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**THE SUPERVISORY PERSPECTIVE OF RESIDENTIAL
MORTGAGE SECURITIZATION IN COLOMBIA**

by

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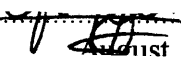
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ABSTRACT

In 1993, the Colombian government approved asset securitization, including mortgage loans, and other kind of receivables. The securitization process presented conditions under which the risk profiles of financial institutions may change, since the regulation requires them to hold an equity position in the mortgage-backed securities issued. Since the Colombian market does not have any government agency that provides mortgage insurance, or that guarantees full and timely payments to the investors, all credit risk is taken by the originator. Even if they are authorized to sell the risky classes of the securities, as approved in May 1995, the marketing of these securities is expected to proceed slowly at best.

This thesis assesses the risks involved in the securitization process from the perspective of the financial institutions' supervisor. First, the structure of the U.S. mortgage-backed securities (MBS) market is analyzed, including risk mitigation techniques. Then, I document the development of MBS, and evaluate the main characteristics of the Colombian regulation. Detailed analysis of the benefits and risks for investors and financial institutions is supplied. I then describe the risk-based capital guidelines used in the U.S. related to mortgage-related securities, and the accounting treatment of transfer of assets with recourse. Finally, the stricter supervision of financial institutions, and the urgency of establishing capital adequacy rules are suggested.

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First I would like to thank my advisor Tim Riddiough for his valuable contribution to this thesis. He guided me through the hard work of building a solid base to furnish the patient reader with a thorough understanding of the topic.

I would also like to thank the Superintendencia de Valores de Colombia (SV) for its support and interest in the research. Hopefully, this thesis will give the SV a different view of the problem, and help it to address the most critical issues of the current process. Special thanks to Angela María Orozco, who answered all the legal questions about the regulation, and gathered all the information utilized in this thesis.

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INTRODUCTION

In 1972 the Colombian government created the UPAC System - Constant Purchasing Power Unit - with two objectives: to furnish the construction industry with sufficient funds to meet the housing demand, and to augment low-income families' access to home loans. This marked the beginning of the Saving and Housing Corporations (Corporaciones de Ahorro y Vivienda - CAVs), privately owned institutions that have financed more than 1.2 million units in twenty-two years. The UPAC System allows the transfer of public indexed deposits to the housing industry, by means of indexed construction loans and residential mortgage loans. Although most of the residential mortgages in Colombia are currently held by the private CAVs, the government has had an active role in the house financing activity through the Central Mortgage Bank ("Banco Central Hipotecario" - BCH); the BCH is a credit institution classified under the Commercial and Industrial Government Enterprises. The Central Mortgage Bank can originate mortgage loans with the partial or full guarantee of the Colombian government, provided that those loans support the government's social and economic development programs, such as the Low-income House Program ("Vivienda de Interés Social - VIS").

President Cesar Gaviria's economic and political reform included the Financial Sector's overhaul. In 1993, the Colombian government authorized the Superintendency of Securities (Superintendencia de Valores - SV) to regulate securitization and to define the instruments that must comply with the public market regulations. By the end of 1993, the SV set forth all the procedures required for asset and debt securitization. On the equity side, the mechanism allowed developers to raise funds in the capital markets for project finance instead of utilizing conventional mortgages. Investors consequently participate in the profits and losses of the project. The regulation also allowed developers to issue pass-through securities backed by the predictable cash flows of their properties.

Likewise, on the debt side, the SV authorized credit institutions to securitize commercial loans, credit documents, mortgages and public debt. This mechanism gives tremendous liquidity to CAVs, who now can sell their mortgages in the public market, freeing additional funds for the construction industry, and alleviating their risks. The new securitization process is expected to create an enormous dynamism in the real estate industry in the following years. However, this new process has to be carefully managed in terms of protection to the investor, soundness of the financial system, effects on the real estate industry, and development of a strong secondary mortgage market.

During the first year of existence of the new mechanism, the SV approved fourteen issues that amounted to \$275 million dollars. Of this figure, \$94 million on “blind pools” were related to portfolio investment in real estate projects, \$64 million to privately issued mortgage-backed securities, \$20 to equity securitization for project financing, \$8 million to securities backed with other credit documents, and \$88 million to other asset-backed securities. Investors have eagerly responded to mortgage-backed securities but not to equity securities for project financing. The risks associated with development, and the unfamiliarity of institutional investors with the real estate practices, still make equity securities an unreliable investment.

On the other hand, mortgage-backed securities (MBS) have had a tremendous acceptance in the market because the securities offered an appropriate trade-off between risk and return. Besides that, big institutional investors such as pension and retirement funds entered into the capital market arena, and were authorized by the government to invest in MBS, increasing the demand for these new long-term instruments. Despite the facts that the first batch of mortgage securitization was a private issue, and that mortgages in Colombia are not insured, nor guaranteed by the government, investors have accepted the new derivatives. This acceptance can be explained by the requirement of very high-quality credit enhancement at the originator’s cost, and also on the implicit reliance of the Colombian financial institutions who are guaranteeing the securities.

However, this securitization process has brought about several concerns regarding the risks for financial institutions willing to securitize their mortgages. The regulation initially forced the originator to invest in the more risky securities (subordinated class) arising from Senior/Subordinated schemes, and to hold equity positions in the securities, such as residual classes (overcollateral). This leaves credit institutions with the riskiest assets. As a result, the benefits of securitization might not compensate its associated costs, such as higher risk and additional capital required. The potential problems that arise from this scheme, with the absence of government agencies who provide insurance to privately originated mortgage loans, can potentially cause severe damage on the financial sector, especially on the UPAC system. The role of the Colombian regulators is to preserve the solvency of the financial institutions while enhancing the quality of the new derivatives.

The thesis explores the factors that could potentially jeopardize the emergence of the securitization process, and tries to assess the risks and opportunities for privately-owned financial institutions of the UPAC system. The well-developed U.S. mortgage-backed securities market provides an excellent example to draw the appropriate criteria for a sound development of these financial instruments in Colombia. Thus, I will try to determine to what extent US techniques are transferable to the Colombian financial system, and if not, what should be done to guarantee the success of such an innovation.

The thesis is organized in five chapters. The *first chapter* explains the U.S. mortgage system, including a description of the rights and obligations of lenders and borrowers under a mortgage contract. It also describes the role of the government as mortgage insurer, and as sponsor of the secondary mortgage market. A brief explanation of the securitization process and the participants close this section. The *second chapter* gives an overview of the Colombian scenario for asset securitization. The UPAC System is explained in detail, and a description of the financial intermediaries is given. Finally, the current securitization regulation is analyzed. Benefits and risks of securitization are analyzed in the *third Chapter*. This section is focused on the supervisor's perspective, who has to understand the potential risks for financial institutions taking part of the process as

originators, or as credit enhancers. The advantages and disadvantages of credit enhancement mechanisms approved by the Colombian regulator are discussed. The *fourth Chapter* discusses the risk-based capital approach for asset securitization, formulating the appropriate criteria for the development of new guidelines including mortgage securitization. The chapter begins with a brief comment on the U.S. Savings and Loans' crash in the 80s, as an example of how financial institutions fail under increasing risk exposure. Finally, the *fifth chapter* concludes the thesis with a summary of the problem created with mortgage securitization in Colombia, as well as policy recommendations for the supervisor.

CHAPTER 1

THE RESIDENTIAL MORTGAGE MARKET IN THE U.S.

In order to compare the Colombian mortgage-backed securities with the U.S. system, and to be able to draw out applicable criteria for the development of the securitization process in Colombia, it is first helpful to understand the American mortgage system. The study of mortgage-backed securities requires an understanding of the rights acquired with the underlying collateral. Much of the risk involved in the process highly depends on the legal effectiveness of the documents that assure those rights. The mortgage contract engages the borrower in a legal commitment, and gives the lender the right to sell the property and recover his capital in case of borrower's default. This chapter introduces the reader to mortgage basics, and furnishes a general overview of the U.S. market participants. Finally, a description of the process and its participants is provided.

1.1 THE MORTGAGE CONTRACT.

The mortgage contract most used in the U.S. does not transfer title and right to possession of the property to the lender. It rather entails a legal claim on the property that may be enforced in case of borrower's default. The mortgage contract in the U.S. stipulates several rights and obligations of both parts. The most important clauses with economic significance are discussed as follows:

1.1.1 Rights of the Lender.

By mean of the Mortgage Contract the borrower pledges real property to the lender as security for the funds, and promises to repay the loan under the terms contained in the Promissory Note. If the borrower breaks any of the clauses contained in the contract, for instance if he does not make the payments under the stipulated conditions,

the borrower is considered to be in default. In this case, the lender has the right to require the borrower immediate and full payment of the entire amount of the debt. If default persists, the lender has the right to obtain title of the property through *foreclosure*, as a means to recover the amount of indebtedness. The lender can also make a claim to the insurer and transfer the property to him¹ (if mortgage insurance has been purchased).

Mortgage securitization is based on the contractual right of the lender to *assign* the mortgage without consent of the borrower, presuming that borrower's rights and obligations are not affected. Through the securitization process, the lender sells the mortgages to a third party transferring - assigning - all the rights on the property defined by the mortgage contract.

1.1.2 Rights and Obligations of the Borrower.

The mortgage contract compels the borrower to pay the mortgage principal and interests, as well as all other closing costs. Mortgage insurance premiums (if required), hazard insurance, property assessments, and other claims are enforced in accordance with the clauses contained in the Note. In the case of default, the contract gives the borrower the right of redemption; that is the possibility to reinstate the original payment terms by paying all amounts due by the time of the acceleration, including all the expenses incurred by the lender in enforcing the debt. The mortgage contract allows the borrower to sell his property; in such case, the debt is assumed by the purchaser who, in turn, may (or may not) relieve the borrower from his personal obligation. The contract entitles the lender to review and to approve the new borrower.

One of the most important clauses of the residential mortgage contract, for the purpose of the later discussion of mortgage-backed securities (MBS), has to do with the *prepayment option*. Under this clause, the lender is required to accept advance payments

¹ Terence M. Clauretje and James R. Webb. *The Theory and Practice of Real Estate Finance*. (Orlando: The Dryden Press, 1993). p. 308

from the borrower at any time with no prepayment penalty. The vast majority of mortgage loans in the U.S. are fixed rate loans. If interest rates decline, the borrower is better off if he can refinance his fixed rate obligations. This leads to an early cancellation of debt, leaving the lender with funds to be invested at a lower rate. Besides declines in interest rates, job changes and mobility are the other major causes of prepayment in the U.S. The effect of prepayment is analyzed in detail in Section 3.2.3. Generally, prepayment of principal affects yields of pass-through securities, but reduces credit risk for the investor. The investor in mortgage-backed bonds is not affected by prepayment, unless the bonds are callable (See Exhibit 3.1).

1.1.3 Default and Foreclosure.

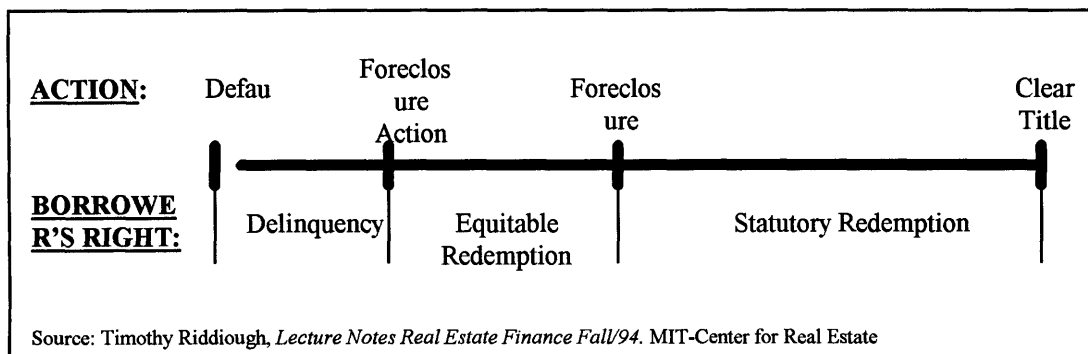
Lenders include in the mortgage contract several clauses to protect their interests in the case of borrower's default. The amount of losses for the lender highly depends on the probability that the borrower fails to meet the scheduled payments, and also on the quality of the insurance against default. The causes of default risk are analyzed in detail in Section 3.2.1.1 Credit risk.

In the event of default, lenders have the right to foreclose on the property, and sell it to recover part of the loan balance. However, the lender seldom strictly enforces the clauses contained in the mortgage contract, and rather he is patient with the borrower in hopes that he overcomes its financial trouble. Lenders can also enter into an arrangement with the borrower that allows him to meet the payments under new terms. The somewhat cumbersome foreclosure process makes it preferable to transfer default risk to a mortgage insurance company, in order to get payment of the losses and costs incurred on the default. In this case, the lender transfers title to the insurer, and leaves to him the execution of the property.

The *foreclosure* process starts with the acceleration of the debt by the lender after a period of borrower's delinquency. The lender notifies the borrower about the default,

and also instructs him upon the action required and time allowed to cure the default. In between the notice of foreclosure action and the actual foreclosure (usually 12 months), the borrower has the right of *equitable redemption*; that is the right to cure the default. Failure to meet the due payments results in a foreclosure suit and a court's decree to sale the property in a public auction. At this auction, the lender usually bids for the property the value of his claim (only if it is lower than the market value less costs associated with foreclosure, holding and resale. The buyer of the property at a foreclosure sale (usually the lender is the highest bidder), purchases the rights of the borrower over the property; these rights are free of the lien of the senior mortgage and all other junior liens. Holders of legal claims are entitled to receive their pro rata share on the sale proceeds, after foreclosure expenses and accrued property taxes have been paid². In addition, some states in the U.S. gives the borrower the right to recover the property lost in a foreclosure sale (*statutory redemption*), by paying the amount paid at the sale plus interest and expenses³. Exhibit 1.1 summarizes the process of the foreclosure.

Exhibit 1.1 The Foreclosure Steps.



To put it briefly, the actual recovery of the defaulted loan's principal amount occurs 1 to 2 years after the borrower's default. This makes default insurance vital for the investor in mortgage loans. Default risk is mitigated in the U.S. by insuring the loans against any loss resulting from default and foreclosure. The insurance is offered in a

² William B. Brueggeman and Jeffrey D. Fisher, *Real Estate Finance and Investment*. (Boston: Irwin, 1993), Chapter 3.

³ Terence M. Clauretje and James R. Webb. *The Theory and Practice of Real Estate Finance*. (Orlando: The Dryden Press, 1993). p. 386.

greater extent by government agencies, created with the purpose of broadening the range of borrowers, and giving low-income families access to credit. The following section discusses mortgage insurance in the U.S.

1.3 CREDIT RISK AND MORTGAGE INSURANCE IN THE U.S.

The secondary mortgage market in the U.S. has been developed in large part thanks to government insurers that, not only have standardized the minimum requirements for credit underwriting, appraisals, and processing, but also have provided mortgage lenders with default insurance and loan guarantees. Federal regulations require lenders to insure mortgage loans with loan-to-value ratios above 80%, either with a government insurer or a private insurer. Originators willing to sell these mortgages to the secondary market agencies (Ginnie Mae, Fannie Mae, or Freddie Mac) must obtain government insurance against default with the Federal and Housing Administration (FHA), or the Veterans Administration (VA). Lenders have to originate mortgages under the FHA or VA's loan standards, in order to qualify for the insurance. The agencies take the default risk of standardized whole loans, and give confidence to the mortgage investor. They make mortgage-backed securities a safer investment, and facilitate the development of the secondary mortgage market. The following sections discuss and compare government and private mortgage insurance.

1.3.1 Government Mortgage Insurance.

Since 1934, the government has insured single-family mortgage loans through the Federal and Housing Administration - FHA. The "*Section 203 (b)*" program⁴ provides mortgage insurance to unserved or undeserved borrowers of one- to four-family detached residences. FHA's function is to stabilize the housing markets in times or places where

⁴ U.S. Department of Housing and Urban Development. Office of Policy Development and Research. "*An Assessment of FHA's Section 203 (b) Program: A Comparison with Private Mortgage Insurance.*" (Washington, DC, March, 1986).

mortgages are not readily available. The main characteristic of FHA's mortgage insurance is that it insures the 100 percent of the remaining loan balance at the time of default, and all the default costs. Five different types of home buyers are targeted by FHA:

- *Low- to moderate-income households*: Households whose income is lower than 120% the median income. Almost 50% of FHA insurance buyers fall in this class.
- *Lower-equity buyers*: Buyers who make extremely low down payments (lower than 5%), minimizing its equity contribution.
- *First-time home buyers*.
- *Minorities*.
- *Buyers in areas where financing is less available*.

FHA has to balance efforts in accomplishing the stabilization of the housing market, extending access to ownership to particular categories of buyers (low-income and low-equity), and maintaining default risk within profitable bounds. The high risk of its clientele and the coverage of the *entire* risk of default make FHA's premiums more expensive for borrowers than private insurance. Exhibit 1.2 describes the qualification criteria to which loans must comply in order to be insured by the FHA, and the main characteristics of the coverage. It also compares FHA's insurance with private mortgage insurance.

The Veterans Administration (VA) is the other government agency that guarantees compensation to the lender of qualified veterans in the case of default, for a 1 percent guaranty fee. VA guarantees losses up to 25% of the original loan, not exceeding \$36,000. This causes the maximum loan amount to be \$144,000.

1.3.2 Private Mortgage Insurance.

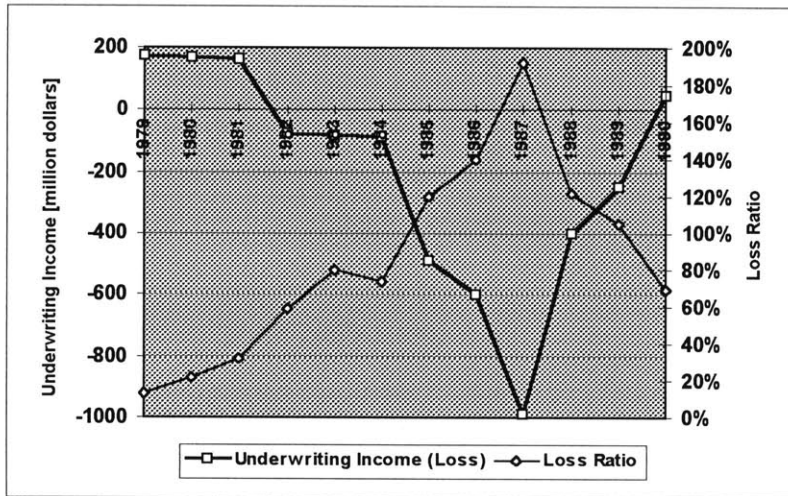
Private mortgage insurers complement the coverage of the government insurance system. Although private insurance also serves low-income and low-equity buyers, FHA has a larger market share in these groups depending on the region's affordability and mortgage limits. Private insurance dominates high-priced end properties.

As opposed to government insurers, private insurers usually protect the lender against default risk only on the amount *in excess* to the agreed percentage of the property value (insurance coverage). Based on this coverage, for example 75% of the property value, the insurer calculates the Coverage Ratio. That is, the maximum percentage to be applied to the lender's claim, in order to calculate the insurer's pay-off. If the calculated pay-off is higher than the lender's total loss, then the insurer pays only the lender's loss. This scheme accounts for risk sharing between the lender and the insurer, if the claim is too high. Appendix A shows an example of a claim calculation for a mortgage loan. It also shows a sensitivity analysis of the lender's loss to different claim amounts. Due to the fact that private mortgage insurance does not supply full coverage, investors in securities backed by private insured mortgages, and even VA guaranteed mortgages, are not free of losses, unless the issuer provides additional credit enhancement as discussed in Chapter 3.

Private mortgage insurers in the U.S. were highly affected by the deregulation of the 1980s⁵, and the subsequent lessening of the credit institutions' underwriting criteria.. Loss ratio climbed to 192% of earned premiums in 1987. Exhibit 1.2 shows the dramatic deterioration and recovery of private insurers.

⁵ See Section 4.1 The Debacle of the Saving and Loans Industry.

Exhibit 1.2 Deterioration and Recovery of Underwriting Performance of Private Insurers



SOURCE: Jess Lederman, ed. *The Secondary Mortgage Market: Strategies for Surviving & Thriving in Today's Challenging Markets.* (Chicago: Probus Publishing Company, 1992.) Figure 32-1. p. 636.

The bad experience of massive defaults during the 80's made private insurers more cautious and selective, leading them to adopt stringent loan standards. They recognized that the losses were related with undifferentiated regional underwriting criteria, price erosion of oversupplied types of property, poor control and servicing, high loan-to-value ratios that implied low borrower's equity on the property.

Closing this section, Exhibit 1.3 illustrates the most important differences between FHA's insurance and private mortgage insurance relating to underwriting criteria:

Exhibit 1.3 Comparison of Government and Private Mortgage Insurance

	Public Insurer: FHA's Section 203(b)	Private Insurer
LOAN-TO-VALUE RATIOS	<ul style="list-style-type: none"> • Calculated over appraised value (selling price) plus closing costs. • 97% of the first \$25,000 plus 95% of any remainder. If calculated with the max. loan amount of \$90,000 the max. LTV is 95.5% of prop value. • If appraised value is less than \$50,000 the max. LTV is 98.75% of the lesser between appraised and sale values. 	<ul style="list-style-type: none"> • Calculated only over appraised value. • 95% Maximum LTV. Generally very low down payment loans are not insured.

	<ul style="list-style-type: none"> • Lower down payment. 	
UNDERWRITING	<ul style="list-style-type: none"> • Specific guidelines followed by its own staff underwriter. Flexible. • Accurate property appraisal. • <u>Tot. Housing expense</u>⁶ < 38% Net eff. Income (After Fed Tax) • <u>Total fixed obligations</u>⁷ < 53% Net eff. Income (After Fed Tax) • Buyers with higher percentages can qualify depending on credit history, accumulated savings, other income. 	<ul style="list-style-type: none"> • General guidelines to be followed by the lender who makes the underwriting. • Accurate property appraisal. • LTV < 90%: monthly payment for PITI must be less than 28% of Gross monthly income. For LTV > 90%: payment must be less than 25% of Gross income. • Less flexible in qualifying borrowers with higher burdens.
LOAN LIMITS	<ul style="list-style-type: none"> • Set by the Congress keeping pace with housing increases. • Maximum is US\$67,500 but can be higher depending on the average cost of housing in the region. The basic limit is \$124,875, and is calculated as a percentage of the median house price in the region. 	<ul style="list-style-type: none"> • None.
PREMIUM	<ul style="list-style-type: none"> • 2.258% of original loan principal on a 30-year loan, collected up-front and financed as part of the loan, PLUS 0.55% paid annually. 	<ul style="list-style-type: none"> • Variable depending on market, type of mortgage, client, loan-to-value ratio. • Initial premium 50 BP of mortgage loan + renewals ranging from 25 to 35 BP.
LOSS COVERAGE	<ul style="list-style-type: none"> • Insures 100% of remaining loan balance + default costs. No coinsurance. • Backed by the full faith and credit of the Federal Gov. 	<ul style="list-style-type: none"> • Insures only the portion of the loan that is at risk (i.e. over 80%). Lender shares risk and assumes part of the losses above certain amount. • Backed by the capital reserves of the insurer.

SOURCE: Compiled by the author upon analysis of: U.S. Department of Housing and Urban Development, Office of Policy Development and Research, "An Assessment of FHA's Section 203 (b) Program: A Comparison with Private Mortgage Insurance." (Washington, DC, March, 1986.), AND, Terence M. Clauretie and James R. Webb. *The Theory and Practice of Real Estate Finance.* (Orlando: The Dryden Press, 1993). pp. 375-378.

1.4 THE GOVERNMENT'S ROLE IN THE SECONDARY MORTGAGE MARKET.

The U.S. government is involved in the mortgage industry, not only providing insurance and guaranties to mortgage loans as discussed in the previous section, but also facilitating the existence of a very liquid secondary mortgage market. Specialized

⁶ Payment for mortgage principal, interest, taxes and insurance (PITI) plus estimated maintenance and utility costs.

⁷ Total housing expense plus State income taxes, retirement deductions, life insurance premiums and payments on loans and charge accounts.

government institutions buy qualified insured mortgages, and issue mortgage-backed securities with the additional guaranty of full and timely payment to investors. This section explains in detail the origins of these agencies and their specific role in the mortgage market.

According to Clauretje and Webb⁸, the federal government's willingness to support the development of a secondary mortgage market was based on the necessity to provide liquidity to credit institutions when potential buyers, such as life insurance companies, reduced their participation in the mortgage market. Whole mortgage loans were not liquid because of their contract heterogeneity and their lack of adequate default risk protection. The development of a secondary mortgage market was meant to eliminate the regional mismatch of funds, redistributing capital throughout the country from areas with excess mortgage supply to areas with shortage of capital. In addition, it would eliminate the institutional mismatch of funds, generated by the shortfall of thrifts and the excess savings of pension funds. Furthermore, pension funds needed a reliable long-term investment to match their liabilities. The government facilitated the securitization process serving as a conduit to securitize pooled mortgages, and providing investors with credit support, stability and standardization.

As discussed in the previous section, default risk is mitigated with mortgage insurance provided by the government agencies or private insurers. Even though mortgages are insured, and credit risk is minimum, investors in mortgage-backed securities still worry about timely payments. The cumbersome and time-consuming process of enforcing mortgage claims, and recovering principal from the borrower may cause a delay in the payment to the investor. Consequently, the government agencies guarantee investors the timely payments of principal and interests from the mortgages, if borrowers default or prepay. The Government National Mortgage Association GNMA ("Ginnie Mae") is the government agency, and the Federal National Mortgage Association FNMA

⁸ Terence M. Clauretje and James R. Webb. *The Theory and Practice of Real Estate Finance*. (Orlando: The Dryden Press, 1993). pp. 230-231.

("Fannie Mae"), and Federal Housing Loan Mortgage Corporation FHLMC ("Freddie Mac"), are the federal-sponsored agencies.

Ginnie Mae has the full guaranty of the U.S. Government, while Freddie Mac and Fannie Mae do not. However, the federally sponsored agencies are perceived in the market as having the ultimate back of the government. Basically, Ginnie Mae promotes the secondary mortgage market by selling loan guaranties, while Fannie Mae and Freddie Mac give liquidity to the market by investing directly on conforming mortgages that meet certain criteria of loan-to-value ratio, payment-to-income ratio, and loan amount. Fannie and Freddie issue securities backed on the mortgage assets, and offer guaranties as to timely payments. The differences between these agencies and its securities are explained as follows.

1.4.1 GNMA ("Ginnie Mae").

The Government National Mortgage Association - GNMA - was created in 1968 under the control of the Department of Housing and Urban Development (HUD). It offers the best credit quality for MBS since it is a U.S. government entity. Because all loans are FHA insured against credit risk, GNMA guarantees only the full and timely pass-through of scheduled monthly payments (interests and principal), whether or not such payments are made by the borrowers. It also guarantees the pass-through to investors of all prepayments and early recoveries. Ginnie Mae requires the originator to pay investors the principal amounts due on borrowers default, so that the investors do not have to wait until the claim to the insurer (FHA or VA) is made. If the originator cannot pay the investor, Ginnie Mae will⁹. GNMA serves as a vehicle for mortgage banking firms, savings institutions or commercial banks to securitize Federal Housing Administration (FHA) insured loans and Veterans Administration (VA) guaranteed loans.

⁹ Ibid. p. 243.

GNMA does not buy, sell or issue securities; it just plays the role of guarantor in exchange for a 6-basis-points fee. The servicer collects this fee from the spread between the mortgage interest rate and the securities pass-through rate. Its most common traded MBS is created from single family mortgages, level payments, 30-year maturity and fixed interest rates, but there are several variations. GNMA offers two different programs: GNMA-I securitizes very homogeneous mortgage pools, that is same type of mortgages, issuer, and rates. Likewise, 90% of the loans have a maturity greater than 20 years and are less than 24 months old. Conversely, GNMA-II are MBS backed on larger pools of mortgages from geographically dispersed issuers. For a comparison with other MBS see Exhibit 1.5.

1.4.2 FNMA (“Fannie Mae”).

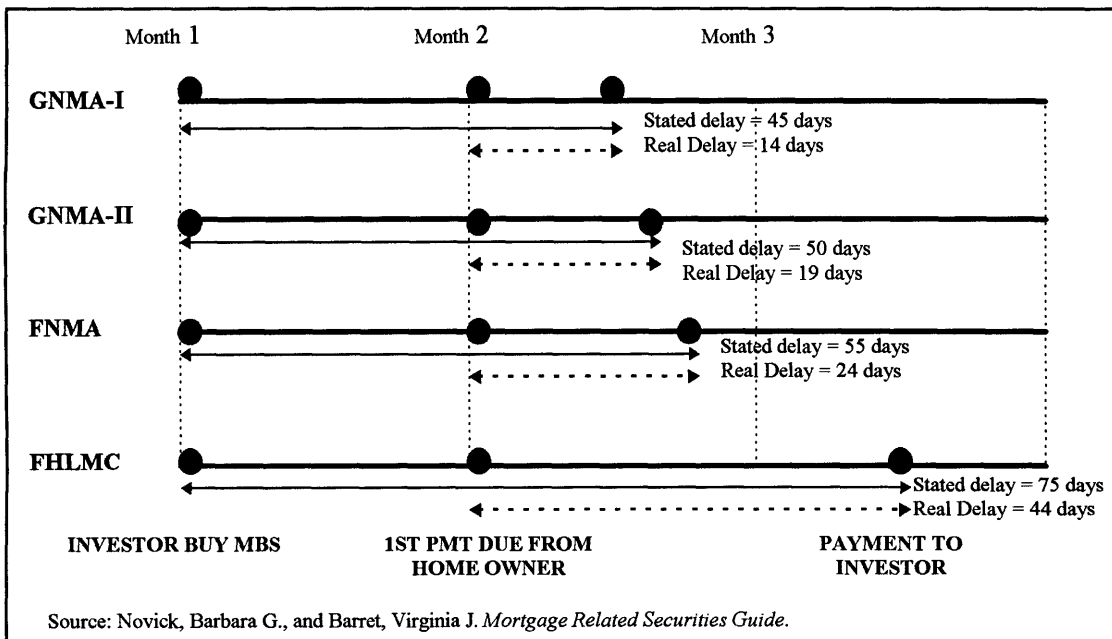
The Federal National Mortgage Association - FNMA - was created in 1938 in order to provide liquidity during the housing market downturns. In 1968 it was divided into GNMA and FNMA. Fannie Mae is a share-holder owned company traded in the New York Stock Exchange, with no special tax treatment. It issues short-term bonds to finance its mortgage purchase activity. Its debt is perceived by the market as “federal agency” debt, even though it is not guaranteed by the U.S. government. Since it faces the same maturity mismatch and interest-rate risk as thrifts, Fannie Mae securitizes its mortgage assets, and also invest in adjustable rate mortgages.

FNMA provides an incentive for the secondary mortgage market by mainly buying and selling FHA insured mortgages and VA guaranteed loans. Although in 1970 Fannie Mae was authorized to invest in privately insured mortgage loans (conventional mortgages), Freddie Mac specializes in these kinds of loans. Fannie Mae issues pass-through securities and collateralized mortgage obligations (CMOs) backed on the purchased mortgages. It guarantees the timely payment of interest and principal to investors, in exchange for a 50 to 250 basis points guaranty fee from the original coupons, disbursing any unpaid principal on defaulted loans and all early payments. Fannie Mae also

uses a delegated underwriting and servicing program to mitigate credit risk with non-conventional mortgages. With this program, the lender or a third party agree to bear default risk limited to a certain percentage of the loans sold to Fannie Mae in exchange for a lower guaranty fee. The lender pledges a collateral to back that obligation. However, Fannie Mae bears the ultimate risk of default on all MBS.

Fannie Mae minimizes the holding period of payments, that is the time interval between the borrower's payment and the pass-through to the investor. A very efficient and direct pass through is achieved in 24 days (delay period), 20 days less than Freddie Mac's PCs. Exhibit 1.4 shows a comparison of payment delays for the different MBS programs:

Exhibit 1.4 Payment Schedule to Investor in MBS.



1.4.3 FHLMC ("Freddie Mac").

Created in 1970 to promote secondary market of conventional mortgages (not insured or guaranteed by the federal government), the Federal Home Loan Mortgage

Corporation - FHLMC - was part of the Federal Housing Loan Bank System, owned by the thrift institutions. Freddie Mac's stock is traded in the New York Stock Exchange; it obtains its resources from issuing of debt and mortgage-related securities. Its representative instrument is called Participation Certificate (PC). The PC has the same cash flow features of the mortgages, for instance, fixed-rate pass-through, or adjustable rate, with 15 or 30 years to maturity.

By means of two different programs, Freddie Mac offers alternatives to thrifts and investors. The *Guarantor Program* consists of swapping mortgages with PCs backed by mortgage pools, in a like-kind exchange transaction. Mortgage lenders use PCs as collateral for structured financing. By using the *Cash Program*, Freddie Mac pools mortgages from different originators and issues securities backed on the pool. These two programs offered a 75-day stated delay, and were "partially modified", that is guaranty of timely interest payment but not principal. Freddie Mac's *Golden Program* (1990) has reduced the delay to 45 days and is "fully modified" (guarantees timely payment of both interest and principal).

The following table summarizes the differences among the government mortgage-related securities discussed so far:

Exhibit 1.5 Comparison of GNMA, FNMA, FHLMC Pass-through Programs.

Feature	GNMA-I	GNMA-II	FHLMC-PC	FNMA-MBS
Guarantee	Full faith and credit of US government for timely payment of principal and interest guaranteed by GNMA.	Same as GNMA-I	Timely payment of interest and eventual repayment of principal guaranteed by FHLMC.	Timely payment of interest and principal guaranteed by FNMA.

Collateral	Primarily single-family residential mortgage, with FHA, VA or FmHA default guarantees. Newly issued mortgages (less than 1 year old)	Same as GNMA-I	Mostly conventional loans (single-family fixed rate mortg. without Gov. guaranty). New or seasoned loans. Some seasoned FHA/VA pools.	Similar to FHLMC.
Minimum Pool Size	\$1 million (\$250,000 for mobile homes)	\$1 million	\$1 million for Guarantor \$50 million for Standard	\$1 million
Maximum mortgage amount	\$135,000	\$135,000	\$115,300 (50% more for Alaska and Hawaii)	\$115,300(50% more for Alaska and Hawaii)
Interest rates of pooled mortgages	All constant	Can vary 100 BP among the highest and the lowest.	Can vary 200 BP among the highest and the lowest.	Can vary 200 BP among the highest and the lowest.
Original term	Max. 30 years (40 years for construction and project pools)	Max. 30 years	10-30 years (wide range of underlying maturities)	10-30 years (wide range of underlying maturities)
Originator	Mortgage Bankers, S&Ls, Savings Banks, Commerc. Banks	Same as GNMA-I (multiple issuer pools available)	Same as GNMA-I (single issuer or FHLMC portfolio)	Same as GNMA-I (single issuer or FNMA portfolio)
Servicing Fee (basis points)	44 BP	44 -144 BP. It Depends on interest rates.	37.5 -225 BP (avg. 60) (Except Standard)	25-225 BP (avg. 75)
Guarantee Fee	6 BP	6 BP	25 BP	25 BP
Payment Frequency	Monthly	Monthly	Monthly	Monthly
Payment Delay (stated)	45 days	50 days	75 days	55 days
Minimum Certificate Denominations	\$25,000	\$25,000	\$25,000	\$25,000 (\$1,000 pilot IRA program)

SOURCES: Adapted from: Barbara G. Novick and Virginia J. Barrett, *Mortgage-Related Securities Guide*, (New York: First Boston, 1985), AND, William B. Brueggeman and Jeffrey D. Fisher, *Real Estate Finance and Investment*. (Boston: Irwin, 1993.)

The different characteristics of the products offered by the government agencies can affect the price of the securities. For example, the possibility of having mortgages with different interest rates packaged in the same pool creates more predictable cash flows, hence more valuable securities for investors. Accordingly, the possibility of having aged mortgages in the pool, makes the default less probable (default occurs in the first years of the mortgage); at the same time, it makes prepayment more likely to occur. All

this affects pricing of mortgage-backed securities. GNMA-I does not allow seasoning or varying interest rates, while GNMA-II, Fannie Maes and Freddie Macs do.

1.5 THE PLAYERS IN THE U.S. MBS MARKET.

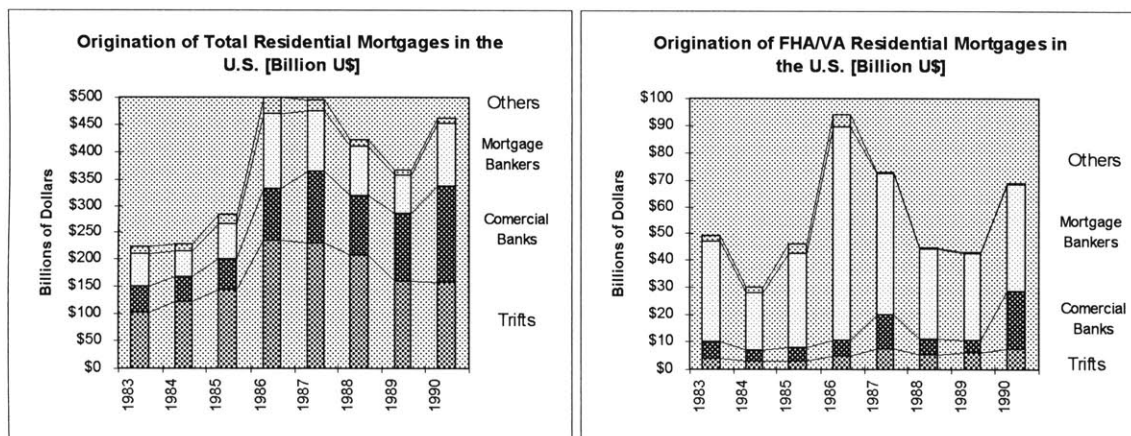
Following Brueggeman and Fisher¹⁰, three different types of intermediaries are identified in the mortgage business, based on the sources of funds they use to generate mortgages. First, depository institutions utilize voluntary deposits of savers. This class includes the thrift institutions (S&Ls, mutual saving banks and credit unions), and commercial banks. The second class of intermediaries funds its mortgage origination activity with contractual commitment of savings; these are pension funds, retirement funds and life insurance companies. The third class is called the specialized mortgage intermediaries; they fund their purchases and origination of mortgages with other sources different of savings. Mortgage banks, some real estate investment trusts (mortgage REITs), and government agencies fall in this category.

Mortgage bankers have a big share of the mortgage origination business. They originate, close and sell the mortgages as intermediaries, instead of being “portfolio” lenders. Mortgage bankers fund their operations by means of short term borrowing with commercial paper (6 to 9 months), or through “warehousing loans” from commercial banks. With the proceeds of the short-term line of credit, the mortgage banker originates, or purchases mortgage loans, pledges the originated mortgages as collateral, hold the assets in their portfolio (“warehousing”), and sell the mortgage-backed securities. The mortgage bank can do one of two things: first, it can buy a guaranty from Ginnie Mae for full and timely payment to investors, and issue the securities backed on the mortgages. Second, it can sell the pooled mortgages to a federal-sponsored agency such as Fannie Mae or Freddie Mac, who in turn issues the securities. The line-of-credit is canceled with

¹⁰ William B. Brueggeman and Jeffrey D. Fisher, *Real Estate Finance and Investment*. (Boston: Irwin, 1993), p. 664.

the proceeds of the sale¹¹. They often keep servicing the loans for which they earn 25 to 50 Basis Points annually over the outstanding loan balance. They also earn origination fees (around 1% of the loan amount), and make some spread, during the warehousing period, from the difference between rates of the mortgages and the line-of-credit. Exhibit 1.6 - Part A shows the participation of mortgage bankers in the residential mortgage origination market for the period 1983-1990. Part B shows the ever dominance of mortgage bankers in the origination of FHA insured and VA guaranteed mortgages.

Exhibit 1.6 Participation of Mortgage Bankers in the Total and FHA/VA residential mortgage market.
Part A **Part B**



SOURCE: HUD Survey of Mortgage Lending Activity.

Exhibit 1.7 shows the size of the residential mortgage market and its participants. From the \$2.6 trillion dollars of residential mortgages outstanding in 1990, 42 percent was securitized. This exhibit shows the importance of the government agencies in the mortgage-backed securities market. It can be observed in Part B that most of the securities (37%) used the GNMA's guaranty, while FNMA's and FHLMC's share in the market was 28 percent. Part C shows the proportion of MBS held by big institutional investors, such as pension funds, life insurance companies, commercial banks, and savings and loans. They use MBS for investment, or hedging purposes.

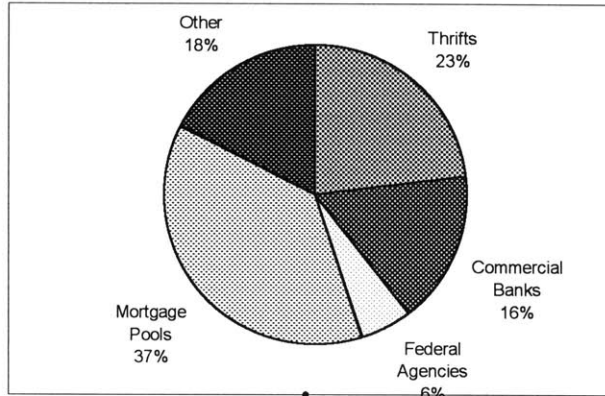
¹¹ Terence M. Clauretje and James R. Webb. *The Theory and Practice of Real Estate Finance*. (Orlando: The Dryden Press, 1993). pp. 343.

EXHIBIT 1.7 - Outstanding Mortgage, Securitized Mortgage and Investors in MBS (1990)

A. Holders of Outstanding Residential Mortgage

Thriffs	\$610,809
Commercial Banks	\$427,740
Federal Agencies	\$146,467
Mortgage Pools	\$990,561
Other	\$463,999
Total	\$2,639,576

Conventional Mortgage	83%
FHA/VA insured mortgage	17%

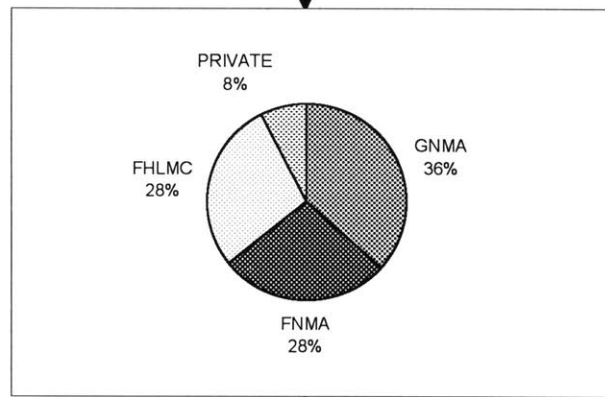


B. Securitized Residential Mortgages by Type of Issuer

42% SECURITIZED

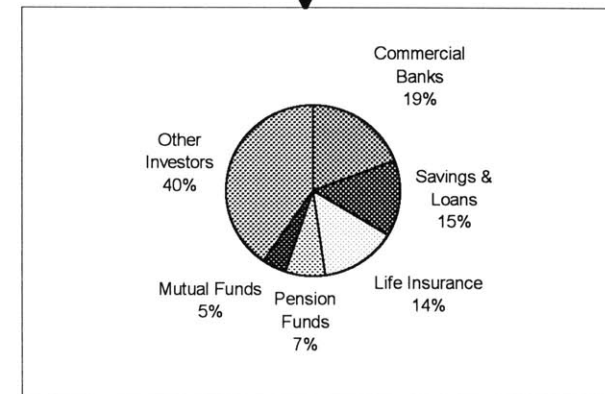
GNMA	\$403,700
FNMA	\$303,600
FHLMC	\$309,100
PRIVATE	\$83,600
Total Securitized	\$1,100,000

Conventional Mortgage	62%
FHA/VA insured mortgage	38%



C. Investors in Residential Mortgage-backed Securities

Commercial Banks	\$210,100
Savings & Loans	\$159,500
Life Insurance	\$157,300
Pension Funds	\$80,300
Mutual Funds	\$49,500
Other Investors	\$443,300
Total	\$1,100,000



SOURCE: William B. Brueggeman and Jeffrey D. Fisher. Real Estate Finance and Investments. (Boston: Irwin, 1993)

1.6 THE PROCESS.

This final section briefly describes the securitization process and identifies the participants, and their functions for future references in this thesis. The *Originator*, also called sponsor or lender, is the entity that creates the mortgage loans to be pooled, with or without the FHA's insurance, or VA's guarantee. The pool is then transferred to the *Issuer* (or trust), who purchases from GNMA a full and timely payment guarantee, and then issues the securities backed on the mortgage pool. The originator can alternatively sell the mortgages to a government-sponsored agency (FNMA, or FHLMC), who in turn issues the securities. In private labeled securitization, the issuer is a special purpose vehicle, usually (but not necessarily) created and owned by the originator; it is protected from bankruptcy by various structural and legal arrangements.

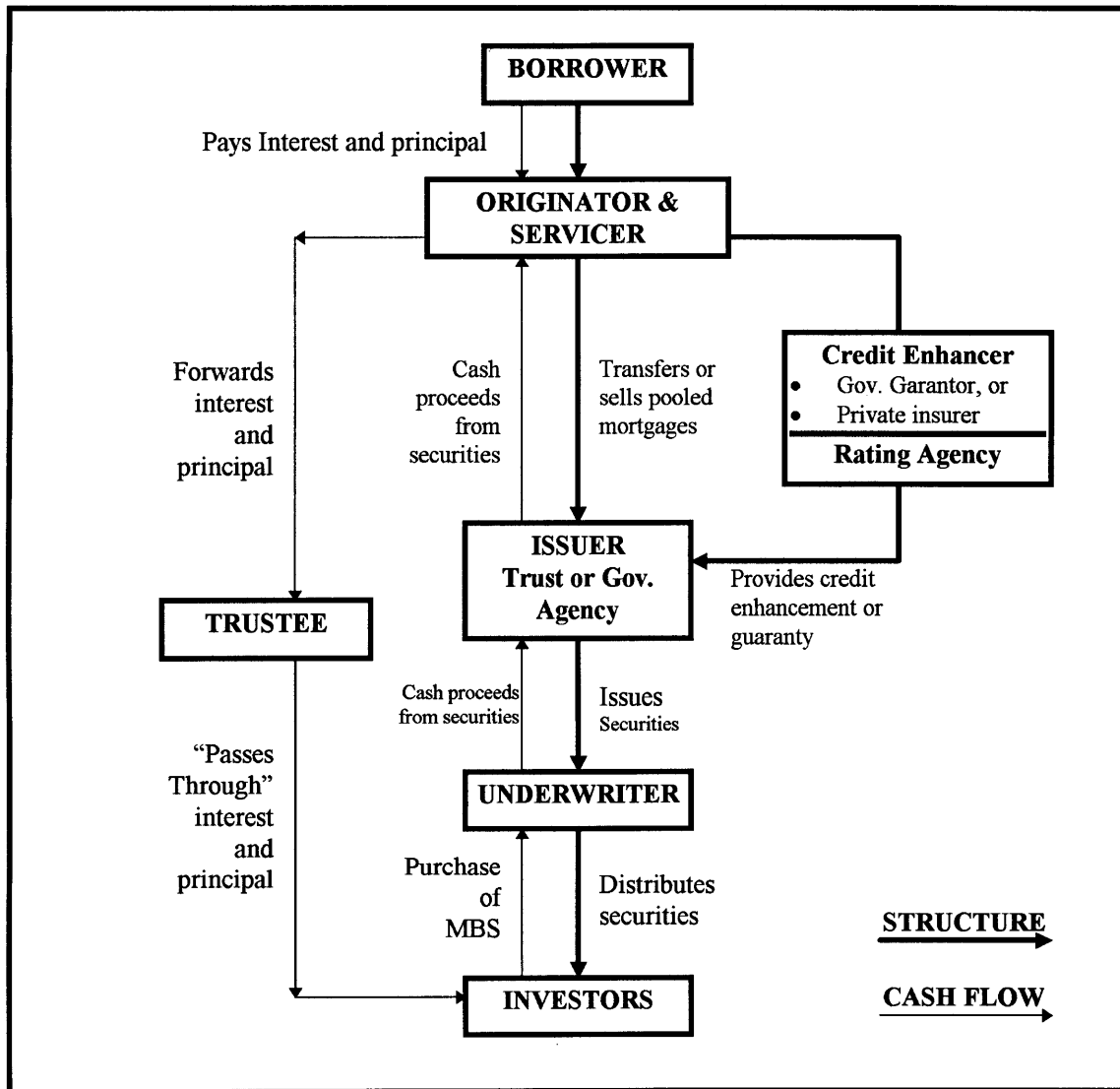
The *Servicer* (or administrator) collects and manages payments from the borrowers, passing-through the interests and principal to the investors. The originator usually retains the role of servicer. The transfer of the funds is made after deducting taxes, mortgage and hazard insurance premiums, servicing fee (usually based on unpaid balance), and guaranty fee. The servicer leads any legal action against the borrowers, including foreclosure process. The major participants in the servicing business in the U.S. are saving and loans (S&Ls), commercial banks, and mortgage bankers.

Investors can be represented by a *Trustee*, entity that oversees the servicing of the mortgages in compliance with the terms of the securities. The trustee is usually separated from the originator or the issuer in order to avoid conflicts of interest. A *Guarantor* provides credit enhancement to the securities, as to secure the full, timely and uninterrupted payment of interest and principal in the case of default. Credit enhancement in the U.S. is offered by government agencies, government-sponsored agencies, or third parties such as mortgage insurers.

Finally, an investment bank acting as *Underwriter* sells the securities in the public market. The issuer can also sell the mortgage-backed securities. Public offerings must be

registered with the Securities and Exchange Commission, and rated by a *Rating Agency*. The rating agency focuses its attention on analyzing both, issuer financial strength, and characteristics of securities. Each function will be clarified in following chapters. Exhibit 1.8 depicts the relationship between all the participants described above:

Exhibit 1.8 The Mortgage Securitization Chain



Source: Federal Reserve Bulletin. October 1989.

CHAPTER 2

THE COLOMBIAN MARKET

One of the most outstanding characteristics of the Colombian economy is its conservative fiscal and monetary policies that have helped the government to steadily reduce inflation. The current inflation of 23% has been an average figure over the past 20 years (highest 32% - lowest 17%), which is relatively healthy if compared with other Latin American countries, where inflation has shown three-digit figures. The development of mortgage-backed securities in Colombia is grounded on a Price Level Adjusted Mortgage system -- the UPAC system -- successfully designed to deal with high inflation rates. The Colombian UPAC system is held in high esteem within all Latin American countries as one of the most successful schemes, with very low default rates.

An analysis of the Colombian mortgage securitization requires an understanding of its mortgage system. This chapter is focused on the specific risks for the development of mortgage-backed securities under the UPAC system. First of all, a description of the operation of the UPAC is made, followed by an analysis of the features that affect credit risk. Originators of mortgage loans and investors in mortgage-related securities must be aware of the risks implied in the UPAC system to properly evaluate the mortgage products. The chapter also provides a brief description of the Colombian financial sector and its intermediaries, as well as a brief description of the capital markets. Finally, the structure of the recently approved securitization process is analyzed.

2.1 THE UPAC SYSTEM

In May of 1972 the Colombian government created the Constant Purchasing Power Unit (known as UPAC - “Unidad de Poder Adquisitivo Constante”) in order to

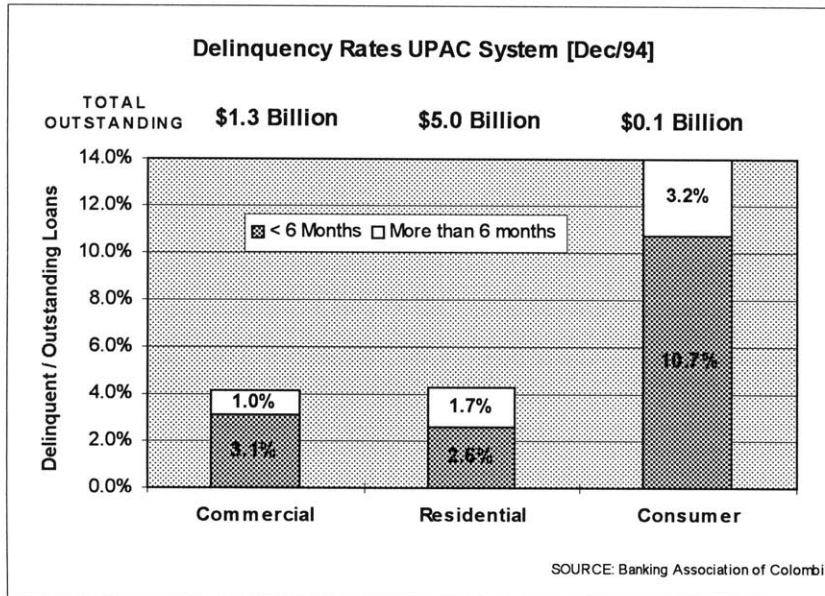
stimulate private savings, and additionally to fund the housing and construction sector. The UPAC was initially conceived as a price level indexed system that adjusted loans and deposits for inflation on a daily-basis. Along with the establishment of the UPAC, the government created the Savings and Housing Corporations (known as CAV - "Corporaciones de Ahorro y Vivienda"). These are depository institutions that finance residential mortgages and construction loans in UPAC units. The CAVs convert deposits into short term construction loans and long-term residential mortgage loans expressed in UPAC units.

Ten savings and housing corporations, with more than 1000 offices operating nationwide, shape the UPAC system. Around 8.8 million of people (almost 25% of the population) fund CAVs operations with their saving accounts and certificates of deposit. Mortgage loans have grown at a compound rate of 47 percent during the last three years, totaling \$6.3 billion dollars as of February 1995¹². In 1993, 88.5% of the total volume of housing loans in Colombia were originated by the CAVs¹³, which shows the tremendous dependence of the construction sector on them. Exhibit 2.1 shows the delinquency rates of the system by type of assets. From these delinquent loans, about 1.5 to 2.0% end up with foreclosure processes.

¹² Colombian Institute of Saving and Housing - ICAV. "Statistics of the UPAC System." Bogota, March of 1995. An exchange rate of \$860 pesos for 1 dollar was used.

¹³ National Council of Economic and Social Policy - COMPES.

Exhibit 2.1 Delinquency Rates on the UPAC System. [December 1994]



Deposits and loans are converted into UPACs, in order to protect the corporation and the depositor against unexpected changes in inflation and interest rates, a major concern of financial institutions. CAVs adjust on a daily basis the value of their assets and liabilities, using the monthly Central Bank’s update (Banco de la República) of the UPAC. The adjustment is based on the *Monetary Correction*, which is a function of the inflation (Consumer Price Index - CPI), and average deposit rates in the financial institutions (DTF). The formula for the calculation of monetary correction has changed over the years; from 1972 until 1988, it was based on the CPI of the prior 12 months, but sometimes restricted to maximum limits. Since 1988, it is calculated as a function of CPI and DTF. Currently, the monetary correction is calculated as 20% of the average CPI for the last 12-month period, plus 50% of the average deposit rate in the financial institutions (DTF) for the last 2 months. In June of 1995¹⁴, the formula was changed to represent a function only of DTF (74% of average DTF during the last month). Notice that the UPAC index, initially conceived to maintain the purchasing power of depositors, has become a mirror of interest rates.

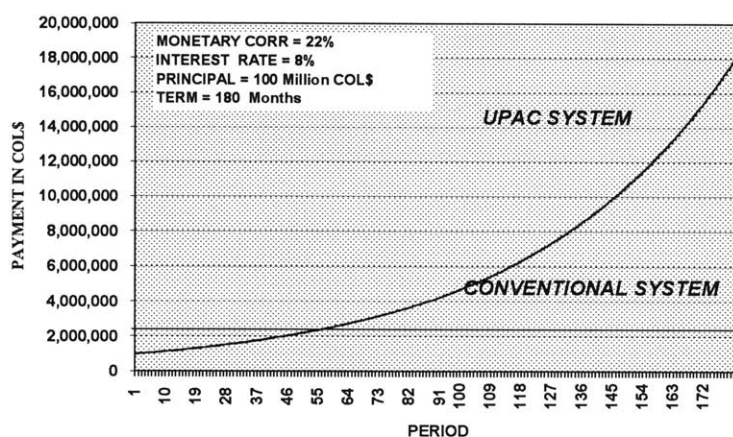
¹⁴ Resolucion Externa No. 18 of 1995, to be applied since August 1st, 1995.

Residential mortgage loans are originated in UPAC units, which adjusts on a daily basis with the monetary correction. Loans are charged an additional fixed interest rate, for example 8% over monetary correction (assume 22%); this results in an effective annual interest rate of 31.76%. Since historical data was used to calculate the monetary correction, there was a lag effect for strong movements in interest rates. Interest payments were not reflecting current rates immediately. The new formula fixes this deficiency, because it is calculated on average interest rates of the last two months. The advantage of the UPAC indexed system is that by mean of the monetary correction the system follow interest rates, so that when interest rates increase, both loans and deposits move together. Only unexpected changes in risk premiums of loans (the fixed portion of 8% above monetary correction in the prior example), as a consequence of changes in macro economic conditions, are not avoided with the system.

The system provides for constant amortization of mortgages in real terms; that is, payment of a constant amount in UPAC, which results in an increasing amount in Pesos that grows at the monetary correction. The system requires *lower payments* during the first years, if compared with the conventional constant payment mortgage. Exhibit 2.2 shows a comparison of the payment schedules for both systems. Observe that during the first third of the mortgage life the payment is lower for the UPAC system than for the conventional system. However, the UPAC system is very flexible on its amortization plans. Borrowers can select and shift among different plans: fixed payment in UPAC, fixed payment in Pesos, fixed amortization of capital in UPAC or in Pesos, exponentially or gradually decreasing payments, and others.

Exhibit 2.2 Payment Scheduled for Conventional and UPAC System.

Comparison of Payments

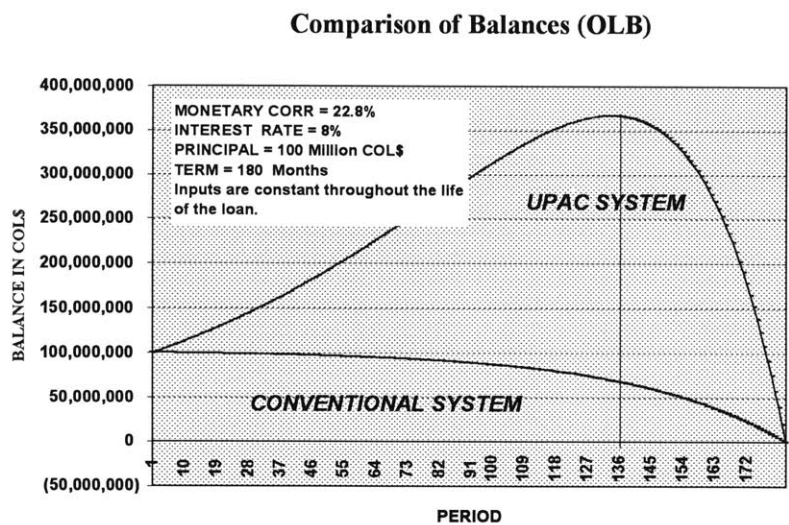


Lower initial payments gives lower-income families access to credit, and also qualifies the borrower for larger mortgage loans, therefore for higher quality housing. The graph also shows how payments grow at a steady rate in nominal terms. This can be a problem if borrower's income does not increase at the monetary correction¹⁵. The growing payment feature make the UPAC system riskier than the fixed constant payment, as to being more sensitive to interest rates changes. If DTF increases, monetary correction does the same, and borrower's payments increase. This higher burden to the borrower may cause what is known as "payment shock", resulting in borrower's default.

One of the main drawbacks of the UPAC system is the *outstanding loan balance* growing in nominal terms during the two thirds of the mortgage life (See Exhibit 2.3). This *negative amortization* is produced by the capitalization of accrued interests that are not covered by the lower payments. Since property appreciation may not be tied to interest rates, the new formula of the monetary correction may cause the loan value to grow at a higher pace than property value, increasing the probability of default. This situation is aggravated if the original loan-to-value ratio is too high (very low down payments).

¹⁵ Salaries' increments usually are based on inflation rates. Since monetary correction is just a function of inflation, and depends more on interest rates (DTF), borrowers income may not grow at the same pace that mortgage payments do. This can create a problem for the lender.

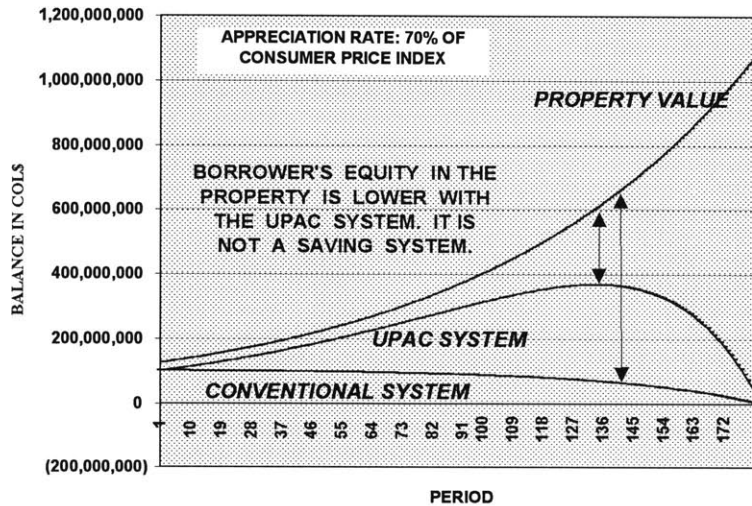
Exhibit 2.3 Comparison of OLB Between Conventional and UPAC System.



The borrower in the conventional system amortizes its debt with each payment, building equity in the property through amortization. He also builds equity via inflation and appreciation of the property. In contrast, the borrower of the UPAC system builds equity at a lower pace due to the lower payment; this means that all the appreciation is earned by the lender via debt increase¹⁶. The UPAC system is not designed to be a savings mechanism as the conventional system. Its most important objectives are to facilitate home acquisition to a broader range of the population, and to provide funds for the construction industry. To illustrate this point, Exhibit 2.4 uses the same example of exhibit 2.3 to compare the outstanding loan balances of the UPAC and the conventional system with the property value, assuming that the original loan-to-value ratio is 80%. Notice that the UPAC borrower's equity in the property is lower.

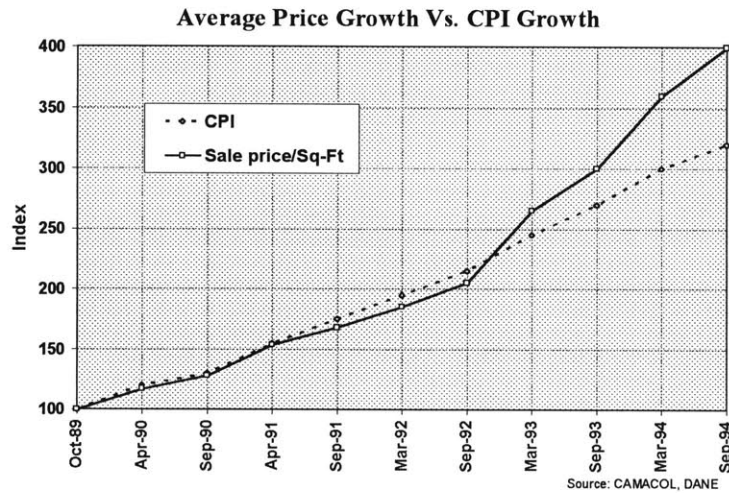
¹⁶ Denise DiPasquale, and William Wheaton. *Real Estate Economics - Lecture Notes*. (Cambridge: MIT - Center for Real Estate. 1995.)

Exhibit 2.4 Comparison of Borrower's Equity in the Property.



The lower the borrower's equity in the property the more probable he is to default. Pricing of mortgage-backed securities has to reflect this risk. In Colombia this effect has not had a strong negative effect. During the first 20 years of existence of the system the monetary correction grew at a compound rate of 20.6%, while the CPI grew at 24.1% annually. Moreover, increases in property values have overpassed the Consumer Price Index for the past five years. Exhibit 2.5 shows an index comparison of average sale price per square feet and CPI for the last five years. Observe that since 1992 prices have increased at a rate higher than the inflation rate. Although this helps to reduce default rates, a satisfactory historical record is not enough guaranty for the future performance of mortgage loans. This is a latent risk that may come out during real estate recessions, and economic depressions, when property prices may decline.

Exhibit 2.5 Appreciation of Property Vs Inflation.



2.2 ASSET SECURITIZATION AND THE COLOMBIAN FINANCIAL SYSTEM.

Until 1990, the Colombian financial sector was characterized by its segmentation, specialization, and huge legal differences between financial institutions. With the Financial System Overhaul of 1990 - Law 45, the Colombian government broadened the operations of the financial agents in order to modernize the sector and stimulate the competition. The objective was to increase public savings, and lower the cost of credit for borrowers. Financial institutions could enter into non-banking transactions, with the possibility of investing in leasing companies, brokerage, pension and retirement funds, and trusts.

The Law 45 defines credit institutions as those financial institutions under the supervision of the Superintendency of Banks, who fund their credit operations with public savings. Exhibit 2.6 shows the four major types of credit institutions in Colombia and their purpose.

Exhibit 2.6 Credit Institutions in the Colombian Financial System.

CREDIT INSTITUTIONS	FUNDING OPERATIONS	CHIEF OPERATIONS
Commercial Banks	<ul style="list-style-type: none"> • Checking Accounts • Sight deposits • Deposit certificates - CDT • Saving Accounts 	<ul style="list-style-type: none"> • Commercial Loans. Long-term and short-term.
Investment Banks (“Corporaciones Financieras”)	<ul style="list-style-type: none"> • Deposit certificates • Debt securities 	<ul style="list-style-type: none"> • Commercial Loans • Create, merge, expand, transform or reorganize companies.
Savings and Housing Corporations - CAV	<ul style="list-style-type: none"> • Saving accounts in UPAC. • Deposit certificates. 	<ul style="list-style-type: none"> • Mortgage loans.
Trade Finance Companies - CFCs. (“Compañías de Financiamiento Comercial”)	<ul style="list-style-type: none"> • Deposit certificates. 	<ul style="list-style-type: none"> • Commercial loans for goods and services trading.

The Law 45 promoted the competition between banks and the UPAC system. On one hand, it allowed banks to originate long-term loans¹⁷ with alternatives of negative amortization as the UPAC system. In addition, banks were allowed to open saving accounts and offer Certificates of Deposit. On the other hand, the Law 45 authorized CAVs to originate consumer loans collateralized with mortgages on real property. This resulted in greater competition, to which CAVs are readily prepared with their large branch network, their marketing strategies, and their management information systems. Certainly, this situation of increased competition will force CAVs and banks to utilize new alternatives of funding their operations. Securitization becomes a new mechanism that will help CAVs to face the challenge of the new competitive environment.

Furthermore, one of the major concerns of the Colombian government has been the dramatic decrease in private savings. During the last decade, private savings dropped from 14 to 6 percent of Gross Domestic Product (GDP), while public savings stayed constant at 8 to 9 percent of GDP. Total current savings of 15 percent of GDP (private plus public) is considered too low if compared with other same-level growing economies. As a result, the current government is encouraging the strengthening and growth of the financial sector and the capital markets, in order to redirect institutional investors’

¹⁷ Before the Law 45 of 1990, banks could only originate short term loans.

resources to the production sector. Mortgage securitization also becomes an excellent vehicle to achieve this goal. Along these lines, in October of 1994 the Colombian government created the Mission for the Development of the Capital Markets which, among other objectives, will propose strategies to expand the supply of securities.

The Colombian financial sector is facing a substantial transformation. The market place is growing fast with the presence of new players. In 1994 new institutional investors such as *Pension Funds* and *Retirement funds* started to operate. This will contribute not only to the desintermediation of the financial sector, but also to the development of new strategies to access the capital markets. A huge amount of funds will be invested in high quality and liquid securities that offer the appropriate trade off between risk and return. The Decree 1630 of August 5 of 1994 from the Superintendency of Securities, and Decree 1885 of August 3 of 1994 from the Finance Ministry, authorized these institutional investors to buy asset-backed securities, including mortgages-related securities, provided they comply with the following criteria:

- The securities have to be authorized by the Superintendency of Securities, and registered in the stock exchange.
- The securities must be rated by rating agency at least in the class A- (A minus), unless they are guaranteed by a financial institution, or insured by an insurance company, both under the supervision of the Superintendency of Banks.
- Pension and retirement funds cannot invest more than 30% of their total portfolio in mortgage-backed securities. For MBS there is no limited investment amount with the same issuer as there is for other types of investment.
- Pension and retirement funds cannot buy more than 20% of the issuing. The limit is reduced to 10% if securities are bought in the primary market.

In addition to pension and retirement funds, Insurance Companies can also invest in mortgage-backed securities, under the criteria set forth by the Law 45 of 1990. In accordance with the Law, they can invest in securities issued by financial institutions under

the supervision of the Superintendency of Banks, in an amount not exceeding 30% of its portfolio. In addition to this limit, insurance companies cannot invest more than 10% of their capital in such securities.

In summary, many conditions are present right now in the Colombian financial system to ensure the emergence of the securitization process. Its success will depend on the strength of the financial institutions offering the derivatives, as well as the quality of the securities. The following chapters will evaluate the risks for all the participants in the process under the current regulation.

2.3 REGULATION FOR ASSET SECURITIZATION IN COLOMBIA.

Regulations 1394 of November 4th of 1993, and 1032 of October 19 of 1994 from the Superintendency of Securities set forth the general guidelines for asset-backed securitization in Colombia. The act authorized credit institutions and developers to fund their operations by issuing asset-backed securities, and selling them in the capital markets. Public debt, commercial loans, mortgage loans, credit documents and real estate projects with predictable cash flows can now be securitized, provided that the structure protects investors, financial strength of the issuer, and in general the securities public market.

The securities must comply with the requirements for public offerings; that is registration with the National Registrar of Securities and Intermediaries (“Registro Nacional de Valores e Intermediarios” - RNVI), and authorization from the Superintendency of Securities. They also have to be rated by an authorized rating agency unless they are guaranteed by a financial institution under the supervision of the Superintendency of Banks, or backed by the government or by the Central Bank.

The securitization process in Colombia is structured under the fiduciary system. The Originator transfers the pooled mortgages to a trust or “Agent”, who put the assets

into an immune holding ("*Patrimonio Autonomo*" - hereinafter called PA), that cannot be seized under bankruptcy of the originator or any other circumstance. The agent issues the securities on behalf of the PA and pays the originator the proceeds of the issuing. In addition, he is legally bound by the PA to prudently and efficiently manage all the amounts deposited; however, his fiduciary duty is to serve as a facilitator, not to guarantee results. The agent is in charge of paying investors the amount of principal and interest stipulated in the securities. He receives and administers the payments collected by the servicer. The Agent can be a fiduciary (or trust), a financial institution with authorization to sign fiduciary contracts, an investment banker, or a foreign financial institution. Investment bankers can serve as agents only in securitization processes in which the underlying assets are instruments registered with the RNVI.

Three types of mortgage-backed securities are authorized by the regulator in Colombia:

- ***Debt securities*** (or "Títulos de Contenido Crediticio"): These are bonds issued by the trust on behalf the PA, that do not represent any ownership interest in the pool of mortgages. Instead, they are backed by the pooled mortgage loans. Bondholders receive interest and principal under contractual arrangements, and their return is not linked directly to the return on the mortgages. Credit enhancement mechanisms such as subordination or overcollateralization are required to reduce credit risk and uncertainty of principal payments by borrowers. These securities are similar to the Mortgage-Backed Bonds (MBBs) in the U.S.
- ***Participating securities*** (or "Títulos de Participación"): With these securities, investors have an undivided ownership interest in the pool, in which they participate in profits and losses arising from the underlying assets in a prorated basis. Interest and principal, including prepayment, are passed-through to the investor in the securities in the same way as the whole-loan originator would

receive the payments. Credit enhancements are also required. These are similar to the Mortgage Pass-Through Securities (MPSs) in the U.S.

- **Mixed securities** (or “Títulos Mixtos”): Mixed securities are defined by the regulation as a combination of debt and participating securities, since the investor has an undivided interest in the pool, that is an ownership position. The investor is also entitled to receive a minimum yield, and to receive prepayments at the time they are received by the servicer (investor assumes prepayment risk). Similar structures in the U.S. are known as Mortgage Pay-Through Bonds (MPTB), or Collateralized Mortgage Obligations (CMO); however, in the U.S. the investor does not have an ownership position.

The Colombian regulation initially authorized financial institutions to securitize mortgage loans classified in categories A (current, or no more than 1 month delinquent), B (delinquency between 1 and 4 months), or C (delinquency between 4 and 6 months), in accordance with the Superintendency of banks’ criteria¹⁸. The recent amendment Resolution 400 of May 1995, omitted this requirement allowing financial institutions to securitize any kind of loan.

Finally, it is worthwhile to mention that Colombia does not have neither a government agency that sponsor an active secondary mortgage market, nor any government agencies that provide default insurance or guaranties to mortgage loans. On this account, issuers of mortgage-backed securities programs are required to provide internal or external credit enhancements, in order to furnish investors with coverage against credit risk. The credit enhancement must cover one and a half times the percentage of probable default of the securitized asset class with the combination of mechanisms such as subordination, overcollateralization, private insurance, money deposits, guaranties from financial institutions, cash flow surplus accounts, loan replacement, and others. The

¹⁸ Superintendency of Banks. *Resolution 1980 of September 15, 1994, and Resolution 2179 of October 5, 1994.*

advantages, disadvantages, and perils of each of these mechanisms are described in detail in Chapter 3.

CHAPTER 3

PROS AND CONS OF ASSET SECURITIZATION

An Analysis of the Colombian Market

As the new market of asset securitization develops in Colombia, and CAVs (Savings and Housing Corporations) and other credit institutions are increasingly participating in the process, it is critical to describe and understand the main benefits and risks for regulated institutions, and the role that securitization will play in the financial system. Regulators and investors have to be sure that credit institutions are able to evaluate and manage the risks involved in mortgage securitization, and that proper regulation and oversight are in place to guarantee the safety and soundness of the system. This chapter starts discussing the main benefits of securitization for all the participants. The second and third section analyze the major risks of securitization from the investor's and supervisor's point of view. Risk mitigation techniques currently contemplated by the Colombian regulation (credit enhancement) are analyzed and criticized in the fourth section, based on the experience of the U.S. mortgage market. Ultimately, the thorough understanding of the risks, their appropriate management, and the strict supervision of financial institutions will determine the success of mortgage-backed securities in Colombia.

3.1 BENEFITS AND OPPORTUNITIES

Asset securitization offers large benefits for the national economy and the participants in the process. It leads to more efficient markets, providing liquidity, stability, transparency, and information. It also reduces financing costs for borrowers and lenders, which translates on consumer spending and economy growth. In the long run, the permanent activity of the securitization process will help to smooth the real estate cycles,

characterized by shortage of funds. This section identifies the benefits for each participant of the process: mortgage loan originators, investors in mortgage-backed securities and home-buyers.

3.1.1 Benefits for Originators

Risk management: Mortgage securitization allows financial institutions to transfer the inherited risks of the lending activity, to investors, or to other participants in the process. This includes credit (default), interest rate, funding, liquidity, operational, and concentration risks. Mortgage securitization works towards spreading the risks among the participants, instead of reducing overall risks of the lending activity. At the same time, it creates new opportunities for other financial and non-financial institutions. It slices the role of credit institutions into several pieces, each of which represents a new source of income for servicers, trusts and credit enhancers (insurers or other risk-takers).

Liquidity: With an active secondary mortgage market the mortgage-backed security is a more tradable asset than the whole loan. Securitization is basically a liquidity provider. A financial institution can securitize its illiquid whole-loan mortgage portfolio, and hold the resulting liquid securities in its assets, just for the sake of gaining liquidity. The securities can be sold in the market quickly for purposes of portfolio management. Furthermore, since mortgage-backed securities split up the two components of a mortgage loan -- indebtedness and servicing -- the institution could sell the security (debt component) and retain the servicing income. Certainly, securitization involves additional guaranteeing or insurance costs, which may somewhat discourage the financial institution to securitize its portfolio.

Balance sheet management: Mortgage originators can remove from their balance sheet their mortgage assets, by pooling and transforming them in tradable instruments. If certain conditions are met, the mortgages are not any more part of the CAV's assets, and the securities issued are not part of its liabilities (Chapter 4 will discuss this in detail).

Therefore, through securitization a financial institution is able to lower its assets, hence lower its reserves, capital requirements (“patrimonio técnico”) and forced investments. Mortgage securitization becomes a useful tool to increase profits and reserve ratios with a minimum increase in deposits to fund mortgages. In addition, CAVs can earn origination and servicing fees without additional capital, improving return on equity.

Asset/liability management: CAVs face a maturity mismatch between assets and liabilities, since their function is mainly to provide long-term financing, using short-term and sight deposits of savers. The duration¹⁹ of assets is greater than the duration of liabilities, which makes earnings very volatile when interest rates change. Although the UPAC system adjusts assets and liabilities for inflation and interest rates (through monetary correction), the adjustment is not instantaneous. The real portion of interest rates, that is the additional interest above monetary correction, is still at risk. A decrease in real interest rates, may encourage borrowers to refinance and prepay their loans, reducing the duration of assets. On the other side of the balance, liabilities (deposits, or certificates of deposits) cannot be adjusted immediately to a lower interest rate, causing a temporary higher interest expense. Similarly, if short term real interest rates increase, the financial institution would have to pay more for its deposits, while the mortgage interest rate remains constant. In other words, assets and liabilities are interest rate sensitive and its maturity mismatch can affect CAV’s earnings. Asset securitization furnishes credit institutions with enough flexibility to mold their asset/liability structure, reducing this effect.

Expansion of investor base: Securitization, as a vehicle to access the capital markets, augment the sources of funds by selling investment grade securities to institutional investors. Mortgage-backed securities generally obtain a high rating, which makes them very competitive with treasury securities. It may not be a cheaper vehicle to fund mortgage origination if compared with deposits, but it definitely is another source of funds. Credit institutions that fund their operations with debt instead of deposits, can raise

¹⁹ Duration is calculated as the weighted-average maturity of the present values of future cash flows.

funds at a lower cost. Their asset-backed securities usually get higher ratings than those conventionally assigned to their corporate debt.

Diversification: Credit institutions can limit their exposure to a certain asset class or certain geographic concentration by securitizing their mortgages, or buying other's to diversify their portfolio.

3.1.2 Benefits for Investors.

Mortgage-backed securities are an attractive investment for long term investors willing to manage their asset/liability structure. Investors such as pension funds or life insurance companies whose liabilities are long-term obligations, can use long-term assets such as MBS to match the estimated duration through a wide range of interest rate environments. An active secondary mortgage market allows investors to reconfigure their portfolio when market conditions change.

Investors get high credit quality securities that offer an appropriate trade-off between risk and return. MBS provide an attractive premium over other high quality instruments. Credit institutions create an appropriate instrument for institutional investors, who may not want to maintain individual whole loans, but rather invest in a secured, liquid, less risky, non-duplicable and high yielding instrument, almost tailored for their needs. Mortgage-backed securities can be structured to partition the risks between investors of different risk tolerances, and also with different time horizons.

Mortgage-backed securities can also be targeted to "retail" customers -- small investors in fixed income securities -- since they offer higher yields than government securities and lower risk than corporate bonds. Small investors can also reduce selling and administrative fees charged by mutual accounts or other trusts.

3.1.3 Benefits for Borrowers

Home buyers, correspondingly, obtain lower mortgage rates due to the cost savings and risk relief of the lender. Mortgage securitization becomes an important way to convey funds from the capital markets into the housing market. Construction activity and home acquisition are not anymore financed only by savings of common people, but also by “fresh” funds of large institutional investors, now present in the Colombian market. In summary, larger funds will be serve a greater portion of the population, avoiding undesirable capital crunches.

3.2 RISKS OF SECURITIZATION: The Investor’s Perspective

Mortgage-backed securities are a new instrument in the Colombian market which investors have eagerly accepted basically for two reasons. First, because of the confidence on the credit institutions involved, and second, because of the low risk of the securities due to a very high-quality credit enhancement provided by the originator. A first look at the outstanding mortgage-backed securities in Colombia reveals the exceptionally low risk for the investor. However, it is expected that in the future issuers will shift more risk to investors in the securities, or to third parties. On this account, an entire understanding of the underlying risks is essential for investors entering into an unfamiliar market, with unusual practices associated with it. This section analyzes the four major risks inherent to MBS from the investor’s perspective, and summarizes the current practices for risk allocation among the participants in the process. The four major risks inherent to MBS are credit, interest rate, prepayment risk and delay risk.

3.2.1 Credit Risk.

As discussed in Chapter 1, credit or default risk is defined as the probability that the borrower breaks the mortgage contract, for example if he does not meet the scheduled

payments for an indefinite period of time. Clauretie and Webb²⁰ mention two theories of default: the “ability-to-pay theory” and the “equity theory” or “put option theory”. The *ability-to-pay theory* is tied to the economic status of the borrower, and is determined in the underwriting process. Underwriting policies of credit institutions are addressed to assess the ability of a borrower to meet housing expenses and total obligations, based on his current income and its likelihood to continue. The underwriting process includes assessment of²¹, among other things, assets of the borrower that indicate ability to meet the down payment and closing costs, other liquid investments, ability to save, life expectancy of the borrower and life insurance, family size, credit history, and other current obligations. As explained before, the secondary mortgage market in the U.S. exists because of the standardization of these underwriting criteria, that give investors the confidence on the originator’s judgment when extending credit to borrowers.

The *equity theory* states that default depends on the appreciation of the property and the borrower’s equity in it. Default risk is very high when the value of the outstanding loan balance is greater than the market value of the property. This is more likely to occur when general economic conditions of the region (market cycles) drive real estate prices down (high price volatility). It is also encouraged when buyers make low down payments on the property (high loan-to-value ratio). The mortgage loan can be seen by the borrower as a “put option”, which is “in the money” if the value of the property falls below the value of the loan. In this case, the borrower is better off if he gives the property to the lender as opposed to repay the loan. The borrower’s option is worth the difference. In this case, default is a matter of willingness to pay, and not of ability to pay. However, default will not always occur when property value is less than the loan amount; the borrower may prefer to make the payments because he is afraid of damaging his credit history, or because the property is worth more for him than for the market.

²⁰ Terence M. Clauretie and James R. Webb. *The Theory and Practice of Real Estate Finance*. (Orlando: The Dryden Press, 1993). p. 308.

²¹ William B. Brueggeman and Jeffrey D. Fisher, *Real Estate Finance and Investment*. (Boston: Irwin, 1993), pp. 199-203.

As mentioned in Chapter 2, property prices have historically grown in Colombia at a rate higher than inflation. However, historical behavior is not guaranty for the future performance of real estate. If property appreciation is lower than the monetary correction (see Section 2.1), loan balances would increase faster than property prices encouraging the borrower to default. In order to reduce this risk, investors have to look at the original down payment of the mortgage pool, as well as the trustworthiness of the property appraisals made by the originator. Studies of George von Furstenberg²² on residential mortgages in the U.S. showed that the probability of default is reduced with lower original loan-to-value ratios, lower original maturities, and newer properties. He also found that the probability of default was greatest between the third and fifth year of the loan life.

Credit risk becomes one of the major concerns of the investor in Colombian mortgage-backed securities. In the absence of government agencies that provide insurance against default risk, private insurance and credit enhancement mechanisms to address risk are crucial to the success of mortgage products. This will be discussed later in this chapter.

3.2.2 Interest rate risk

The large majority of residential mortgages in the U.S. are fixed rate, that is, lenders are not able to adjust interest payments. Lenders assume changes (losses) on the components of interest rates: real interest rate, inflation and risk premium. For example, a contraction or expansion of the economy results in changes in the level of investment or employment, which in turn affects in real interest rates and risk premiums. On the other hand, a monetary expansion or contraction can cause changes in inflation rates²³. The risk

²² George von Furstenberg, "Default Risk on FHA Insured Home mortgages as a Function of the Terms of Financing: A Quantitative Analysis", *Journal of Finance*, 1969. "The Investment Quality of Home Mortgages", *Journal of Risk and Insurance*, 1970. "Estimation of Delinquency Risk for Home Mortgage Portfolios", *Journal of the American Real Estate and Urban Economics Association*, 1974.

²³ William B. Brueggeman and Jeffrey D. Fisher, *Real Estate Finance and Investment*. (Boston: Irwin, 1993), pp. 153.

premium is the component of interest rates used to account for these unexpected changes in real or inflation rates.

As explained in chapter 2, price level amortization mortgages, such as the Colombian UPAC system, reduces interest rate risk for the lender, because deposits and loans are adjusted when interest rates change. However, when UPAC Mortgages are securitized by means of “debt securities” or “mixed securities” (mortgage-backed bonds or collateralized mortgage obligations, see Section 2.3), interest rate risk arise if the interest rate paid to the investor does not adjust in the same fashion that interest payments on the underlying assets. With these kind of securities, there is also uncertainty about the possible changes in the formula for the calculation of the monetary correction during the life of the security. In the case of “participating securities” (pass-through securities), the lender receives payments adjusted by both CPI and DTF (monetary correction) that are passed-through to the investor without risk for the issuer.

3.2.3 Prepayment risk.

Since borrowers can prepay their mortgages at any time without any prepayment penalty, they are able to refinance their loans when interest rates fall. In the case of securitized loans, prepayment can affect the issuer or the investor, depending on the securitization scheme. In the case of pass-through securities (“participating securities” in Colombia), prepayment affects directly the investor, who has to reinvest the prepaid amount at a different rate. In the case of mortgage-backed bonds (“debt securities”) and pay-through bonds, or collateralized mortgage obligations (“mixed securities” in Colombia) prepayment affects the issuer, if he has to reinvest the funds at a rate different from the offered to the investor in the security. Issuers in Colombia shift this risk to the investor by structuring callable mortgage-backed bonds, by which the issuer can call in the bond (cancel the bond before maturity) under the event of massive prepayments, in order to avoid reinvestment of funds until maturity date of the bond. Exhibit 3.1 summarizes the effect of prepayment with the different mortgage related securities.

Exhibit 3.1 Effect of Prepayment in Mortgage-Backed Securities (Falling Interest Rates).

U.S.	Pass-Through	Mortgage-Backed Bond	Collateralized Mortgage Obligation
COLOMBIA	“Participating Security” or “Títulos de Participación”	“Debt Security” or “Títulos de Contenido Crediticio”	“Mixed Security” or “Títulos Mixtos”
Risk for Investor	- Prepayment passed through to investor. - Investor has to reinvest @ lower rate.		- Prepayment passed through to investor. - Investor has to reinvest @ lower rate.
Risk for Issuer	None	- Issuer receives prepayment and has to reinvest @ lower rate. - Issuer guarantees minimum coupon rate that may be higher than market's.	- Issuer guarantees minimum coupon rate that may be higher than market's.
Benefit for Investor due to falling rates.	- Securities increase in value because lower discount rate.	- Securities increase in value because lower discount rate.	- Securities increase in value because lower discount rate.

Investors in MBS should evaluate the predictability of the income stream and the probability of the bond to be called. As Brueggeman and Fisher suggest²⁴, the predictability of the cash flows in a pool with *varying interest rates* (i.e. pools of mortgages with interest rates between monetary correction plus 7, and monetary correction plus 8), is higher than in a pool with constant mortgage rates, since it is less probable that all the mortgages are affected by changes in interest rates at the same time, producing a massive prepayment. *Seasoning* is defined as the time that a mortgage loan has been outstanding before it is pooled and securitized. It is important for the investor because the higher the seasoning, the greater the probability that the borrower sells the house and prepays the loan. On the other hand, default is less probable with seasoned mortgages. On this account, seasoning augments or reduce prepayments, resulting in higher volatility and complex pricing. *Geographic dispersion* of mortgage loans in a pool can partially mitigate the risk of prepayment.

²⁴ William B. Brueggeman and Jeffrey D. Fisher, *Real Estate Finance and Investment*. (Boston: Irwin, 1993), pp. 736.

3.2.4 Delay on principal and interest payments.

Timely payment of interest and principal on mortgage-backed securities is a major risk in the Colombian market. There is no government agency such as Ginnie Mae, Fannie Mae or Freddie Mac in the U.S. that guarantees the timely payment of interest and principal. Investors in Colombian MBS depend on the credit enhancements provided by financial institutions to accumulate enough cash flow. To illustrate, Davivienda in January of 1995²⁵, deposited \$1.7 million dollars (6% of the issuing) in an escrow account to guarantee timely payments of interest and principal of its mortgage-backed bonds. A trust, which is the same agent that manages the immune holding (“Patrimonio Autonomo” - PA), manages the money deposit. It utilizes the deposit to cover the cash flow variations on the mortgage pool that impedes to meet the interest and principal payments on the bonds. The money deposit is considered a temporary source of liquidity, and all the moneys drawn have to be reimbursed by the PA after paying all the fees, interests and principal of senior bonds. The mechanism is very secure since it isolates the capability of making timely payments from the creditworthiness of the originator or a third party; however it imposes an additional burden and risk to the originator, because it ties up capital for the life of the security.

3.2.5 Liquidity risk.

The investor in Colombian mortgage-backed securities may face liquidity risk. Investors may find difficult to sell their investments due to the facts that: the market is still very thin and immature, the performance of the securities has not been tested, performance and risks inherent to real estate have to be fully understood, and there is not an active secondary market for mortgage related securities. This can lead investors to liquidate their positions at a discount, discouraging investments.

²⁵ Davivienda is one of the first Savings and Housing Corporation - CAV in Colombia to securitize residential mortgages. In January of 1995, Davivienda securitized \$28 million dollars of its mortgage portfolio, issuing “debt securities” (mortgage-backed bonds).

3.3 RISKS OF SECURITIZATION FOR THE FINANCIAL SECTOR: The Supervisor's Perspective.

The regulation of mortgage securitization in Colombia pointed at investor's protection, requiring the originator to provide credit enhancement at its own expense. Although the regulation suggests the use of credit enhancement mechanisms provided by third parties, those imply additional costs for the originator. Originators would opt for using internal credit enhancements, instead of incurring in an additional cost for the securitization process. On this account, the securitization process may not reduce effective risk exposure of credit institutions, and rather it would contribute to create a riskier financial institution. The regulator must keep in mind that the process should not affect the financial stability and solvency of the credit institutions. This section describes the perils for financial institutions involved in the process playing the role of originators, servicers, issuers, trustees, or credit enhancers.

3.3.1 Risk for Originators.

As explained before, the Colombian regulation proposed the use of credit enhancement mechanisms that concentrate the risk of the issuing on the originator. Securitization is meant to be a way to transfer risks, and not to be a secured financing strategy that results in riskier financial institutions. For example, the originator was initially obligated to subscribe the subordinated class securities of senior/subordinated structures, assuming the entire credit risk of the pool. Just in May of 1995²⁶, the originator was allowed to sell the subordinated securities to investors, a task that will not be as easy as selling the senior tranche (See Chapter 5). Other credit enhancements, such as overcollateralization, imply an equity position of the credit institution to which all losses are applied. Furthermore, the regulation authorized only the securitization of loans under the categories A, B, or C in accordance to the Superintendency of Banks (loans that are

²⁶ Superintendency of Securities, Finance Ministry of Colombia. *Regulation 400*. May 22, 1995. Art. 1.3.4.5

current or that have not been delinquent for more than 6 months). The regulation limited financial institutions to sell the best part of their assets, and retain a worsened portfolio of riskier loans. This was changed by the Resolution 400 of May, 1995.

Even though Colombian originators now can sell the “risky” securities to the public, there is a latent risk termed “moral recourse”. Under extremely adverse events of massive prepayment or default, credit institutions may feel the moral obligation to repurchase non-performing securities. They may prefer to incur in a loss and buy back the securities, in order to preserve their reputation and future access to the market.

The supervisor of the financial institutions must be aware of other risks that could emerge from securitization, with more originators taking advantage of the process. If securitization is properly structured, it is easier and faster than ever to raise large amounts of funds in the capital markets. Originators eager to increase their market share may lessen their underwriting criterion in order to increase their loan origination activity. Supervisors have to pay special attention with the lending practices of credit institutions entering the securitization market, focusing on maintaining loan origination standards independent of the decision to securitize. In addition, as Moody’s Investors Service²⁷ suggests, origination and servicing fees become more important than spreads, encouraging higher volume of loan origination, and relaxed credit standards.

3.3.2 Risk for Servicers and Credit Enhancers.

As the role of the CAVs is sliced into several activities, one by one representing a valuable asset, specialized servicers find in securitization an attractive business opportunity. The cost of servicing per loan is lower when the volume of operations increases. This may result in servicers accepting higher volumes than those they can efficiently handle. The cost of achieving economies of scale in the servicing business is the risk of mishandling the pools, which in turn may cause a stressful situation. In these cases,

²⁷ Moody’s Investors Service. *Structured Finance, Special Report*. December, 1987.

provisions for substitution of the servicer, or sale of servicing rights, are encouraged by rating agencies in the U.S. Servicers bear the operational risk of the lending activity, and must carefully assess the cost of servicing to justify a fixed rate fee.

Financial institutions taking the role of credit enhancers -- whether it is a third party, or it is the originator itself -- bears all the credit risk of the securitization. These entities must establish appropriate criteria for loan origination, in order to assure the quality of the underwriting. Financial institutions guaranteeing mortgage-backed securities must set aside additional capital to back the operation and support the losses without jeopardizing depositor's wealth. This approach is analyzed in Chapter 4, where risk-based capital adequacy rules are discussed.

3.4 MITIGATION OF CREDIT RISK AND THE ROLE OF CREDIT ENHANCEMENT.

Summarizing the evolution of the securitization process in the U.S., the process was driven by the increasing complexity of the instruments, and the need of appropriate credit enhancement according to the perceived risk. The three major stages in the development of U.S. MBS are characterized by the involvement of the federal government in the process, as explained in Chapter 1. MBS started in the U.S. with the initial issuance of GNMA pass-through securities backed by the "full faith and credit" of the government, and insured by FHA, or guaranteed by VA. The second stage is characterized by the participation of new privately owned, government-sponsored agencies, FNMA and FHLMC, without the full faith and credit of the government, but perceived as very low risk investments. Finally, the third stage in the U.S. MBS business was the private issuing of securities neither backed, nor insured by the government. This last stage coincides with the Colombian approach to securitization, in which credit risk is alleviated by furnishing investors with private credit enhancement. This makes easier the participation in a complex market without assuming high risks, or performing costly due-diligence. This section compares credit enhancement mechanisms for private issuing in

both systems and describes their advantages and disadvantages based on the U.S. experience.

In accordance with the current regulation, Colombian issuers must protect the investor by means of one or more credit enhancement mechanisms, described in this section, assuring a 150 percent coverage of the Percentage of Probable Default (PPD). The calculation of the PPD must consider delinquent loans (30,60 and 90 days), historic default rate during the last 5 years, collateral characteristics, risk factors (i.e., tenure of the client), legal and economic risks, and other risks associated with the specific asset class. The PPD to be covered depends on the seasoning of the pooled mortgages. For instance, if the loans are relatively new -- less than 3 years old -- it must be taken the originator's overall PPD for that type of assets. If mortgages are more than 3 years old, it must be taken the greater between the overall PPD for that type of asset and the PPD for the specific pool.

The coverage of credit enhancement can be reduced to 120 percent of the PPD if the mortgages are of high quality (no defaults on the first third of their life), therefore classified in the Class A loans in accordance with the Superintendency of Banks. In addition, if the securities are offered in the secondary market, in which only accredited investors (sophisticated and experienced) have access, no credit enhancement supplied by the originator is required. The subsequent sections will explain credit enhancement mechanisms, and their advantages and disadvantages.

3.4.1 Analysis of Internal Credit Enhancement.

3.4.1.1 Subordination.

The subordination structure is a self-insurance mechanism that consists on the aggregation and redirection of principal and interest cash flows into two different tranches: senior class (non subordinated) and junior class (subordinated). Senior class securities have priority claim on the cash flows generated from the pool of mortgages, thus they

receive high ratings and low interest rates. Holders of junior class securities earn a higher interest rate because they assume all the losses of the pool. They receive payment of principal only after the senior class has been totally canceled.

The subordinated structure is widely used in the U.S. in securities backed by non-conforming loans (not insured by the government); 52% of the non-conforming MBS market utilizes senior/subordinated structures, while corporate guarantees and pool insurance account for 35% and 12%, respectively²⁸.

3.4.1.2 Overcollateralization.

This is a credit enhancement tool by which the value of the mortgage pool is greater than the value of the securities issued, therefore providing a cushion for losses due to default. The buffer represents the originator's equity in the transaction, that can be partially released in the proportion that the pool is amortized. The trustee (entity that represents the investor's interests) marks-to-market the mortgages on a frequent basis, in order to assess the level of overcollateralization, what requires the complete understanding of the technicalities of the securities. Any residual left over after paying off the bonds is returned to the originator as return on equity²⁹.

3.4.1.3 Recourse.

The simplest form of credit enhancement in the U.S. is recourse. Recourse is the commitment of the originator to assume all the credit risk, and pay investors in the case of borrower's default. In Colombia, the originator is allowed to endorse the securities provided that it holds additional capital in accordance to the capital adequacy rules. However, one of the primary benefits of securitization is that it disconnects credit risk of the issuer from that of the issuing. Maintaining recourse by the issuer keeps this link, affecting the investor if the credit standing of the issuer changes due to other events. It

²⁸ Frank J. Fabozzi. *The Handbook of Mortgage-Backed Securities*. (Chicago: Probus, 1992). p. 121.

²⁹ Terence M. Clauretie and James R. Webb. *The Theory and Practice of Real Estate Finance*. (Orlando: The Dryden Press, 1993). p. 236.

also creates riskier institutions, as discussed before. In addition, recourse is a costly capital charge for the credit institution, which discourages issuers to use this alternative.

3.4.1.4 Spread Account.

This mechanism is typically used in the U.S. in the securitization of credit card receivables. The excess of cash flows resulting from the difference between the mortgage rates and pass-through rate will go to an escrow account, that is used to cover expected losses in the pool. This mechanism is very useful to avoid risk retention by the originator or issuer. The transfer of mortgages, and sale of MBS can be treated as sale of assets; that is, the originator can take the assets off the balance sheet, and he does not need to support the transaction with capital. The sale accounting treatment will be discussed in detail in Section 4.3.

3.4.1.5 Loan substitution.

Colombian regulation allows credit institutions to commit to buy back mortgages with increasing risk of default, and substitute them with others of better quality. Although this provides investors with a superior guaranty, it can severely affect financial soundness of the originator. If the originator regularly repurchases and holds in his balance sheet the non-performing assets, he can compromise his financial performance, and would not benefit from the securitization process. This alternative again does not spread credit risk among the players³⁰. This alternative should probably be eliminated from the Colombian regulation due to its tremendous risk for the originator.

3.4.1.6 Lines of credit.

The last internal mechanism for credit enhancement proposed by the Colombian regulation is the provision of lines of credit that assist the originator in meeting timely and full payments to investors. This alternative implies a risk for the financial institution that

³⁰ Donald G. Coonley. Office of the Comptroller of the Currency. Committee on Banking, Finance and Urban Affairs. U.S. House of Representatives. July 31, 1991.

open the line of credit, which in case of default is awarding a loan under a financial distress situation of the originator. Again in this case, the originator keeps all the credit risk that is supposed to be transferred to the investors or to a third party.

3.4.2 Analysis of External Credit Enhancement.

Third parties can also provide credit enhancement to an issuing of mortgage-backed securities by means the following mechanisms:

3.4.2.1 Letter of credit.

Irrevocable letters of credit in which the trustee is the beneficiary are used to cover defaults on mortgages up to the letter amount. Investors must rely upon the creditworthiness of a third party providing the guaranty. The rating of the security depends on the rating of the guarantor, being it susceptible of downgrading. Issuers of letters of credit are required to have additional capital under capital adequacy rules, implying a cost for the guarantor bank, that is transferred to the issuer of the securities. Furthermore, many banks are not rated triple A, which implies certain risk for the securities. According to Fabozzi³¹, this mechanism should not be used as the primary source of credit enhancement due to the short-term character of the letter of credit.

3.4.2.2 Pool Insurance.

Pool insurers in the U.S. “sell” its higher credit rating to an issuer of mortgage-backed securities by means of guaranteeing full and timely payment of principal and interests to investors. The cost of pool insurance must be compared with the cost of capital for the issuer implicit in backing the securities by its own. Although bond insurers are not exempted of credit downgrading³², their business heavily depends on retaining its

³¹ Frank J. Fabozzi. *The Handbook of Mortgage-Backed Securities*. (Chicago: Probus, 1992). p. 139.

³² Two private insurers in the U.S. have had problems with the guarantees offered to MBS. TMIC Mortgage Insurance defaulted on his guaranty contract, and Verex Insurance, Inc. was downgraded. (Frank J. Fabozzi. *The Handbook of Mortgage-Backed Securities*. (Chicago: Probus, 1992)).

high rating. Their underwriting standards are of the stringent class because they are unwilling to back an issuance that could jeopardize its rating standing. The high rating of the security, and the thorough analysis by the insurer guarantees the marketability of the security and mitigates credit risk for the investor, regardless of issuer or originator's distress. Bond insurers intermediate risk and allow investors to make simple investment decisions. Investors rely on the expert capabilities of the credit enhancer to analyze the financial soundness of issuers, servicers, trustees and the securities themselves.

3.4.2.3 Money Deposits.

Money deposits act as a reserve fund used to guarantee payment to investors in case of default or delay. The cash deposit is created by the originator with the purpose of performing as a temporary source of liquidity. It is held and managed by the trust who issues the securities. Although it is originator's money, it is not equity invested in the transaction, since all the drawings are considered short-term loans to the Immune Holding ("Patrimonio Autonomo" - PA, see section 2.3). The deposit is maintained throughout the life of the securities, and is recovered by the originator at the end.

3.4.2.4 Fiduciary contracts.

The securitization regulation in Colombia allows the originator to convey other classes of securities to a trust with the purpose of covering any default on the mortgages. The securities that serve as guaranty for the MBS can be securities backed by the government, by the Central Bank, by financial institutions under the supervision of Superintendency of Banks, or other securities registered with the National Registrar of Securities and Intermediaries ("Registro Nacional de Valores e Intermediarios"). The guaranty can be partially released upon amortization of principal and interest of the mortgages. This credit enhancement again represents originator's equity at risk.

3.5 RATING AGENCIES

Rating agencies provide a benchmark for assessing the risks involved with a specific investment. The rating agency closely analyzes the security's structure and the parties involved, to evaluate the risks that can affect overall performance. It evaluates and establishes the amount of loss coverage required based on stress tests that include different risk scenarios of default frequency. Rating agencies analyze the following characteristics of a securitization program:

Securities: Structure of the issuing, underlying pool of assets, and support of the securities is evaluated to determine the credit soundness of the derivatives. It includes calculation of worst-case scenarios, probability of delinquency or losses from the individual mortgages, declines in property values, delinquency history, quality of credit enhancement mechanisms, geographic concentration of the pool, characteristics of loans, seasoning, mechanisms for transferring cash flows, legal transfer of assets from the originator to the trust, rights to dispose of real assets.

Participants: The rating agency analyzes the qualifications and risk profiles of the originator, servicer, trustee and credit enhancer. It also investigates the issuer including financial track record, business diversification, organizational structure, policies and strategies. The rating agency focuses on originator's underwriting analysis, such as controls on loan approvals, documentation required, collection procedures, loan-to-value restrictions, rate setting procedures, and insurance of individual mortgages.

Finally, the Colombian regulation for mortgage securitization requires securities to be rated by a rating agency as a requisite to inscribe the issuing with the National Registrar of Securities and Intermediaries. This requirement can be waived if the issuing is guaranteed by a financial institution under the Superintendency of Bank's supervision, or backed by the government or the Central Bank.

CHAPTER 4

RISK-BASED CAPITAL STANDARDS

As explained throughout this thesis, the Colombian securitization process has been built under the frame of non-government guaranty. The risks of privately securitized residential mortgage pools were analyzed in the preceding chapter. The mandatory requirement of self insurance mechanisms, in which financial institutions take the biggest part of the risk, leads this discussion to consider the appropriate principles that will make the pioneers Savings and Housing Corporations (CAVs) capable of managing securitization without endangering the UPAC system.

The risk-based capital approach implemented by the Basle Agreement in 1988 has also been adopted in Colombia. The agreement requires financial institutions to hold capital directly related with the risk of the assets in their portfolio. It induces financial institutions to abstain of entering into high-risky operations, instead of depending too much on the Financial Institutions Guaranty Fund (“Fondo de Garantías de Instituciones Financieras”) and its deposit insurance program.

In March of 1994, the Colombian government decreed an increase in the minimum capital standard³³. It established a minimum capital to risk-adjusted assets ratio of 9%, increased to 10% in January of 1996. Although this may seem a healthy measure in terms of preventing the failure of the financial institutions, it can rather cause a shift of the portfolio composition to more risky assets. That is, the additional capital burden may harm return on investments, and in turn may force financial institutions to seek more profitable (and riskier) transactions, in order to obtain acceptable returns. With the new alternative of asset securitization, and the possibility for credit institutions to invest in high-yielding

³³ Finance Ministry. *Decree 673 - March 28 of 1994. Capital Adequacy for the Credit Institutions.*

securities such as the subordinated pieces, regulators and supervisors must be alert to the new business plans of the financial institutions.

Having understood the risks involved in the securitization process discussed in the previous chapters, the Colombian government may find this chapter useful when analyzing capital guidelines on the recently approved asset securitization process. This chapter discusses the risk-based capital rules applied in the U.S., and formulates the criteria to analyze mortgage-related securities upon the Basle Agreement. First, it is discussed the Savings and Loans crash in the United States, to illustrate the need of strong supervision and justify the risk-based capital adequacy approach. Second, an explanation of the risk-weighted capital required by the Basle Agreement and the federal government in the U.S is provided, with emphasis on mortgage securitization. Third, a discussion of the criteria used to account for sale of mortgage pools through securities is presented. Finally, an analysis for mortgage backed securities and capital standard is provided.

4.1 THE DEBACLE OF THE THRIFT INDUSTRY IN THE U.S.

Although the 7-billion-dollars UPAC System in Colombia is seen as one of the strongest in Latin America, and it has weathered more than one financial crisis, it is worthwhile to analyze the extreme case of insolvency and failure, to which the regulatory agencies must be ultimately prepared. The extremely expensive crash of the Savings and Loans (S&Ls) in the U.S. is a very good example to review, and learn about how financial institutions can fail. It is worth noting that the failure had nothing to do with asset securitization. The example shows, however, how the lack of appropriate control and prudent policies can lead to the collapse of a system.

Before 1980, interest rates paid by savings associations were limited to below market rates by the Regulation Q. Depositors seeking higher market returns started to withdraw money from S&Ls causing a liquidity problem and disintermediation. To solve

this, the Regulation Q was phased out in the early 1980s, allowing thrifts to offer market interest rates throughout the country. This resulted in a huge growth of deposits, with a large amount gathered by Wall Street firms³⁴ (known as “brokered deposits”).

During the 1980s, the U.S. government intensified its financial sector deregulation strategy to make the system more competitive, and reduce their sensitivity to interest rate pressures. Particularly, the thrift industry (S&Ls) was allowed to originate consumer loans (e.g., credit cards, personal loans, auto loans), and enter into more real estate transactions, some of them very risky. They were allowed to grant permanent financing³⁵ to any type of income-producing property, including hotels, office buildings, industrial warehouses, shopping centers, and other non-residential properties³⁶. At the same time, they could also participate in joint ventures for real estate development. Facing the new more profitable opportunities, and the huge amounts of deposits available, many S&Ls proceeded too aggressively in this business, lowering their underwriting standards. They knew depositors were ultimately protected by the Federal Saving and Loan Insurance Corporation (FSLIC) in case of failure, that had just increased the maximum insured deposit amount, from \$40,000 in 1979 to \$100,000 in 1980. This encouraged S&Ls to take on more risky transactions, without having to pay for a higher risk premium in terms of higher rates of deposits.

Savings and Loans started to hemorrhage in the early 1980s, as a consequence of short-term interest rates (rates on deposits) growing faster than long-term interest rates (rates on loans). The S&Ls were caught in a situation where they paid more for deposits

³⁴ As Lawrence J. White mention: “Thrifts got into trouble because of where and how they invested their funds, not because where and how they gathered those funds”. *The S&L Debacle. Public Policy Lessons for Bank and Thrift Regulation*. (New York: Oxford U. Press, 1991). p.127.

³⁵ In contrast to the Colombian construction sector, commercial properties in the U.S. are constructed by a developer, who holds the property instead of selling it immediately after construction. The property is owned and operated by the developer with a long term horizon. Short-term construction loans are replaced by long term mortgage loans, and the cash flows coming out from the operation of the property (rents, lodging rates, etc.) are used to meet the mortgage payments. Quality of the underlying real estate is of vital importance to guarantee an uninterrupted cash flow that allows the developer to meet the mortgage payments.

³⁶ William B. Brueggeman and Jeffrey D. Fisher, *Real Estate Finance and Investment*. (Boston: Irwin, 1993), p. 671.

than what they received from mortgages, resulting in a total depletion of capital and insolvency. As Stanton³⁷ describes, the failure of Savings and Loans occurred in two steps: loss of capital and gambling for solvency. The government, through the FSLIC, supplied the required capital to take the place of the exhausted shareholder capital. Many thrifts remained in business despite their negative capital according to general accepted accounting principles (GAAP), because new regulatory accounting showed an improved financial situation of the Corporations. The regulator had the dilemma of promoting the industry that supported house financing, while having to supervise it; this made harder to accept failure of thrifts. When no shareholder capital was anymore at stake, S&Ls started gambling to recover solvency. The undercapitalized S&Ls, with nothing to lose and everything to win, took on the new high-risky approved activities. Brealey and Meyers say³⁸:

Stock holders of levered firms gain when business risk increases. Financial managers who act strictly in their shareholders' interest (and against the interest of creditors) will favor risky projects over safe ones. The temptation to play is strongest when the odds of default are high.

By the end of 1983, the interest rate squeeze softened. However, the new opportunities for thrifts lead the industry to grow at rates of 18.6% in 1983, and 19.9% in 1984 (compare with 7.4% in the early 1980s). The favorable tax treatment of real estate created a commercial real estate boom in the Southwest from 1983 to 1985, fueled by thrifts' money. In 1986, two events drove real estate prices down: the elimination by the Congress of many tax benefits of real estate, and the sharply decrease in oil prices causing an economic downturn.

The number of insolvent thrifts increased from 71 (\$14.9 billion in assets) in 1984, to 351 (\$99.1 billion in assets) in 1987. Because payment of claims on insured deposits largely overpassed the FSLIC's reserves, the FSLIC increased deposit insurance premiums, issued long-term callable bonds, and arranged the sale of the remaining assets

³⁷ Thomas H. Stanton. *A State of Risk: Will Government-Sponsored Enterprises Be the Next Financial Crisis?*. (Washington: HarperCollins, 1991).

³⁸ Richard A. Brealey and Steward C. Myers. *Principles of Corporate Finance*. (McGraw Hill, Inc, 1991)

of insolvent institutions. The recapitalization process of the FSLIC was characterized by the government's postponement of its approval, what made the costs even higher. At the present time, there are still diverse estimations of the total clean-up costs of the system. Figures range between **\$300 and \$400 billion dollars**.

The moral is that if financial institutions make high-risk bets to survive under financial distress, not only is the depositor's money at risk, but also the government's. Capital is key to guarantee the long-term shareholder's stake in the business, as well as the prudent management of public money. At the same time, strict supervision is required to protect the interests of the Colombian Financial Institutions Guaranty Fund, who plays the same role of the FSLIC in the U.S. A statement of Lawrence White summarizes the crash:

The thrifts largely failed because an amalgam of deliberately high-risk strategies, poor business judgments, foolish strategies, excessive optimism, and sloppy and careless underwriting, compounded by deteriorating real estate markets³⁹.

4.2 RISK-ADJUSTED CAPITAL STANDARDS

The effort of the Basle Committee on Banking Regulations and Supervisory Practices comprised by the central banking authorities of 12 countries (Western Europe, Japan, and the U.S.), resulted in the *Basle Agreement of 1988*. It established internationally consistent practices for capital requirements of the banking industry, under which financial institutions are required to maintain an adequate capital as a cushion for loss absorption, based on the perceived risk of on- and off-balance sheet assets. The Basle Agreement expanded the previous work of the U.S. and the U.K.⁴⁰ on risk-based capital adequacy. In 1989, the U.S. banking regulators adopted the final risk-based capital

³⁹ Lawrence J. White. *The S&L Debacle. Public Policy Lessons for Bank and Thrift Regulation*. (New York: Oxford U. Press, 1991). p.117.

⁴⁰ In 1986, the U.S. Federal banking agencies proposed the adoption of risk-based capital rules that distinguished risks between assets and off-balance sheet items (51 Federal Register 10602 - 1986). In 1987, a coordinated effort of U.S. and U.K.'s supervisory authorities resulted in new risk-based capital rules (52 Fed. Reg. 23045 - 1987).

guidelines based on the Basle Agreement. These guidelines included mortgage-backed securities, a topic that was not discussed in Basle.

The Financial Institutions Reform, Recovery and Enforcement Act of 1989 -- FIRREA -- placed restrictions on thrifts, and the Federal Reserve Board, the Federal Deposit Insurance Corporation and the Office of the Comptroller of the Currency issued specific guidelines for banks⁴¹. They established strict capital requirements, as to risk-based capital and minimum amount of capital. The Colombian government also adopted the Basle approach, and elaborated unified regulations for all the financial institutions under the supervision of the Superintendency of Banks.

This section explains the basic procedure used to determine capital required against risk-weighted assets. The different components of capital required in Colombia are discussed, as well as the criteria to assign credit risk weights to the financial institution's assets. Later in this chapter (Section 4.4), capital required against mortgage-related securities is analyzed.

4.2.1 Qualifying Regulatory Capital.

Risk-adjusted capital standards require depository institutions to maintain a minimum ratio of capital to risk weighted-assets. The Colombian regulations on capital adequacy⁴² follow the substance of the Basle Agreement, but requires a higher overall capital against risk-weighted assets. As mentioned before, Colombian financial institutions are required to set aside an amount of capital equal to 9 percent of risk-adjusted assets, percentage that will be increased to 10 percent in 1996. This figure compares with the 8 percent established by Basle, and required in the U.S. This regulatory capital must be composed of two main portions: core capital and supplementary capital. The Colombian regulations define, as Basle suggests, each component as follows:

⁴¹ 54. Fed. Reg. 46845 - 1989

⁴² Finance Ministry. *Decree 673 - March 28 of 1994*, and, Superintendency of Colombian Banks. *Statement No. 041 - May 27 of 1994*.

Core capital (“*Patrimonio Básico*”). It includes, among other minor accounts, issued and fully paid ordinary shares and common stock, reserves, capital appreciation⁴³, and retained earnings. Accumulated inflation adjustment for non-monetary assets is subtracted from the core capital. The components of this tier can directly absorb losses; therefore it counts at a 100 percent for regulatory capital.

Supplementary capital (“*Patrimonio Adicional*”). The Supplementary capital is considered a less stable protection against losses; therefore only a portion is allowed to add for regulatory capital. For instance, just 50 percent of the inflation adjustment for non-monetary assets, and 50 percent of the revaluation of investments and properties to reflect current values are added to meet the regulatory capital. It also includes the total amount of provisions and loan loss reserves, that do not represent an *identified* reduction in value or deterioration of a particular asset. Mandatory convertible debt is also part of supplementary capital. The supplementary capital cannot exceed the core capital amount.

The Colombian standards do not mention any minimum amount of core capital against risk-weighted assets, as Basle does. Basle requires financial institutions to hold at least 50% of the bank’s capital base in its core capital component⁴⁴. The Colombian regulator should incorporate a minimum ratio of capital to non-weighted assets, as an additional leverage requirement.

4.2.2 Risk-Weighting System

The second step to calculate the required capital of a financial institution consist in assigning a risk weight to each asset. Basle suggests five different categories in order to classify assets by risk: 0, 10, 20, 50 and 100 percent. Each asset is assigned to one of these categories, receiving a weight that depends on its perceived credit risk. Finally, the sum of all risk-weighted assets is multiplied by the minimum ratio of capital (i.e. 9% in Colombia) to obtain the amount of capital required against assets.

⁴³ Inflation Adjustment made to the capital account.

⁴⁴ Committee on Banking Regulations and Supervisory Practices. *The Basle Agreement on Risk-Based Capital*. (July 1988.) Paragraph 14.

For instance, cash and assets backed by the full faith and credit of the government, or guaranteed by the Central Bank are considered to have no credit risk, therefore, they receive a 0% weight when computing for capital requirements (no capital is required against cash). Assets with higher, but moderate, credit risk such as residential mortgage loans (relatively low record of loss) receive a risk-weight of 50%, while other commercial loans are assigned a 100% risk-weight.

The Basle Agreement also considered importantly to require additional capital in order to support off-balance sheet activities. The transactions are first converted to on-balance sheet equivalents by multiplying the principal amount by a “*Credit Conversion Factor*”. The conversion factor ranges between 0 percent (no capital required against the transaction), and 100 percent (capital required against the entire transaction) depending on the risk of the contingency. The credit-equivalent amount is then multiplied by the risk weight that would be applicable depending on the underlying collateral, or the obligor. The resulting amount is added to the risk-weighted, on-balance sheet assets, against which it is applied the minimum capital required. Appendix B shows an example of the capital requirements calculation, using the consolidated balance sheets of the UPAC System in Colombia.

It is important to mention that the Basle Agreement of 1988 made emphasis only on *credit risk*, but recognized that other risks such as interest rate, market, investment, exchange rate, and concentration risk should be also addressed. In April of 1993, the Basle Committee proposed a new framework to measure risk exposure of financial institutions to *interest rate risk*. In addition, in September of 1993, the Federal Reserve Board issued new capital guidelines to include interest rate risk and market risks. The interested reader is remitted to the Appendix C for a summary of the Federal Reserve’s proposed approach to measure interest rate exposure of financial institutions.

4.3 OFF-BALANCE SHEET TREATMENT.

Chapter 3 mentioned that securitization could benefit the originator if the mortgage assets were taken off the balance sheet. Assets are usually transferred to a special purpose vehicle (i.e. trust), in order to securitize the pool of mortgages and sell the resulting securities to investors. However, the transaction can be treated either as a sale or as a liability, depending on the originator's stake in the deal. If the transaction is treated as a sale, which is the aim of the securitization for its purpose of shifting credit risk to the investor, the mortgages are not any more part of the originator's assets, nor are the related securities considered liabilities. On the other hand, if the deal is not considered a sale, the assets remain in the balance sheet, and capital is required to support the entire transaction. The proceeds are then recorded as liabilities, what is known as "collateralized financing arrangement". On this account, the amount of capital required against the transaction depends on the structure of the mortgage-backed securities issuing. This section discusses the U.S. regulation with regard to accounting treatment for mortgage sales, a major issue to consider when assessing the originator's effective shifting of credit risk, and determining the amount of capital under risk-based capital guidelines.

For bank holding companies and their nonbank affiliates, or for other nonbank entities publishing audited financial statements, the accounting treatment is established by GAAP (General Accepted Accounting Principles). Sale treatment is obtained by the transferor of the securities (originator or issuer), if he does not hold *any* direct or indirect *recourse*. Recourse is referred to as:

The right of a transferee [who receives the assets - investor] to receive payment from the transferor [who delivers the assets - originator or issuer] of those receivables for (a) failure of the debtors to pay when due, (b) the effects of prepayments, or (c) adjustments resulting from defects in the eligibility of the transferred receivables⁴⁵.

⁴⁵ Financial Accounting Standard Board - FASB. *Statement of Financial Accounting Standards No. 77. Reporting by Transferors for transfers of Receivables with Recourse.*

If the transaction involves some recourse, GAAP⁴⁶ allows the originator to treat the transfer as a sale of assets, though. This is possible *only* if the following conditions are met:

(a) *Pass-Throughs and CMOs*: If the originator surrenders control of the probable future economic benefits (or losses) implied in the pool of mortgages transferred, that is, if he loses his rights on the future economic benefits, or he relinquishes to control those benefits⁴⁷. Maintaining servicing does not preclude the transaction to be considered as a sale. Control is not transferred, for example, if the originator has the option to repurchase the loans at a later date, or to negotiate new favorable terms of the transfer. In addition, control is not transferred if the originator is entitled to receive or pay cash, assuming any future variation on interest rates. In those cases the originator controls the future economic benefits of the pool, and basically plays the role of a common borrower (treated as liability). The originator, instead of selling the assets, would be borrowing money from the investors in the securities, and collateralizing the loan with the mortgages. In this case, the well-being of the “lender” (investor in the securities acting as a lender) is unmodified regardless of the source of payment: the originator who assumed default losses, or the mortgage borrower who met the payment. The key question is whose money is at stake after securitizing the pool, and which are each party’s rights and obligations resulting from the transaction, particularly who owns the future economic benefits.

(b) *Pass-Throughs and CMOs*: If the originator or the issuer is not obligated to repurchase any mortgage loan from the buyer (investor), except pursuant to the recourse provisions, that may permit the originator to buy-back the securities in order to keep its management from becoming unreasonable (“Clean-up” provision). Transfer of legal ownership of the loans is jeopardized by any covenant

⁴⁶ FASB No.77 for pass-throughs, and FASB Technical Bulletin 85-2 for CMOs.

⁴⁷ Financial Accounting Standard Board - FASB. *Statement of Financial Accounting Standards No. 77. Reporting by Transferors for transfers of Receivables with Recourse*. Appendix C, paragraph 25.

that obligates the originator to repurchase the loans, resulting in substantial uncertainty for the originator (or issuer) about disposition of the receivables. In the case of CMOs, if the originator has the option to call the bonds before maturity, the transaction is not considered a sale⁴⁸, because the originator (or issuer) makes uncertain the timing of the payments to the investor.

(c) *Pass-Throughs*: If the recourse can be reasonably estimated. The originator's obligations with the investors in the securities, the collectibility of the loans, and the costs associated with the collection and repossession must be easily assessed based upon historical data on the mortgages sold, or on mortgages of similar characteristics⁴⁹. In other words, the retention of measurable risk by the originator does not impede him to treat the transaction as a sale, though.

CMOs: Collateralized Mortgage Obligations are considered borrowings, and generally are reported as liabilities unless all economic benefits are passed to the investor. It means, that if the originator (as an affiliate of the issuer) retains a partial ownership interest in the MBS, such as subordinated classes, the transaction is recorded as liability. It also means that if there is any residual interest, such as overcollateral or other reinvestment proceeds that revert to the issuer or to the originator, the transaction is not considered a sale⁵⁰. In addition, sale treatment is precluded if an affiliate of the issuer is secondarily obligated to repay principal and interest on the obligation; the investor can only claim on the issuer's assets (Immune Holding or "Patrimonio Autónomo"), or on any other guarantor's, but not on the originator's.

If the conditions above explained are met, and the transaction is recorded as sale, the estimated amount of losses under the recourse provision are recorded as liability on

⁴⁸ Financial Accounting Standard Board. *FASB Technical Bulletin No. 85-2. Accounting for Collateralized Mortgage Obligations (CMOs)*. Paragraph 2(b)(2). November, 1985.

⁴⁹ Frank J. Fabozzi. *Handbook of Mortgage Backed Securities*. (Chicago: Probus Publishing Company, 1992). p. 141.

⁵⁰ Financial Accounting Standard Board. *FASB Technical Bulletin No. 85-2. Accounting for Collateralized Mortgage Obligations (CMOs)*. Paragraph 2(a)(2). November, 1985.

the seller's balance sheet. This recourse liability is adjusted periodically to reflect any change in the estimated loss⁵¹.

Accordingly, commercial banks are also allowed to report transfer of loans, different from residential mortgage-backed securities, as sales of assets if the entity holds *no* risk of loss, *and* has no obligation to any party for the payment of principal or interest on the assets transferred resulting from any cause⁵². A minimum retention of risk, even if it is reasonably estimated, causes the holding of the assets in the bank's balance sheet, and the recording of the transaction as a liability. This risk retention can be direct (specific recourse provision), or indirect (retention of subordinated class securities, or overcollateral).

For residential mortgage-backed securities, the requirements for banks are more flexible, in order to sponsor the secondary mortgage market. Disposal of mortgage loan pools to any government, or government-sponsored agencies are recorded as a sale, regardless of the risk retention. In the case of privately issued MBS, the institution must report a sale only if the retained risk (direct or indirect) is *equal or lower* to the probable loss. A contractual exposure to a higher loss amount (which is almost always the case in senior/subordinated securities) implies the retention of the entire credit risk, thus the retention of the assets in the balance sheet, and the provision of capital against the entire transaction.

In 1986, the U.S. Congress created the *Real Estate Mortgage Investment Conduit - REMIC*⁵³, a tax status that could be selected by issuers of MBS avoiding double taxation⁵⁴. The REMIC status allows the issuer to create multiple-class pass-

⁵¹ Thomas R. Boemio, and Gerald A. Edwards, Jr. "Asset Securitization: A supervisory Perspective." *Federal Reserve Bulletin* (October 1989), p.665.

⁵² Reports of Condition and Income, The Call Report. (instructions for commercial banks).

⁵³ U.S. Congress. Public Law 99-514. *Tax Reform Act of 1986*. (October 22, 1986). Part IV Real Estate Mortgage Investment Conduits.

⁵⁴ The REMIC reports interest received from mortgage loans, deducting interest paid to investors in the securities. Any net income or loss resulting is passed-through to the holders of residual interests as

through securities with varying maturities analogous to the CMOs, without satisfying the FASB's conditions explained before. The issuer is able to take the assets off the balance sheet, if he elects to recognize the sale of assets immediately. If he does not want to recognize a gain or loss in the sale, he is obligated to hold the residual interest owned in the REMIC as assets. This off-balance sheet treatment was allowed before only if the issuer did not retain any interest in the MBS, as explained before.

The issuer must follow certain rules in order to maintain his REMIC status. The rules basically require the entity to maintain separate records of the pool and management of funds, and define the type of investments and assets that the entity can hold. Generally, assets must be composed of qualified mortgages⁵⁵ secured by a real estate interest, foreclosure property, cash flow investments for a temporary period before distribution to holders of interests, and a qualified reserve fund (longer term investments) as added insurance to investors against default. The REMIC is a flexible entity that facilitated the issuing of more attractive securities, for a wider range of investors.

4.4 MORTGAGE-BACKED SECURITIES AND CAPITAL STANDARDS.

The capital adequacy guidelines resulting from the Basle Agreement did not include mortgage-backed securities. This topic was addressed by the Federal Reserve Board in its final regulations adopted in January of 1989⁵⁶. The Colombian regulator will have to address this point with the recent approval of asset securitization. This section describes the main criteria used by the U.S. government in analyzing mortgage related securities under the risk-based capital approach, with emphasis on privately labeled securitization. The regulations differentiate treatment for private issuers, government-sponsored entities (FNMA and FHLMC), and government entities (GNMA). Each group

ordinary income or loss. Investors in CMOs pay taxes only on interest received. William B. Brueggeman and Jeffrey D. Fisher, *Real Estate Finance and Investment*. (Boston: Irwin, 1993), p. 790-792.

⁵⁵ Qualified mortgages is a broad category that includes first mortgages, participations, other pass-through securities.

⁵⁶ "Capital; Risk-Based Capital Guidelines". *Federal Register* 54, (Final Regulations, January 27, 1989): 4168-4184.

has its own regulator and supervisor, that has issued individual capital requirements to which issuers must comply. This section extracts the basic criteria used for the private issuers, including thrifts (savings associations), banks, and bank holding companies.

4.4.1 Criteria for Risk Weights.

Privately issued securities are considered indirect holdings of the underlying assets. As such, perceived risk depends on the underlying collateral and not on the credit quality of the issuer, as is the case of government guaranteed securities. Looking through the issuer, and analyzing the underlying collateral is in fairness to issuers that securitize less risky assets. The mortgage-backed securities will receive the same weight assigned to the highest risk-weighted asset in the pool, only if certain conditions are met. Otherwise, the securities are assigned a 100% risk weight, unless the supervisor authorizes the holder to assign the portfolio proportionately to the various risk categories⁵⁷. The following conditions are required⁵⁸:

- (a) The underlying assets must be held by an independent trustee, and the trustee has a first priority on behalf of the security holders.
- (b) The holder must have an undivided pro rata ownership interest in the mortgage pool, or the trust (entity that serves as a conduit for the issuing) has liabilities only related to the issued securities.
- (c) The cash flows passed- or paid-through to investors are met without depending on reinvestment income. Furthermore, there is no reinvestment risk of funds waiting to be distributed to investors in the securities.

Giving the security the same risk weight of the underlying collateral is a conservative position, since the security improves the cash flows coming out of the pool, due to the credit enhancements provided, at least for the senior securities or well-

⁵⁷ Office of Thrift Supervision. U.S. Department of Treasury. *12 Code of Federal Regulations. Banks and Banking*. § 567.6 *Risk-Based Capital Credit Risk Weight Categories*. (Washington: Office of the Federal Register National Archives and Records Administration, 1995). p.373.

⁵⁸ "Capital; Risk-Based Capital Guidelines". *Federal Register* 54, (Final Regulations, January 27, 1989): 4181, 4186, 4202, 4214.

protected bonds. On the other hand, it may also overlook the risks involved in the different classes of MBS, not only because of the dissimilar investor's rights on the underlying asset depending on the security's structure, but also because of the payment structures that make some securities more risky than others. As Bhala⁵⁹ suggests, only in the pass-through structure the investor owns the underlying assets, as opposed to pay-through bonds or mortgage-backed bonds, which represent the issuer's indebtedness. In the latter cases, if the trust goes bankrupt, bondholders are considered as debtors of the trust, thus they do not have control over the assets, as opposed to the ownership rights of the pass-through securities holders. From the point of view of ownership, pass-throughs are preferable. Nevertheless, the U.S. regulation does not make any risk differentiation for treatment of these three main structure classes.

Collateralized Mortgage Obligations (CMOs) receive a special treatment according with the U.S. regulations. Securities receive an undifferentiated 20% weight if they are collateralized by, or represent an indirect ownership in a pool backed by a government agency, or government-sponsored agencies, or if they are privately issued but guaranteed by one of the government agencies. If it is not backed by the government, then the risk weight depends on the underlying collateral as explained before. For instance, CMOs collateralized by residential mortgages receive a 50% risk weight.

Extremely interest rate sensitive securities such as *Interest Only (IOs) and Principal Only (POs)*⁶⁰, known as "Stripped" MBS, are assigned a 100% risk weight, regardless of the guarantor. The U.S. regulator considers that what matters here is interest rate risk and not credit risk. However, it leaves to the bank examiner the task of evaluating if the financial institution is using these instruments as a way to hedge against interest rate

⁵⁹ Raj Bhala. *Perspectives on Risk-Based Capital. A guide to the New Risk-Based Capital Adequacy Rules.* (Illinois: Bank Administration Institute, Rolling Meadows. 1989). p. 93.

⁶⁰ Mortgage backed securities that receive only the principal payments of the underlying mortgage pool (POs), or the interest payments coming out of the pool (IOs). POs increase in value when prepayments increase (due to decreasing interest rates), because investors recover their principal sooner. IOs decrease in value with decreasing interest rates, because prepayments increase, thus maturity shortens, and interest payments become lower

exposure. The regulator does not intend to discourage their use, but rather recognizes their advantages if prudently utilized⁶¹. Accordingly, high risk securities, such as *subordinated classes* that absorb more than their pro rata share of losses, or *residual classes*, that represent claims on excess cash flows of CMOs or other MBS after the payments to holders of other classes and all administrative costs have been met, are assigned a 100% risk-weight.

Exhibit 4.2 summarizes the risk factors to be applied to mortgages and mortgage related securities of different perceived credit risks in the U.S.

EXHIBIT 4.2 Risk-Based Capital Standards: Risk Weights for Assets.

	BANKS	THRIFTS
Minimum ratio of Capital to risk-weighted assets	8%	8%
Cash	0%	0%
Government Securities	0%	0%
MORTGAGE LOANS		
FHA-insured & VA-guaranteed	20%	20%
Qualifying mortgage loans 1-4 family homes, secured by first liens less than 90 days delinquent.	50% if conservatively valued	50% if original LTV<80% or insured by private mortgage insurance
Qualifying multifamily mortgage loans	100%	50%
Delinquent loans (1 - 4 family) >90 days due	100%	100%
Delinquent Loans (multifamily) >90 days due	100%	200%. Assets of uncertain value.
Nonresidential construction loans	100%	100%
Non-qualifying residential loans, consumer, construction, and commercial loans.	100%	100%
MORTGAGE-BACKED SECURITIES		
Securities unconditionally guaranteed by the U.S. Government agency (Ginnie Mae) **	0%	0%
Securities issued by Government-sponsored agencies (Fannie Mae & Freddie Mac) **	20%	20%
High-quality MBS, senior classes of CMOs, and other securities collateralized by securities issued or guaranteed by a U.S. government or government-sponsored agency.	20%	20%

⁶¹ 54 Fed. Reg. p. 4186, 4192.

Privately issued (Non-agency) securities such as Pass-throughs, and CMOs that are assigned to one of the two highest rating categories (investment grade), and that meet the conditions explained in section 4.4 (second paragraph).	Treated as indirect holding of assets. They are Assigned 20, 50 or 100% based upon the highest risk-weight that would be assigned to the assets of the pool. Proportionate allocation to risk-weight classes, is accepted.	Same as Banks. 0% is reserved for <i>direct</i> claims on the government.
Non-High-Quality MBS backed by, or representing an interest in qualifying mortgage loans ⁶² , that receive timely payment of principal and interest.	50%	50%
Other MBS backed by non-qualifying loans	100%	100%
<u>Subordinated</u> class of MBS that can absorb more than their pro rata share of the principal loss without the whole issue being in default.	100%	100%
<u>Stripped</u> securities (Interest only - IOs, and Principal Only - POs)	100% because of high interest rate volatility	100%
<u>Residual</u> classes of CMOs regardless of issuer or guarantor.	100%	100%

OFF-BALANCE SHEET ITEMS	<u>Conversion F./Risk Weight</u>	<u>Conv. F./Risk Weight</u>
Unused home equity loan lines	50% / 100%	50% / 100%
Standby Letters of Credit		
Performance conveyed to others	50% / 20%	
Financial conveyed to others	100% / 20%	
Performance (Transaction-related contingencies)	50% / 100%	
Financial guarantee (direct credit substitute)	100% / 100%	
Assets sold with <u>Recourse</u>	100% / 100%	Same as banks.
	Treated as financing. Capital required against entire transaction.	

** It is not applicable to Colombia.

SOURCES: 54 Federal Register, Vol. 54, No. 17, *Risk-Based Capital Guidelines*, January 27 of 1989. William B. Brueggeman, and Jeffrey D. Fisher, *Real Estate Finance and Investments*, (Boston: Irwin, 1993) p. 675. Lawrence R. Cordell, and Kathleen Kuester King. *A Market Evaluation of the Risk-Based Capital Standards for the U.S. Financial System*, (Washington, 1992).

4.4.2 Supervisory Policies for Investment in MBS.

The Colombian supervisor of financial institutions will have to set forth criteria to assess the suitability of investments in mortgage-backed securities. The basic concepts

⁶² Qualified loans are those originated following FHA or VA's underwriting criteria. See section 4.4.2 for a definition of "non-high-risk" securities.

applied in the U.S. are explained in this final section. The Federal Financial Institutions Examination Council - FFIEC adopted in 1991 a policy statement on mortgage derivative products⁶³ such as CMOs, REMICs, Residuals, and Stripped MBS. As discussed in Chapter 3, these mortgage-related securities offer more risk and price volatility than simple pass-throughs, therefore must be managed in a safe and sound manner. The statement classifies derivatives as “high-risk” and “non-high-risk” securities. High-risk securities can only be used as a strategy for reduce institution’s overall interest rate risk (hedging), otherwise they will be considered as unsuitable investment practice. The involvement in these risky activities must be related with additional capital, capacity to absorb losses, and level of in-house management sophistication and expertise, and control procedures⁶⁴.

In accordance to the FFIEC, any derivative that shows a higher volatility than a standard thirty-year mortgage-backed pass-through security is deemed to be a “high-risk” security. In addition, three tests are applied to the mortgage product to determine if it is a “high-risk” security. If the security does not meet one of the tests, it is considered “non-high-risk”. The tests are:

- (a) Average Life Test: Expected average life is greater than 10 years.
- (b) Average Life Sensitivity Test: Expected average life extends by more than 4 years assuming a parallel increase of 300 basis points in the yield curve, or shortens by more than 6 years assuming a decrease of 300 BP in the yield curve.
- (c) Price Sensitivity Test: Under the same prepayment assumptions (must be reasonable) used for the preceding tests, the estimated change in the price is more than 17% when the yield curve shifts upwards or downwards in 300 BP.

⁶³ Federal Financial Institutions Examination Council. *Supervisory Policy Statement on Securities Activities*. (December 2, 1991). (The FFIEC includes the Board of Governors of the Federal Reserve System - FRB, the Federal Deposit Insurance Corporation - FDIC, the National Credit Union Administration - NCUA, the Comptroller of the Currency - OCC, and the Office of Thrift Supervision - OTS).

⁶⁴ Federal Financial Institutions Examination Council. *Supervisory Policy Statement on Securities Activities*. (December 2, 1991). p. 60.

Financial institutions investing in high-risk securities must keep record of its own analysis of the security before the purchase. They have to establish clear investment policies, limits on the purchases, accountability of the purchase, information systems, procedures for periodic evaluation, and internal controls.

CHAPTER 5

CONCLUSIONS

By this time, the reader must be aware that mortgage securitization in Colombia not only involves benefits for the participants, but also brings about huge risks for the financial institutions entering into this new funding source. The perspective analyzed in this thesis is that of a supervisor, who must understand the perils for the financial institutions, and the ultimate risks for the deposit insurance system, specifically the Colombian Financial Institutions Guaranty Fund (“Fondo de Garantías de Instituciones Financieras”). The Fund’s resources, mainly represented by the deposit insurance premiums paid by the financial institutions⁶⁵, are used to support troubled institutions in their recapitalization, and are ultimately utilized to pay depositors in the case of the institution’s bankruptcy. The extent to which the Fund is required to meet other’s obligations is determined by the probability of the financial institution’s failure. From this point of view, the greater the capital requirement for financial institutions, the lower the probability of using the Fund’s money. The risk-based capital adequacy approach properly fulfills this demand, requiring financial institutions to set aside more capital against more risky transactions. Capital is important because it is stock holder’s wealth what provides a cushion against downside losses under adverse conditions, before depositors start losing money, or the Guaranty Fund has to rush into the institution to support its collapse. At the same time, risk-based capital encourages financial institutions to reduce risky practices, what results in a lower return on equity for shareholders.

5.1 THE PROBLEM

As mentioned in Chapter 4, the recent increase of the overall capital required against risk-weighted assets⁶⁶ for Colombian financial institutions is a two-edge sword.

⁶⁵ The premium cannot exceed 0.3% of the institution’s liabilities with the public.

⁶⁶ Capital currently must be 9% of risk-weighted assets, and increased to 10% after January of 1996.

From one viewpoint (the guarantor's), it creates a greater buffer against which losses can be applied in case of failure. On the other hand, if the portfolio composition of the credit institution remains unchanged, and earnings are constant, the return on stock holder's equity will decrease because of higher capital required to support the same level of operations. This suggests that management is encouraged to shift the portfolio composition from low-risky to high-risky assets, in order to generate high enough returns for share holders, even though new assets require more capital. Along these lines, the deregulation process of the Colombian financial sector described in Chapter 2, extended the field of operations for supervised institutions, and generated a higher competition for funds between the participants. This will contribute even more to reduce margins, and to encourage institutions to seek more profitable transactions. Since savings institutions fund their operation with deposits, and the general public is usually not aware of increases in risk, as would be the capital markets if the entity had to issue corporate debt, the institutions can take more risk without hurting the level or cost of deposits.

The securitization process was allowed to emerge under risky conditions for the financial institutions. The fact that the originator of mortgage-backed securities had to retain the risky portion of the deal, either providing overcollateralization with its own equity, or retaining the subordinated class of the issuing, or arranging a reserve fund to reduce uncertainty of timely payments, left the financial institution with a higher risk exposure. The securitization regulation provided for the originator's retention of a riskier portfolio, instead of the risk shifting to the investor or a third party. The risk-weighted capital approach measures, to some extent, this riskier condition of the assets, but it should not be the only remedy. Later on this chapter, supervisory policy recommendations will be formulated.

As explained in previous chapters, the Colombian regulator has just allowed (Resolution 400, May 22 1995) financial institutions to sell the subordinated class securities, initially held by the originator. This action, although plausible to the extent that the financial institution does not support all the credit risk involved, may not solve the

problem at all. First, the market for this kind of securities is very thin (at least, it is expected to be); no other past experience has been seen that would give investors reliance on the performance of the securities. Second, the presence of other types of credit enhancement provided by the originator, such as overcollateralization, leaves the institution in a deeper trouble because the overcollateral is a position below the subordinated class. This enhances investor's comfort in the securities. Holders of subordinated class securities have priority over the credit institution's equity position. The "residual" interest in the issuing (overcollateral), is the most volatile part of all the structure, that bears almost all the credit risk.

In Addition, the sale of these securities may imply the recognition of a huge loss for the financial institution that booked its investment far away from the real market price. Since the market was (and is) very immature at the time of sale, and these kind of securities were not being offered in a big enough amount that ensured the appropriate market price, there was no reference price that could be used to record in books the value of the investment. Selling the senior securities was relatively simple because of the high level of credit enhancement offered, which has made the investment decision easy. However, selling the junior (subordinated) securities, or "residual" interest (if allowed in the future) will not be as simple. Investors may require a higher premium that represents better their risk perception. The probability that the investor's price is equal to the price assumed and recorded by the financial institution, with the absence of an active secondary market, is unlikely. This may discourage financial institutions to sell the securities, resulting in the retention of credit risk.

The mortgage securitization process will contribute to the development of the Colombian capital markets, and to the sustained growth of the UPAC system, only if it is carefully managed by supervisory agencies and financial institutions. Savings and Housing Corporations (CAVs) are not anymore restricted to lending activities, the business in which they have mastered for more than two decades. Now they have the possibility to access the capital markets as a funding source, by means of financial products that, not

only are new for them, but also are new for sophisticated investors. Furthermore, CAVs do not have the same experience and capabilities to handle high-risk securities as specialized investors do. Securitization definitely represents new opportunities, but also it represents new risks, actually untested in the Colombian market. The financial institution's ability to manage the new portfolio of investments must be a matter of concern for the supervisor.

5.2 THE RECOMMENDATION

This thesis may serve as a basis for the Colombian regulator and supervisor to re-assess the impact of the securitization process on the financial strength, performance and risk of credit institutions, and does not pretend to be exhaustive upon the solutions to the problem. It aims to be an analytical foundation to the ongoing debate on securitization and capital regulations, and also a warning for the regulator on the potential risks, without pretending to be a "joy-killer". Two main courses of action are suggested: control and capital adequacy guidelines.

The stringent and effective *supervision* of credit institutions' operations is mandatory. Asset securitization, as an effective and relatively effortless tool to raise funds - considering the Pesos volume of one operation -- is an attractive opportunity for credit institutions. The effect of a massive interest in the process may generate the lessening of the underwriting criteria for mortgage loans, in order to gain market share. Rigorous standards on loan origination must be enforced to bring into being high quality securities. Mortgage loans to be securitized must be more rigorously analyzed than any other loan. The supervisor must develop an adequate control system to guarantee the prudent activities of depository institutions related to securitization. Along these lines, financial institutions entering into securitization processes must justify and logically integrate the new business within their strategic objectives. They have to demonstrate first, that appropriate procedures are in place for the protection of the investor, and for their own safety. Control measures, such as reporting, monitoring, management information

systems, accountability for the operations, limits of positions in MBS, and any other mechanism to handle problems are to be required. The supervisor has to request appropriate disclosure of information, not only to the investor, but also to the supervisor and to the credit enhancer (if it is an independent entity).

Regulations on mortgage-backed securities must also include investment policies for financial institutions playing the role of investors, as to setting limits on high-risky investments. High concentrations of risky classes of MBS must be considered as an unsuitable practice. Prudent investment in high yielding securities such as subordinated securities, or residuals, require an extensive credit analysis and understanding of the economy, to identify the sources of credit and legal risk. The investor must prove its ability to manage credit and interest rate risks, and should report to the supervisor periodic revisions of its positions on MBS, to account for market changes.

The second course of action is related with *capital requirements*. Before the goal of effectively shifting credit risk to the investor is accomplished by a re-assessment of the securitization structure allowed in Colombia, the supervisor of financial institutions has to include asset-backed securities in the risk-based capital framework. Capital requirements against off-balance sheet transactions and investments in mortgage-backed securities might reduce the economic advantages of securitization, forcing the financial institutions to study carefully the convenience of this transaction. The criteria to observe when assigning risk weights to different classes of MBS were discussed in Section 4.4. The important point here is to recognize that, regardless of the off-balance sheet treatment of transfers to trusts in Colombia (“encargos fiduciarios”), and the 0% conversion factor for these transfers⁶⁷, the financial institution may be bearing recourse back against which capital must be set aside. This depends on whether the assets have been really sold, or not, to the investors, and if the credit risk has been shifted to them. If the originator holds loss-absorbing

⁶⁷ A 0% conversion factor for transfers to trusts (“encargos fiduciarios”) implies that the off-balance sheet transaction is not computed for risk-based capital requirements.

positions for amounts higher than the probable loss, such as retention of the subordinated class, and provision of overcollateral, he must support the entire transaction with capital⁶⁸.

The Colombian regulation for risk-based capital only takes into account certain transaction-related, off-balance sheet contingent items, such as endorsements, warranties, and standby letters of credit. All of them are converted to on-balance credit equivalents at 50%, as Basle requires. However, Basle also requires a 100% conversion factor for direct credit substitutes, such as general guarantees of indebtedness (standby letters of credit serving as financial guarantees - credit enhancements - for loans and securities) and acceptances⁶⁹. The Colombian regulator should differentiate between types of guaranties, because of the possible use of these external credit enhancements. The credit enhancer must set aside capital against the entire guaranty.

The basic principle is that mortgage securitization should not create riskier institutions. Unfortunately, the actions towards obtaining this goal may discourage financial institutions to enter into this business. The Colombian government has to keep in mind that securitization, by itself, does push toward economic development, and growth of the financial sector. Not only the capital markets will benefit, but also the housing sector will be improved with the redirection of institutional investor's resources to the production sector. The possibility of creating a government institution that offers partial credit guaranties for mortgage-backed securities should not be discarded. It may contribute to the **sounder, safer and speedier** development of a secondary mortgage market.

⁶⁸ Basle suggests that asset sales with recourse, where the credit risk remains with the bank, must be converted to on-balance sheet equivalent by a 100% factor. Committee on Banking Regulations and Supervisory Practices. *The Basle Agreement on Risk-Based Capital*. (July 1988.) Annex 3, Item 4.

⁶⁹ Committee on Banking Regulations and Supervisory Practices. *The Basle Agreement on Risk-Based Capital*. (July 1988.) Annex 3, Item 1.

5.3 THE FUTURE

The increase in the capital requirement for Colombian financial institutions will impose an additional burden to the lending industry that will make institution's growth more difficult. Financial institutions will face in the near future three different alternatives to comply with the higher capital requirements. First, they may have to raise equity, which in turns dilutes ownership. Second, they may have to generate higher profits to accumulate enough capital and comply with the greater standard, an alternative that under the ever increasing competition for funds, may be hard enough without increasing risk exposure. Third, they may have to reduce the size of their balance sheets, for example by means of securitization, provided that the sale of assets will not compel additional capital. This last alternative is feasible only if the securitization process effectively reduces their risk exposure, spreading the risks among investors and other third parties. This, in turn, coincides with the prudent supervisor's desire of guaranteeing the soundness of the financial system.

The mortgage business will head credit institutions towards servicing instead of risk-taking activities. The latter will be taken by more specialized and knowledgeable institutions, whose risk preferences are higher. The "unbundling" of the mortgage industry will create new business opportunities for servicers, originators, conduits, and mortgage insurance. In the absence of a government initiative upon credit insurance, the emergence of private mortgage insurance might be the solution. Insurance companies are professional risk-takers, that can diversify their portfolio with mortgage pool insurance. In any event, strict underwriting standards, risk concentration controls, and thorough understanding of the real estate market, will be required by the guarantor of mortgage-backed securities programs.

In the course of this thesis, the U.S. system has been compared and contrasted with Colombia's, with the purpose of enabling the Colombian regulator to anticipate certain obstacles for the healthy development of the financial system. Only time and experience will bring the knowledge required to regulate investments in mortgage-related

securities. I have attempted to speed this process taking the U.S. market as an example, and extracting the main criteria that might be useful in the regulatory process.

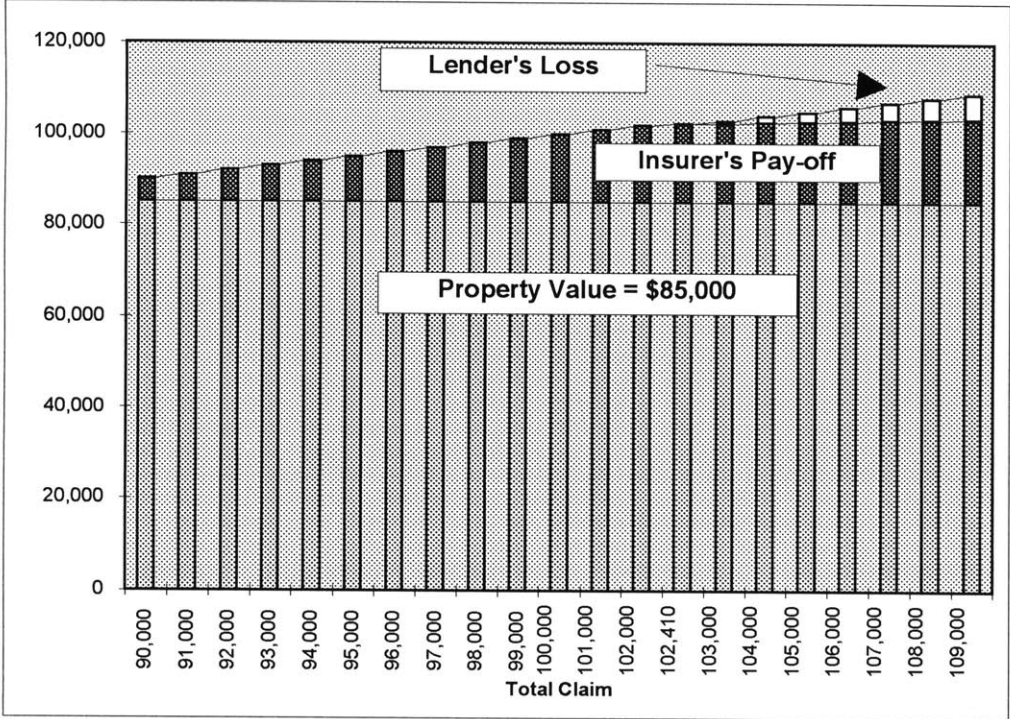
Appendix A - Example of Mortgage Insurance

CALCULATION OF A TYPICAL PRIVATE MORTGAGE INSURANCE CLAIM

Original Property Value	100,000	
Loan Amount	90,000	90% LTV
The amount of the loan in excess of 75% of the property value is insured by the Private Mortgage Insurer.		
Thus, Coverage Ratio is calculated as:		
Loan Balance	90,000	
less 75% of prop. value	75,000	
Amount covered	15,000	
Divided by loan amount	90,000	
Coverage Ratio	17% Rounded	

SUPPOSE THAT:	Scenario 1	Scenario 2	Scenario 3
Property value at the time of default is:	85,000	85,000	85,000
And, the lender makes a Claim for:	90,000	102,410	107,000
THEN, insurer pays the <u>minimum</u> of:			
17% of claim	15,300	17,410	18,190
And, lender's loss (Prop value - Claim)	5,000	17,410	22,000
TOTAL Pay-off is:	5,000	17,410	18,190
Therefore the lender's loss is:	0	0	3,810

CONCLUSION: The lender shares the credit risk with the mortgage insurer. Claims above \$102,410 imply losses for the lender.



Appendix B - Overall Capitalization of the UPAC System.

SAVINGS AND HOUSING CORPORATIONS - CAV
 CONSOLIDATED BALANCE SHEETS - December 1994
 Rough Estimation of Capital Adequacy

	Pesos [Million]	Dollars [Million]	Risk Weight	Risk Weighted Assets [Pesos]	
ASSETS					
Cash	105,302	119	0%	0	
Interbank Funds (Sold)	46,712	53	20%	9,342	
Investments					
Financial	548,379	620	20%	109,676	Assumed Between 0 and 100%
Other	14,324	16	100%	14,324	
Loans					
Mortgage					
Current	4,079,504	4,610	50%	2,039,752	
Delinquent					
< 6 months	111,109	126	100%	111,109	4.3%
6 to 12 months	43,081	49	100%	43,081	Delinquent
12 to 48 months	24,251	27	100%	24,251	
48 to 60 months	1,472	2	100%	1,472	
> 60 months	2,995	3	100%	2,995	
Provision	(7,490)	(8)	100%	(7,490)	
Commercial					
Current	1,076,566	1,216	100%	1,076,566	
Delinquent	46,748	53	100%	46,748	4.2%
Provision	(4,753)	(5)	100%	(4,753)	Delinquent
Consumer					
Current	98,391	111	100%	98,391	
Delinquent	15,981	18	100%	15,981	14.0%
Provision	(3,074)	(3)	100%	(3,074)	Delinquent
Accounts Receivable	105,555	119	100%	105,555	
Property for Sale	10,872	12	100%	10,872	
Property and Equipment	159,650	180	100%	159,650	
Other Assets	338,762	383	100%	338,762	
TOTAL	6,814,337	7,700		4,193,210	Total Risk-Weighted Assets
				9.0%	
				377,389	Capital Required
LIABILITIES					
Deposits					
Ordinary Savings	629,772	712			
Savings UPAC	3,444,866	3,893			
Certif. of Dep UPAC	1,030,227	1,164			
Certif. of Dep	787,326	890			
Interbank Funds (Bought)	98,737	112			
Debt	78,133	88			
Accounts Payable	139,971	158			
Other Liabilities	34,245	39			
Provisions	40,828	46			
Total	6,284,105	7,101			
CAPITAL					
Ordinary Shares	96,016	108	100%	96,016	Core Capital
Reserves	185,160	209	100%	185,160	Core Capital
Appreciation (Inv, prop, goods)	151,295	171	50%	75,648	Additional Capital
Capital Appreciation	38,241	43	100%	38,241	Core Capital
Earnings	59,520	67	100%	59,520	Core Capital
Total	530,232	599		454,585	
TOTAL	6,814,337	7,700		10.8%	of risk-weighted assets
					Overcapitalized

Source: Data obtained from the Superintendency of Banks. Calculations made by the author.

At first glance, the overall UPAC system is well capitalized. Savings and Housing Corporations will not have problem to meet the higher capital standards. However, it is possible that portfolio allocations may change in response to the regulations put in place, which suggests that capitalization should be monitored closely on a go-forward basis.

Appendix C - Proposed Rule Making on Interest Rate Risk.

Summary of the Federal Reserve Press Release, September 14, 1993. "Risk-Based Capital Guidelines. Notice on Proposed Rule Making on Interest Rate Risk."

In September 1993, the Federal Reserve Board issued general guidelines to ensure that banking institutions effectively measured and monitored Interest Rate Risk (IRR). The guidelines included the method for determining additional capital against this exposure, if required. The following is a summary of the guidelines.

1. Measure of IRR Exposure.

Interest Rate Risk exposure is defined as the effect that changes in market interest rates may have on the net economic value of a bank. That is, change in Net Present Value of assets plus off-balance sheet transactions, less change in Net Present Value of liabilities. Two methods to measure this exposure are allowed: supervisor's method, and bank's internal model.

Under the *supervisory method*, the bank has to report assets and off-balance sheet positions into different time bands, based on estimated remaining maturities. This includes analysis of prepayment characteristics in the case of mortgage-backed securities. Non-maturity deposits can be distributed among time bands as the bank appropriately estimates, allocating different percentages on each time band. Banks must report just "high-risk" mortgage backed securities held for sale or for trading. "Non-high-risk" securities have to be distributed across time bands in the category "All other securities" (See Exhibit C-1). Seven major time bands are used: 0-3 months, 3 to 12 months, 1 to 3 years, 3 to 5 years, 5 to 10 years, 10 to 20 years, and more than 20 years.

Each position is multiplied by an "IRR risk-weight" representing the estimated change in present value under a particular scenario. Interest rate scenarios include a range of possible values in accordance with historical volatility. Rising and declining interest rates have to be considered. The risk weights are calculated by the supervisor, based on percentage changes of representative hypothetical instruments. Exhibit C-2 shows the characteristics of the hypothetical instruments used to calculate risk weights. All risk-weighted assets are summed to get the total "net risk-weighted position", which is a measure of interest rate risk exposure of the financial institution. Exhibit B-1 shows an example of the worksheet used to the calculations.

The supervisor also accepts the *bank's own model*, if the method is deemed adequate (and accurate) measure of bank's risk position by examiners. In both methods, financial institutions must evaluate quarterly if their holdings of high-risk mortgage-backed securities really reduce interest rate risk. They must evaluate the changes in values of those investments when interest rates increase and decrease.

2. Assessment of Capital Adequacy.

If the estimated decline in the net economic value of the bank is more than 1% of its assets (2% for Saving Associations), the supervisor requires capital against all the excess of that minimum level. This minimum level is based on the inaccuracy of the model. The supervisor will also take into account the quality of interest rate risk management, internal controls, and the overall financial condition. This includes financial institution's earnings capacity, capital base and other risks that may impair future earnings or capital⁷⁰.

- Required minimum capital for Banks = (Measured Exposure IRR) - (1% X Total Assets)
- Required minimum capital Thrifts⁷¹ = 50% X [(Measured Exp. IRR) - (2% X Tot Assets)]

⁷⁰ Federal Financial Institutions Examination Council. *Supervisory Policy Statement on Securities Activities*. (December 2, 1991). p. 66.

⁷¹ Office of the Thrift Supervision. *12 Code of Federal Regulations*. Chapter V. § 567.7.

Exhibit C-1

Interest Rate Risk Worksheet - Example

	Scenario 1: 200 Basis Point Rise			Scenario 2: 200 Basis Point Decline		
	Total	Risk-weights	Risk weighted Positions	Total	Risk-weights	Risk weighted Positions
INTEREST RATE SENSITIVE ASSETS						
1. Adjustable Rate Mortgages, asset-backed securities, and consumer loans						
0 - 3 months	5,500	-0.10%	(6)	5,500	0.10%	6
3 - 12 months	4,950	-0.50%	(25)	4,950	0.60%	30
1 - 3 years	4,050	-1.60%	(65)	4,050	1.70%	69
3 - 5 years	4,166	-3.00%	(125)	4,166	3.10%	129
5 - 10 years	6,620	-5.30%	(351)	6,620	3.40%	225
10 - 20 years	6,454	-8.80%	(568)	6,454	5.90%	381
More than 20 years	10,430	-9.20%	(960)	10,430	3.60%	375
2. Zero or low coupon securities						
0 - 3 months	1,000	-0.25%	(3)	1,000	0.25%	3
3 - 12 months	1,000	-1.20%	(12)	1,000	1.20%	12
1 - 3 years	1,000	-3.70%	(37)	1,000	3.90%	39
3 - 5 years	0	-7.40%	0	0	8.00%	0
5 - 10 years	0	-13.30%	0	0	15.60%	0
10 - 20 years	0	-24.90%	0	0	33.50%	0
More than 20 years	0	-38.00%	0	0	61.90%	0
"All other" securities, loans and trading account						
0 - 3 months	26,672	-0.25%	(67)	26,672	0.25%	67
3 - 12 months	28,432	-1.20%	(341)	28,432	1.20%	341
1 - 3 years	31,136	-3.50%	(1,090)	31,136	3.70%	1,152
3 - 5 years	19,728	-6.40%	(1,263)	19,728	7.00%	1,381
5 - 10 years	10,564	-10.20%	(1,078)	10,564	11.70%	1,236
10 - 20 years	8,837	-14.90%	(1,317)	8,837	19.00%	1,679
More than 20 years	9,462	-17.60%	(1,665)	9,462	24.60%	2,328
4. "High-Risk" Mortgage securities						
Self-reporting	2,000		160	2,000		(200)
Risk weighting	1,000	-38.00%	(380)	1,000	-38.00%	(380)
Total Interest-sensitive assets	183,001		(9,190)	183,001		8,872
ALL OTHER ASSETS	3,000			3,000		
TOTAL ASSETS	186,001			186,001		Continues....

Exhibit C-1 - Continuation

INTEREST RATE SENSITIVE LIABILITIES						
1. Non-maturity deposits, time deposits and "all other"						
0 - 3 months	23,083	0.25%	58	38,583	-0.25%	(96)
3 - 12 months	74,582	1.20%	895	77,582	-1.20%	(931)
1 - 3 years	51,321	3.70%	1,899	39,821	-3.90%	(1,553)
3 - 5 years	17,090	6.90%	1,179	10,090	-7.50%	(757)
5 - 10 years	64	11.60%	7	64	-13.50%	(9)
10 - 20 years	0	18.70%	0	0	-24.50%	0
More than 20 years	0	24.00%	0	0	-36.00%	0
Total interest sensitive liabilities	166,140		4,038	166,140		(3,346)
NON-INTEREST-SENSITIVE LIAB	860			860		
TOTAL LIABILITIES	167,000		4,038	167,000		(3,346)
EQUITY CAPITAL	19,001			19,001		
OFF-BALANCE SHEET POSITIONS						
1. Interest Rate Contracts						
0 - 3 months	4,000	-0.25%	(10)	4,000	0.25%	10
3 - 12 months	500	-1.20%	(6)	500	1.20%	6
1 - 3 years	(4,050)	-3.50%	142	(4,050)	3.70%	(150)
3 - 5 years	(450)	-6.40%	29	(450)	7.00%	(32)
5 - 10 years	0	-10.20%	0	0	11.70%	0
10 - 20 years	0	-14.90%	0	0	19.00%	0
More than 20 years	0	-17.60%	0	0	24.60%	0
2. Mortgage and other amortizing contracts						
0 - 3 months	1,000	-0.10%	(1)	1,000	0.10%	1
3 - 12 months	0	-0.50%	0	0	0.60%	0
1 - 3 years	(1,000)	-1.60%	16	(1,000)	1.70%	(17)
3 - 5 years	0	-3.00%	0	0	3.10%	0
5 - 10 years	0	-5.30%	0	0	3.40%	0
10 - 20 years	0	-8.80%	0	0	5.90%	0
More than 20 years	0	-9.20%	0	0	3.60%	0
Total Off-Balance Sheet Positions	0		170	0		(181)
NET RISK WEIGHTED POSITION			(4,982)			5,344
Net Risk-Weighted Position / Assets			-2.68%			2.87%
Maximum Loss in Net Economic Value			(4,982)			
1% of Assets			1,860			
Loss in excess to the 1% of Assets			(3,122)			
Capital required against IRR			3,122			

Source: Federal Reserve Press Release. Notice on Proposed Rule Making on Interest Rate Risk. September 14, 1993

Exhibit C-2				Scenario 1: 200 Basis Point Rise				Scenario 2: 200 Basis Point Decline			
Calculation of Risk Weight Factors				(Parallel shift in the yield curve)							
Tiem Band	Maturity	Coupon	Initial Price	Initial PSA/ABS	Expected PSA/ABS	Price	% change in present	Expected PSA/ABS	Price	% change in present	
	(Mid point)		(% of Par)			(% of Par)	value (Risk Weights)		(% of Par)	value (Risk Weights)	
AMORTIZING INSTRUMENTS (Calculated based on MBS)											
0 - 3 months	1.5 mo.	8.50%	100%	1.0 % ABS *	1.0 % ABS	99.90%	-0.10%	1.0 % ABS	100.10%	0.10%	
3 - 12 months	7.5 years	8.50%	100%	1.0 % ABS	1.0 % ABS	99.50%	-0.50%	1.0 % ABS	100.60%	0.60%	
1 - 3 years	2 years	8.50%	100%	1.0 % ABS	1.0 % ABS	98.40%	-1.60%	1.0 % ABS	101.70%	1.70%	
3 - 5 years	4 years	8.50%	100%	1.0 % ABS	1.0 % ABS	97.00%	-3.00%	1.0 % ABS	103.10%	3.10%	
5 - 10 years	7.5 years	7.00%	100%	166% PSA	137% PSA	94.70%	-5.30%	501% PSA	103.40%	3.40%	
10 - 20 years	15 years	7.00%	100%	166% PSA	137% PSA	91.20%	-8.80%	501% PSA	105.90%	5.90%	
More than 20 years	25 years	7.50%	100%	242% PSA	146% PSA	90.80%	-9.20%	590% PSA	103.60%	3.60%	
ALL OTHER INSTRUMENTS											
0 - 3 months	1.5 mo.	8.50%	100%			99.75%	-0.25%		100.25%	0.25%	
3 - 12 months	7.5 years	8.50%	100%			98.80%	-1.20%		101.20%	1.20%	
1 - 3 years	2 years	8.50%	100%			96.50%	-3.50%		103.70%	3.70%	
3 - 5 years	4 years	8.50%	100%			93.60%	-6.40%		107%	7%	
5 - 10 years	7.5 years	8.50%	100%			89.80%	-10.20%		111.70%	11.70%	
10 - 20 years	15 years	8.50%	100%			85.10%	-14.90%		119%	19%	
More than 20 years	25 years	8.50%	100%			82.40%	-17.60%		124.60%	24.60%	
LIABILITIES											
0 - 3 months	1.5 mo.	4.75%	100%			99.75%	0.25%		100.25%	-0.25%	
3 - 12 months	7.5 years	4.75%	100%			98.80%	1.20%		101.20%	-1.20%	
1 - 3 years	2 years	4.75%	100%			96.30%	3.70%		103.90%	-3.90%	
3 - 5 years	4 years	4.75%	100%			93.10%	6.90%		107.50%	-7.50%	
5 - 10 years	7.5 years	4.75%	100%			88.40%	11.60%		113.50%	-13.50%	
10 - 20 years	15 years	4.75%	100%			81.30%	18.70%		124.50%	-24.50%	
More than 20 years	25 years	4.75%	100%			76.00%	24.00%		136%	-36%	
ZERO OR LOW COUPON SECURITIES											
0 - 3 months	1.5 mo.	8.50%	98.97%			98.72%	-0.25%		99.22%	0.25%	
3 - 12 months	7.5 years	8.50%	94.95%			93.81%	-1.20%		96.09%	1.20%	
1 - 3 years	2 years	8.50%	84.66%			81.53%	-3.70%		87.96%	3.90%	
3 - 5 years	4 years	8.50%	71.68%			66.38%	-7.40%		77.41%	8%	
5 - 10 years	7.5 years	8.50%	53.56%			46.44%	-13.30%		61.92%	15.60%	
10 - 20 years	15 years	8.50%	28.69%			21.55%	-24.90%		38.30%	33.50%	
More than 20 years	25 years	8.50%	12.48%			7.74%	-38.00%		20.21%	61.90%	
* 1.0% monthly prepayment on Asset Backed Security.											
Source: Federal Reserve Press Release. Notice on Proposed Rule Making on Interest Rate Risk. September 14, 1993											

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