acute during periods of severe housing deflation, such as the one that occurred in the Southwest during the early 1980s.

Default rates are also closely related to seasoning. People who buy a house they cannot afford usually discover this unpleasant fact within the first few years of home ownership. Also, as time passes, monthly mortgage payments begin to pay down larger amounts of principal, causing the homeowner's equity to rise.

For these reasons, the highest default rates occur in the early years of a mortgage's life. For FHA/VA loans, peak default rates occur in years two and three. For conventional loans, the peak occurs in years three and four.

Defaults are introduced into the servicing model via seasoning curves, one for FHA/VA loans and one for conventional loans as shown in Exhibit 2. The FHA/VA curve is based on FHA data. The shape of the conventional curve is based on data from Moody's, while its height is set at one-half that of the FHA/VA curve, which is the long-term average ratio of conventional defaults to FHA/VA defaults.

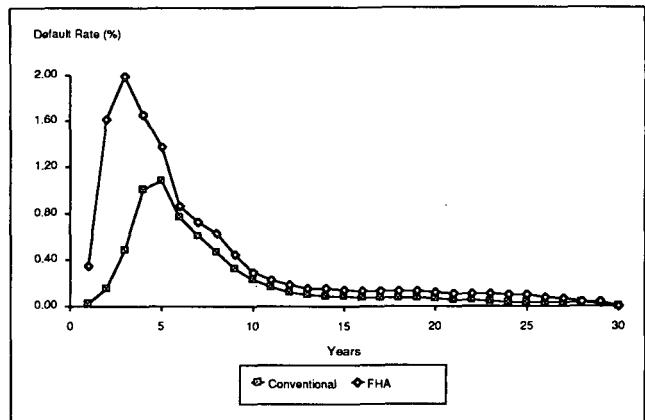
The FHA data cover eighteen years of default history, including the high rates of the mid-1980s, so the height of the curve overstates current default levels. In our servicing model, we use the shapes of the curve shown in Exhibit 2, but the heights are determined by our latest estimate of annual default rates, which currently are 0.8% for FHA/VA loans and 0.4% for conventional loans.

Loan Characteristics

The characteristics of the loans in a servicing portfolio determine how changes in interest rates and other economic variables affect prepayments and defaults.

TYPE: GNMA, conventional, and non-conforming loans have different projected prepayment speeds,

EXHIBIT 2 ■ Default Seasoning Curves for FHA and Conventional Mortgages



which play a crucial role in determining a servicing portfolio's value. In addition, GNMAAs and those conventional pass-throughs containing VA loans are subject to the possibility of a VA "no-bid" if a loan defaults.

The VA has the right to either take over a defaulting loan or declare a "no-bid" and simply pay the lender the guaranteed amount of the loan. Currently, VA guarantee limits are 40% of the loan amount or \$36,000, whichever is smaller. If property values drop sharply, as they have in several sections of the country in recent years, the VA will pay the guaranteed amount, and the servicer will be forced to absorb the remainder of any loss.

The loan type also impacts the amount of float because agency programs and private market investors have different remittance schedules. The longer the time between receipt of monthly payments and remittance to the agency or owner of the loan, the greater the float.

LOAN SIZE: Large loans are more profitable to service than small loans. The cost of servicing a loan is relatively fixed, so the cost per \$1,000 of balances will be less for large loans. However, loan size also helps determine prepayment and default rates. Large loans are usually taken out by homeowners with high incomes; this group of homeowners historically has had fewer defaults and higher prepayment rates than have homeowners with low incomes and small mortgages.

SEASONING: Default rates first rise and then taper off, so the amount of seasoning on a portfolio is a good indicator of future default rates. In general, servicing that is seasoned a year or two beyond the peak default period is most valuable.

GEOGRAPHIC LOCATION: Regional economics strongly influence prepayment speeds and default rates. Prospective buyers will mark down servicing portfolios originated in regions undergoing sharp economic slowdowns, like the Southwest in the mid-1980s, the Northeast in today's market, and, possibly, California in the near future. A depressed regional economy will cause prepayments to slow, an advantage that may be offset by a sharp rise in defaults.

LOAN-TO-VALUE (LTV) RATIO: A low LTV ratio acts as a buffer to declining equity values. Over the years, high LTV loans have proved to be much riskier than low LTV loans, and many banks and thrifts have reduced the maximum LTV ratio they will accept. Because of the well-known relationship between LTV ratios and defaults, servicers will mark down their bids for servicing portfolios with high LTVs.

Valuation Sensitivity

Exhibit 3 shows how our servicing model values a hypothetical servicing portfolio. In the top half of the exhibit are inputs including portfolio characteristics, the prepayment and foreclosure parameters, income and expense factors, and a choice of tax rate and amortization method. The bottom half of the exhibit displays the calculated value of the portfolio for three target IRRs on a pre-tax and after-tax basis.

EXHIBIT 3 ■ PBCF's Mortgage Servicing Model

Number of Loans:	5,000	Service Fee (Bp.):	50.00
Average Loan Size (\$):	60,000.00	Other Fees/Loan/Yr. (\$):	30.00
Mortgage Balance (\$):	300,000,000	Average Escrow Balance/Loan (\$):	600.00
Mortgage Type:	CONV	Foreclosure Cost/Loan (\$):	800.00
WAC (%):	10.250	Escrow Earnings Rate (%):	4.00
Original Term (yy/mm):	30-00	Servicing Cost/Loan/Year (\$):	85.00
Remaining Term (yy/mm):	26-00	Inflation Rate/Year (%):	3.00
Prepayment Assumption:	PSA 159%	Tax Rate (%):	34.00
Foreclosure Assumption:	1.00%/yr.	Amortization Method:	FASB 65
Target IRR (%)	Pre-Tax PV (\$)	After-Tax PV (\$)	
17.00	4,506,932 (150.2 Bps.)	3,719,229 (124.0 Bps.)	
19.00	4,244,838 (141.5 Bps.)	3,462,081 (115.4 Bps.)	
21.00	4,011,894 (133.7 Bps.)	3,237,790 (107.9 Bps.)	

The sample portfolio shown in Exhibit 3 has an outstanding principal balance of \$300 million and consists of conventional loans with an average loan size of \$60,000, a weighted average coupon of 10.25%, an original term of thirty years and a remaining term of twenty-six years. Given the other inputs, and a target IRR of 19%, the model values this portfolio at \$4.2 million. Target IRRs of 17% and 21% produce values of \$4.5 million and \$4.0 million, respectively.

Exhibit 4 shows the sensitivity of this portfolio's value to estimation error for several of the variables that can only be estimated and are subject to change. A 25% error in the estimated foreclosure rate or average foreclosure cost results in only a marginal change in value because the absolute level of foreclosure, at 1.0%, is very small. Changes in the earnings rates for escrow float have a larger, but still not dramatic, impact because these income sources represent only one-fourth or less of total servicing income. A 25% change in the escrow and the float earnings rates changes the portfolio's value by 2.8% and 3.1%, respectively.

The servicing cost component is relatively large, so estimation errors in this area will be important. A 25% error in servicing costs leads to a nearly 10% difference in the value of the sample servicing portfolio.

Valuation changes that result from major interest rate or economic changes are considerably more important. The point here is that, compared to securi-

EXHIBIT 4 ■ Servicing Portfolio Valuation Sensitivity (Using PBCF's Mortgage Servicing Model)

	Estimation Error				
	+25%	+10%	NC	-10%	-25%
Foreclosure Rate %:	1.25	1.10	1.00	.90	.75
Portfolio Value \$:	4,205,368	4,299,050	4,244,838	4,260,626	4,284,309
Change in Value %:	-0.93	-0.37	--	+0.37	+0.93
Foreclosure Cost \$:	1,000	880	800	720	600
Portfolio Value \$:	4,205,368	4,229,050	4,244,838	4,260,626	4,284,309
Change in Value \$:	-0.93	-0.37	--	+0.37	+0.93
Escrow Rate %:	5.0	4.4	4.0	3.6	3.0
Portfolio Value \$:	4,364,226	4,292,593	4,244,838	4,197,083	4,125,450
Change in Value %:	+2.8	+1.1	--	-1.1	-2.8
Float & Other Fees \$:	37.50	33.00	30.00	27.00	22.50
Portfolio Value \$:	4,378,471	4,298,291	4,244,838	4,191,385	4,111,205
Change in Value %:	+3.1	+1.3	--	-1.3	-3.1
Servicing Cost \$:	106.25	93.50	85.00	76.50	63.75
Portfolio Value \$:	3,822,006	4,075,705	4,244,838	4,413,971	4,667,670
Change in Value %:	-10.0	-4.0	--	+4.0	+10.0

ties valuation, servicing valuation involves a much larger degree of uncertainty, even if the economic environment remains constant.

Scenario Analysis

The impact of interest rate and prepayment rate changes on the hypothetical servicing portfolio is illustrated in Exhibit 5. The portfolio values corresponding to different interest rate moves and prepayment speeds are all based on a required return of 19%. It is clear from Exhibit 5 that falling interest rates and rising prepayments severely impact the value of servicing rights. A 300-basis point fall in rates cuts the value of the servicing portfolio by 40%. In contrast, a rise in rates of 300 basis points increases its value by only 15%.

Exhibit 5 also shows the yield on the servicing portfolio for various scenarios given an initial purchase price of \$4,245,000. It also contrasts the yield behavior of servicing to that of an FNMA 9.5% IO strip. A 300-basis point fall in rates causes the yield on the servicing portfolio to drop to -1.4%, while a 300-basis point rise in rates increases the yield only to 23.9% (from a base case of 19.0%).

The IO strip shows a much greater response (in terms of percentage change in yield) to rising prepayment rates and a smaller response to falling prepayment rates. For a 300-basis point fall in rates, the IO strip

(from an initial 10.8%) falls to -6.1%; for a 300-basis point rise in rates, it rises only to 12.7%.

Thus, servicing rights outperform IOs in both bullish and bearish scenarios. The reason for this is that only a portion of servicing income, namely, the servicing fee, responds to prepayment changes the way the interest cash flows affect an IO. Most of the remaining servicing income, escrow and float earnings, behaves quite differently.

When rates rise, escrow and float earnings increase in line with increases in short-term rates. The

EXHIBIT 5 ■ Impact of Prepayments and Interest Rate Changes on the Value of a Servicing Portfolio

	Interest-Rate Scenario (Basis Points)						
	-300	-200	-100	0	+100	+200	+300
% PSA	397	298	204	159	141	136	131
Value (\$000) ^{1,2}	2,537	3,081	3,771	4,245	4,532	4,708	4,887
% Change	-40.2	-27.4	-11.2	*	+6.8	+10.9	+15.1
Portfolio Yield (%) ³	-1.4	7.0	14.8	19.0	21.2	22.5	23.9
IO Yield (%) ⁴	-6.1	1.1	7.7	10.8	12.0	12.3	12.7

1. Escrow earnings rate moves in parallel with long rates.
2. Value for servicing portfolio calculated for IRR = 19.0%.
3. Yield for servicing portfolio calculated for Price = \$4,245,000.
4. IO yields are for FNMA SMBS60 IO priced at 42-28.

Note: Analysis based on PBCF's Mortgage Servicing Model.

added earnings, as a result of higher interest on the float, typically are much greater than the gain in the servicing fee income or in the interest component of an IO due to slowing prepayments. When rates fall, the earnings on escrow and float decline in line with the decline in short rates, but this change is much less extreme than the decline in servicing fee or interest income of an IO due to the acceleration in prepayments.

Although less sensitive than IOs, servicing rights are one of the few fixed-income investments with negative duration, and, like current-coupon IOs, servicing rights have large negative convexities; that is, they lose more during rallies than they gain on market declines. Clearly, the value of servicing rights is strongly influenced by changes in prepayment speeds. However, even though servicing rights have significant prepayment-related option costs, it is common practice not to consider these costs explicitly when pricing a servicing portfolio. That is, an option-adjusted spread (OAS) approach typically is not used to value servicing.

To some extent, this may reflect the uncertainty introduced into the pricing analysis by the need to estimate numerous economic and business variables. It also may indicate that servicing is a less efficient market than the MBS market, and more sophisticated pricing approaches are not yet widely accepted. It is our view that the IO-like components of servicing are so important that the option value of servicing should be explicitly recognized.

OAS VALUATION OF SERVICING

The valuation of servicing has traditionally focused on static cash flow analysis, while IOs tend to be evaluated by means of OAS analysis. The OAS calculation involves evaluating an instrument over a large number of randomly generated interest paths; the effects of interest rate variation on cash flows are hence factored into the analysis.² Widespread use of OAS analysis in the stripped-mortgage-backed securities (SMBS) market is a reflection of the critical dependence of the value of these securities on prepayments.

Given that the value of a servicing portfolio has a similar dependence on prepayments, OAS analysis can be a valuable complement to traditional static cash flow analysis in evaluating a servicing portfolio. It provides a measure of how much impact interest rate variation and resulting changes in prepayments are likely to have on the value of the portfolio.

OAS calculations in the portfolio-servicing context are somewhat more involved than for standard securities, because servicing cash flows depend not only on prepayments but also on several other variables (such as inflation) that vary with interest rates.

Calculation of OASs for Servicing Portfolios

Calculation of OASs involves two main steps: 1) simulating a large number of interest rate paths representing the spectrum of possible interest rate behavior over the term of the instrument, and 2) for each such path, calculating the corresponding cash flows from the instrument. A number of interest rate-related factors affect the cash flows from a servicing portfolio:

- Prepayments. For each interest rate path, the corresponding prepayment projections are obtained by feeding the path into a prepayment model.
- Inflation. This is assumed to move directly with interest rates; in other words, the "real" rate of interest is assumed to be constant. Hence escrow balances, foreclosure costs, and servicing costs will increase at a faster (slower) rate in a high (low) interest rate environment.
- Float Rate. This is assumed to be a short-term reinvestment rate and moving directly with the simulated interest rates.
- Escrow Earnings Rate. This is assumed to be the difference between short-term reinvestment rates and the state-mandated minimum rate required to be paid on escrow balances, and hence varies with interest rates. Because the mandatory minimum may be raised in a sustained high-rate environment, the variation may not always be direct.
- ARMs. For adjustable-rate mortgages (ARMs), there is the additional complication of coupons varying with interest rates. For ARMs linked to market rates (such as short-term Treasury rates), the coupon index paths will move directly with the simulated interest rate paths. For cost-of-funds (COF) ARMs, the COF index paths are obtained by means of COF models.³

The relationship between interest rates and foreclosure rates is problematical. While it could be argued that a recession will be characterized by falling interest rates, low mortgage rates may also spur housing sales and price appreciation, and the resulting decrease in LTVs may reduce default rates. Historical data provide

EXHIBIT 6 ■ OAS Analysis of a Servicing Portfolio

Number of Loans:	5,000	Service Fee (Bp.):	50.00
Average Loan Size (\$):	60,000.00	Other Fees/Loan/Yr. (\$):	30.00
Mortgage Balance (\$):	300,000,000	Average Escrow Balance/Loan (\$):	600.00
Mortgage Type:	CONV	Foreclosure Cost/Loan (\$):	800.00
WAC (%):	10.250	Escrow Earnings Rate (%):	4.00
Original Term (yy/mm):	30-00	Servicing Cost/Loan/Year (\$):	85.00
Remaining Term (yy/mm):	26-00	Inflation Rate/Year (%):	3.00
Prepayment Assumption:	PSA 159%	Assumed Volatility:	15% per annum
Foreclosure Assumption:	1.0%/yr.	Purchase Price:	1.40% (\$4,200,000)
		Price Corresponding to an OAS of 300 Bp.:	1.78%
		IRR:	19.85%
		OAS:	1075 Bp.
		Option Cost:	185 Bp.

no clear answer to this question, so we have chosen to keep foreclosure rates independent of interest rates.

An OAS Example

Exhibit 6 shows OAS analysis for the hypothetical servicing portfolio in Exhibit 3. This approach reveals how cheap servicing currently is compared to fixed-income securities. The purchase price of 1.40% of the current balance (or \$4,200,000) results in a yield of 19.85%, which, if anything, is low compared with what many servicing portfolios are currently offering. Yet it gives an OAS of 1,075 basis points, while most other fixed-income instruments, including IOs, currently have OASs below 100 basis points.

The option cost is the difference between the OAS at a zero volatility (which will approximately equal the IRR minus the yield of a comparable-duration Treasury) and the OAS at the assumed volatility of 15%. The option cost measures the impact interest rate and resulting cash flow variation have on the value of the instrument. In this case, this variation is estimated to cost the investor about 185 basis points, which is comparable to the option costs on current-coupon IOs. A simple way to interpret the option cost is to think of it as the amount that the investor should subtract from the IRR to obtain a yield that has been adjusted for the adverse impact of interest rate variation.

SENSITIVITY ANALYSIS: The OAS of the servicing portfolio remains high even if we assume high levels of volatility and prepayments. Exhibit 7 shows the results if we assume a volatility of 20% and assume that all prepayments are 20% higher than projected. The OAS with

these new assumptions is 801 basis points, still orders of magnitude higher than spreads on other fixed-income instruments. The option cost is now 201 basis points.

FAIR OAS PRICE: Exhibits 6 and 7 also show purchase prices that will lead to an OAS of 300 basis points, which can be thought of as a *fair* OAS; the corresponding price is hence the implied *fair* price. The fair OAS is chosen to be 200 basis points or more higher than what most IOs are offering, to account for lower liquidity, supply and demand considerations, and so on. In the base case in Exhibit 6, for example, the *fair* price corresponding to a *fair* OAS of 300 basis points is 1.78%, or \$5,340,000, about 27% higher than the actual purchase price of 1.40%.

REGULATORY ENVIRONMENT

State Laws

In order to protect the rights of homeowners, many states have passed laws that impact the value of a servicing portfolio.

EXHIBIT 7 ■ OAS Sensitivity Analysis

Purchase Price:	1.40% (\$4,200,000)
Assumed Volatility:	20% per year
Prepayment Multiplier:	1.20
IRR:	19.85%
OAS:	801 Bp.
Option Cost:	201 Bp.
Price Corresponding to an OAS of 300 Bp.:	1.63%

EXHIBIT 8 ■ State-Mandated Interest (%) on Escrow

California: 2.00	New Hampshire: 5.00
Connecticut: 5.00	New York 2.00
Iowa: Savings Account Rate	Oregon: 4.50
Maine: 3.00	Rhode Island: 4.00
Maryland: Regular Passbook Rate	Utah: 5.25
Massachusetts: Determined by Lender	Wisconsin: 5.25
Minnesota: 5.00	

Source: Mortgage Bankers Association.

INTEREST ON ESCROW: Thirteen states mandate a minimum *interest on escrow (IOE)* rate that must be paid to the mortgagor. As Exhibit 8 shows, these state-mandated rates range from 2.00% to 5.25%, with two states requiring a rate not less than the regular savings rate. In California and several other states, the escrow laws also stipulate that loans at or under a certain original LTV are not required to escrow for taxes.

FORECLOSURE PROCEEDINGS: Some states have fairly stringent conditions limiting circumstances under which homeowners can be forced to leave their homes. A state with strict consumer protection provisions in the foreclosure laws can increase foreclosure costs by requiring extra legal and administrative costs or by extending the foreclosure period. Some states allow a redemption period, a period either prior to or after foreclosure during which the homeowner can regain rights to the property by bringing mortgage payments up to date.

An example of how foreclosure laws can vary from state to state is given in Exhibit 9, which shows the normal time it takes for a servicer to transfer foreclosed property to FHA and VA. The time to transfer property to FHA can vary from two to sixteen months, leading to a wide difference in foreclosure costs. In some states, the time to transfer VA loans is less than the time to transfer FHA loans because, in those states, property can be transferred to the VA before the redemption period has expired; this is not true for FHA loans.

When a homeowner defaults on a mortgage and the property is sold, if the proceeds from the sale do not cover the mortgage and associated legal and

EXHIBIT 9 ■ Comparison of Selected Foreclosure Regulations

	Time Required to Complete Action (Mos.)	Normal to Transfer Property	
		Initial Period (Mos.)	Redemption (Mos.)
Arizona:	4	0	5 5
California:	5	0	6 6
Connecticut:	6	0	7 7
Illinois:	6	7	14 4
Massachusetts:	9	0	10 10
New York:	8	0	9 9
Texas:	1	0	2 2
Wisconsin:	3	12	16 4

administrative costs, a deficiency is created. In some states, this deficiency can be turned into a deficiency judgment, which is a personal obligation of the mortgagor. In other states, this is not the case. These and other aspects of state regulations mean that the market for servicing is very state-dependent. Servicers will discount servicing rights from those states viewed as having onerous regulations.

Federal Laws

The growth in servicing sales over the past several years has brought the federal government into the servicing picture. Many homeowners experience complications with crediting of their monthly mortgage payment when the servicing of their mortgage is sold to another institution. Congress responded to these problems by including language in the Cranston-Gonzalez National Affordable Housing Act (October 1990), which imposes standards for protecting the homeowner when a mortgage is transferred or sold.

Included in the bill are provisions that:

- Require lenders to give borrowers an estimate of the percentage of loans they typically sell.
- Require servicers that sell servicing to notify homeowners fifteen days prior to a transfer of servicing.
- Require servicers who purchase servicing to notify homeowners within fifteen days after transfer of servicing.
- Disallow late fees for sixty days after a servicing transfer if a mortgagor remits payments to the wrong address.
- Provide for punitive damages if the servicer, even inadvertently, fails to adhere to these regulations.

This legislation will increase administrative and servicing costs as well as the probability of litigation. Further movement on a nationwide minimum interest rate on escrow of 5% by consumer-oriented legislators is likely in the years ahead.

Regulatory Issues

In this era of intense concern over capital adequacy, capital guidelines have had a major impact on the value of many mortgage products, including servicing rights. Regulations proposed by the FDIC would allow banks and thrifts to count purchased mortgage servicing rights up to only 25% of core capital (subject to certain exemptions). Some thrifts have quite sizable servicing portfolios relative to their capital. To recognize PMSR in excess of the 25% limit, thrifts would be forced to sell them, in effect converting PMSR to cash.

The FDIC proposal had two effects: the price of servicing fell abruptly, and the FDIC was deluged with complaints from the thrift industry as well as others. The FDIC has been analyzing these concerns and may well offer some relief when the final regulations are published.

A second and related topic deals with the determination, for regulatory capital purposes, of whether servicing contains elements of recourse. This issue is relevant to both purchased and retained servicing for banks and thrifts. Servicing deemed to have associated recourse may carry substantial capital costs.

For example, in June 1990, the OTS issued a letter indicating that if a GNMA pool in a servicing portfolio had more than 20% VA loans, the total amount of the VA loans in the pool would be classified as recourse servicing. The result would be that most FHA/VA servicing would carry a risk-based capital requirement equal to the VA loans being serviced, whether or not these loans were held by the servicer. A month later, however, the OTS suspended the initiative pending a broader review of the entire recourse issue being undertaken by the Federal Financial Institutions Examination Council (FFIEC). The FFIEC is still engaged in review.

SERVICING RIGHTS ACCOUNTING TREATMENT

The Financial Accounting Standards Board, in its Statement 65 (FASB 65) issued in September 1982,

defines purchased servicing as an intangible asset, and requires the purchase cost to be amortized over the economic life of the asset. The method prescribed in FASB 65 requires amortization in proportion to net servicing income.

Investors should be aware of the differing accounting treatments accorded to purchased servicing rights, retained excess servicing, and MBSs, including IOs held at amortized cost. Both excess servicing and IOs are amortized by means of modified versions of the level-yield method (described, for example, in FASB 91) rather than the proportional method described in FASB 65.⁴ In addition, there are differences in the adjustments to be made to amortization and book values if actual prepayments differ from projections.

Amortization of Purchased Servicing Rights

While buyers of servicing rights seem to use a variety of amortization methods, with a simple straight-line write-down a common choice, the proportional method of FASB 65 is required under GAAP. FASB 65 states that the purchase cost should be amortized in proportion to, and over the period of, estimated net servicing income (mortgage-servicing revenues in excess of servicing cost).

There are no explicit guidelines in the FASB bulletins for choosing prepayment rates and other factors needed in calculating projected net servicing income. The prepayment rate assumption should be consistent with the historical speeds of large groups of similar mortgages, while the other assumptions made in calculating servicing income and expenses (ancillary income, foreclosure rates and costs, etc.) should be based on historical experience or on accepted industry norms.

Once prepayment, discount rate, and other assumptions have been made, the amortization method is straightforward:

- Calculate projected net servicing income using the chosen assumptions for each period, and sum to obtain the total projected income.
- For each period, the amount amortized is equal to:

$$\frac{\text{Purchased Price} \times \text{Net Income for Period}}{\text{Total Projected Net Income}}$$

An example is provided in Exhibit 10 for a

**EXHIBIT 10 ■ Amortization of Purchase Price at Assumed Prepayment Rate
(Using the PBCF Mortgage Servicing Model)**

Number of Loans:	5,000	Service Fee (Bp.):	50.00
Average Loan Size (\$):	60,000.00	Other Fees/Loan/Yr.:	30.00
Mortgage Balance (\$):	300,000.00	Average Escrow Balance/Loan:	600.00
Mortgage Type (\$):	CONV	Foreclosure Cost/Loan:	800.00
WAC (%):	10.2450	Escrow Earnings Rate (%):	4.00
Original Term (yy/mm):	30-00	Servicing Cost/Loan/Year:	85.00
Remaining Term (yy/mm):	26-00	Inflation Rate/Year:	3.00
 Prepayment Assumption:	PSA 159%	 Tax Rate:	34.00%
Foreclosure Assumption:	1.000	 Amortization Method:	FASB 65
Total Projected Net Income: \$9.313mm			
 Month	Net Servicing Income (\$)	Amortization (\$)	Book Income (\$)
1	108,750	52,547	56,203
2	107,592	51,987	55,605
3	106,550	51,484	55,067
-	-	-	-
-	-	-	-
-	-	-	-

hypothetical servicing portfolio, purchased for a price of 150 basis points, assuming that the actual prepayment rate is equal to the assumption. The total projected net servicing income at the assumed PSA speed of 159% is approximately \$9.313 million. The amortization each month is hence equal to the purchase price of \$4.5 million multiplied by the ratio of that month's net servicing income to the total projected income of \$9.313 million.

In practice, of course, it is unlikely that the mortgages will prepay at the assumed speed every month. Suppose that the first month's speed is 175% PSA. Based on this, and on a drop in mortgage rates, it is decided to revise the prepayment projection to 175% PSA. The total net servicing income (including the actual income for the first month) is now projected to be \$8.7365 million. The revised amortization schedule is shown in Exhibit 11.

The effect of the higher prepayment projection is to speed up the amortization of the purchase price. This in essence reflects the shorter period over which the servicing income is received; the faster speeds reduce the amount of all cash flows, but especially the later ones, and hence the economic life of the asset is

shorter. Similarly, if prepayments are slower than anticipated, the amortization schedule will lengthen, reflecting the longer economic life of the asset.

Note that even if the prepayment assumption is not changed, the amortization schedule will, in all likelihood, still have to be recalculated each month. Prepayment rates vary from month to month for a host of reasons, such as seasonality, even if the average speed is close to the assumption. Any variation from the assumed speed, even if for only one month, means a change in future projected cash flows, and hence an adjustment to the amortization schedule.

Are write-downs necessary if speeds increase? The FASB's EITF Bulletin 86-38 indicates that a write-down is not necessary if estimated future net servicing income exceeds the asset's carrying amount. The estimated future net servicing income can be a discounted or an undiscounted value, depending on the institution's standard policy for valuing similar assets. If the undiscounted value is used, then a write-down is necessary only if the sum of all projected future net servicing income is less than the amortized cost of the portfolio. As this is unlikely even under a substantial increase in projected speeds, a write-down

**EXHIBIT 11 ■ Amortization of Purchase Price at Revised Prepayment Rate
(Using the PBCF Mortgage Servicing Model)**

Number of Loans:	5,000	Service Fee (Bp.):	50.00
Average Loan Size (\$):	60,000.00	Other Fees/Loan/Yr.:	30.00
Mortgage Balance (\$):	300,000.00	Average Escrow Balance/Loan:	600.00
Mortgage Type (\$):	CONV	Foreclosure Cost/Loan:	800.00
WAC (%):	10.2450	Escrow Earnings Rate (%):	4.00
Original Term (yy/mm):	30-00	Servicing Cost/Loan/Year:	85.00
Remaining Term (yy/mm):	26-00	Inflation Rate/Year:	3.00
 Prepayment Assumption:	PSA 175%	 Tax Rate:	34.00%
Foreclosure Assumption:	1.000	 Amortization Method:	FASB 65

Total Projected Net Income: \$8.737mm

Month	Net Servicing	Income (\$)	Amortization (\$)	Book Income (\$)	Book Value (\$)
1		108,750	56,015	52,735	4,443,985
2		107,479	55,360	52,118	4,388,625
3		106,338	54,773	51,565	4,333,852
-		-	-	-	-
-		-	-	-	-
-		-	-	-	-

will not be needed in most circumstances.

Excess Servicing and Interest-Only SMBs

The accounting treatment for retained excess servicing is different from that of purchased servicing. The question of what constitutes excess servicing has a long and somewhat controversial history, with the federal mortgage agencies taking the position that excess servicing did not exist. The FASB addresses this question in *Technical Bulletin 87-3*, defining excess servicing to be the excess of the total servicing spread over the normal servicing spread required by the agencies.

In terms of cash flow characteristics, excess servicing is typically akin to an IO rather than a servicing portfolio; it represents a portion of the coupon interest from a group of mortgages rather than the many income and expense elements constituting net income from a servicing portfolio. Its accounting treatment is different from both purchased servicing and IOs.

The amount to be capitalized and amortized by the servicer should be the present value of the excess servicing cash flow using an appropriate discount rate. While the choice of discount rate is left to the servicer, the amount capitalized should, according to FASB 65,

be the difference between the actual experience sales price and the estimated sales price that would have been obtained if a normal servicing fee rate had been specified. This implies using a discount rate comparable to prevailing market yields on pass-through securities.

The amortization is analogous to the level-yield method of FASB 91 used for IOs; each period, the excess servicing income is subtracted from the accrued asset book value (using the chosen discount rate) to obtain the new book value. A critical difference in the accounting treatment of excess servicing and of IOs is in the action to be taken if prepayment projections differ from actual or if projections are changed (due, for example, to changes in interest rates).

The book yield of the IO is recalculated using the new projected cash flows and the current amortized book value.⁵ For excess servicing, the discount rate cannot be changed. This means that if prepayment projections are increased, a write-down in asset book value may be required for excess servicing. On the other hand, if prepayment projections are lowered, holders of excess servicing cannot recognize an immediate gain; the only effect would be an adjustment to the amortization schedule.

SUMMARY

The market for servicing underwent changes during the 1980s. Computerization and the availability of commercial valuation software have standardized the pricing process, while the thrift crisis and regulatory changes have affected the composition of market participants. Valuation of servicing portfolios henceforth requires both good analytic tools and an understanding of regulatory considerations.

This article has attempted to give a comprehen-

sive review of both the analytic and the regulatory aspects. While OAS methods are traditionally not used to value servicing, we believe that they can be a valuable complement to traditional analysis, because servicing cash flows is strongly affected by changes in interest rates. OAS analysis allows assessment of changes in costs of servicing cash flow caused by changes in interest rates. On the regulatory side, while our treatment is believed to be complete at the time of writing, there are frequent changes in this area, and a competent expert should be consulted for the latest information.

- Must have associated reliable and predictable cash flows with a high degree of certainty;
- Must have an active and liquid market;
- Must be able to be feasibly sold apart from the depository or the bulk of its assets.

APPENDIX: REGULATORY CAPITAL TREATMENT FOR FEDERALLY INSURED DEPOSITORY INSTITUTIONS

On December 31, 1990, the risk-based capital requirements for federally insured banks began to be phased in. In accordance with the Financial Institutions Reform, Recovery and Enforcement Act of 1989 ("FIRREA"), thrift risk-based capital requirements began to be phased in in late 1989. In addition to total risk-based capital requirements, banks and thrifts were required to comply with regulations relating to the share of the total capital made up of certain "core" capital elements. Banks and thrifts also were faced with limits on the minimum amount of core capital to total adjusted (non-risk-weighted) assets. Thrifts have an additional minimum requirement regarding "tangible capital."

Rules issued by the four major regulatory agencies for depository institutions — the Federal Reserve Board ("Fed"); the Federal Deposit Insurance Corporation (FDIC); the Office of Thrift Supervision (OTS); and the Office of the Comptroller of the Currency (OCC) — spell out the items that may be included as tangible, core, and total capital.

The regulatory capital treatment of purchased mortgage servicing rights ("PMSR"), an intangible that is reported as an on-balance sheet tangible asset according to GAAP, is addressed in the risk-based capital regulations issued by each of the four agencies. Servicing created through loan origination activities and retained is not reflected on the balance sheet for banks, but the OTS has agreed to permit thrifts to include "excess mortgage servicing" as an on-balance sheet, tangible asset (includable in capital) under certain circumstances. For banks, off-balance sheet-originated servicing generally is not capitalized and bears no capital expense unless it is determined to involve "recourse."

QUALIFICATIONS TEST

All four bank and thrift regulatory agencies require three elements for PMSR and other intangibles (excluding goodwill) to qualify as Tier-1 (core) capital. To qualify as Tier-1 (core) capital, the intangible:

VALUATION

The Fed (which regulates state member banks and bank holding companies) requires "prudent" amortization methods and periods for PMSRs and requires that PMSR values be evaluated at least quarterly and audited at least annually. The OCC (which regulates national banks) requires banks to value PMSR for capital purposes at the lower of current amortized book value or current market value, and requires that PMSR be valued and audited at least annually.

In its capital regulations, the OTS (primary regulator of federally chartered savings banks and savings associations, state-chartered savings associations, and savings and loan association holding companies) specifies that PMSR be recorded at the lower of:

- 90% of fair market value;
- 90% of original cost;
- 100% of current book value.

OTS-regulated institutions are required to value their PMSR portfolio at least quarterly and subject the portfolio to an independent evaluation at least annually. The FDIC (primary regulator of state non-member banks and state-chartered BIF-insured savings banks) in its proposed rule applies a similar valuation methodology.

The OCC limits PMSR to 25% of total core capital. The Fed does not explicitly preclude regulated institutions from counting qualifying intangibles in excess of 25% of total core capital but states that amounts over 25% will be subject to "close scrutiny."

Pursuant to FIRREA, the maximum amount of PMSR that thrifts may include as capital may not exceed the amount permitted for FDIC-regulated state non-member banks. FIRREA also directs the FDIC to adopt a rule stating a PMSR ceiling for thrifts' tangible capital requirement.

The FDIC has proposed, in a regulation released for comment in February of 1991, to cap the amount of PMSR that may be counted in capital by FDIC-regulated banks and OTS-regulated thrifts to 25% of core capital. For purposes of the tangible capital requirement for thrifts, the FDIC also would limit the remaining amount of PMSR after the first adjustments to no more than 50% of tangible capital (exclusive of such PMSR).

This proposal severely depressed the market value of PMSR and led to an intensive lobbying effort by the thrifts and related industries. In December of 1990, the FDIC issued amended regulations that raised the amount of PMSR that a state-chartered non-member bank or thrift may count as regulatory capital to 50% of core capital.

- Prior to this action, FIRREA allowed thrifts to grandfather any PMSR acquired prior to August 9, 1989. The grandfathered PMSR, however, had to be written down over six years. The new rule extends the grandfathering date to February 9, 1990, and applies a mandatory write-down schedule. Grandfathered PMSR counts against the 50% limit. If a thrift or bank has over 50% of its core capital in grandfathered PMSR, the thrift or bank could count it all as regulatory capital, but only 50% of any newly purchased servicing would count as capital.
- Computation of the 50% limit for capital and 100% limit for thrift tangible capital is based on the regulatory core or tangible capital on the books of the institution, plus ALL PMSR (grandfathered and non-grandfathered) prior to the application of the 50% limit.

For example, if a thrift has core capital before deductions of \$100 million, which includes PMSR (both grandfathered and non-grandfathered) of \$70 million, then the denominator in the calculation would be \$100 million; the thrift may count PMSR equal to 50% of that amount, or, \$50 million. If all \$70 million of the PMSR

were grandfathered, then all of the \$70 million of PMSR it owns would count as capital.

The FDIC improvement act, enacted on December 19, 1991, returned to the OTS the power to determine the amount of PMSR that may be counted toward regulatory capital requirements. The OTS is expected to affirm the 50% limit set by the FDIC, but may move to liberalize the definition of eligible intangible assets to include purchased credit card service rights.

RISK WEIGHTING

All the regulatory agencies require a 100% risk-weighting for PMSR and (in the case of thrifts) for any on-balance sheet excess mortgage servicing. Other retained servicing rights are off-balance sheet and do not require capital unless the servicing is deemed to involve a recourse obligation. If the servicing involves recourse, the OCC, the Fed, and the FDIC require the servicer to reserve capital against the servicing as if the full amount of the asset were retained on the balance sheet of the servicer.

The OTS differs from the other agencies in that the OTS risk-based capital rules place a limit on the amount of capital that may be required against recourse arrangements. For thrifts, capital must be maintained only in the amount of the lesser of the capital requirements for the asset transferred or the total amount of the recourse exposure. The regulatory capital requirements for servicing involving recourse apply whether the servicing is purchased (PMSR) or originated and retained.

The Federal Financial Institutions Examination Council ("FFIEC"), whose members include the federal regulatory agencies for both banks and thrifts, is involved in a major review of recourse arrangements. The FFIEC review is likely to lead to changes in the definition, reporting, and regulatory capital treatment of various recourse arrangements and may affect the treatment of mortgage-servicing rights and obligations.

ENDNOTES

This is a modified version of a Prudential Securities, Inc., paper published December 1990.

¹For a detailed description of the model, see Ben-Dov, Hayre, and Pica [1992].

²See Hayre [1990b].

³See Hayre, Lodato, and Mustafa [1991].

⁴See Hayre [1990a].

⁵Note that this method, prescribed in EITF 89-4, is a modification of FASB 91, which requires the new book yield to be calculated using actual and projected cash flows and the original purchase price.

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