



# FINANCIAL STABILITY REPORT

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BANCO DE LA REPÚBLICA  
CENTRAL BANK OF COLOMBIA

BOGOTÁ, D, C., COLOMBIA

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# CONTENTS

TABLES AND GRAPHS	4
EXECUTIVE SUMMARY	7
I. THE MACROECONOMIC ENVIRONMENT	11
II. THE FINANCIAL SYSTEM	16
A. CREDIT INSTITUTIONS	16
B. NON-BANK FINANCIAL INSTITUTIONS	27
BOX 1: INTERNATIONAL INDICATORS	36
III. CURRENT SITUATION AND OUTLOOK FOR FINANCIAL SYSTEM BORROWERS	42
A. HOUSEHOLDS	42
BOX 2: ANALYSIS OF HOUSEHOLD BORROWING IN COLOMBIA	46
B. NON-FINANCIAL PUBLIC SECTOR (SPNF)	48
BOX 3: 2006-2010 NATIONAL DEVELOPMENT PLAN AND THE COLOMBIAN FINANCIAL SYSTEM	50
IV. POTENTIAL RISKS	52
A. MARKET RISK	52
BOX 4: WHO BOUGHT AND SOLD STOCKS AND DOMESTIC GOVERNMENT BONDS IN 2006?	57
B. CREDIT RISK	59
BOX 5: PROBABLE SCENARIOS FOR FINANCIAL STABILITY IN 2007: SIMULATIONS OF A GENERAL EQUILIBRIUM MODEL OF THE FINANCIAL SYSTEM	60
C. LIQUIDITY RISK	62
BOX 6: ASSET OVERVALUATION	66
FINANCIAL STABILITY ISSUES	
FINANCIAL PERFORMANCE OF MANDATORY PENSION FUNDS IN COLOMBIA ÓSCAR MARTÍNEZ A. ANDRÉS MURCIA P.	75
INTEREST RATE PASS THROUGH IN COLOMBIA: A MICRO-BANKING PERSPECTIVE ROCÍO BETANCOURT HERNANDO VARGAS NORBERTO RODRÍGUEZ	91
AN INDUSTRIAL ORGANIZATION APPROACH FOR THE COLOMBIAN BANKING SYSTEM SANDRA V. ROZO DIEGO VÁSQUEZ	107
LIQUIDITY ADJUSTED VALUE-AT-RISK IN COLOMBIA JUANITA GONZÁLEZ U. DANIEL OSORIO R.	120

# TABLES AND GRAPHS

## I. THE MACROECONOMIC ENVIRONMENT

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Graph 1	Growth in GDP and Its Components	12
Graph 2	(A) Changes in Yield on G7 and EMBI + (B) Stock Market Indexes in Emerging and Developed Countries	12
Graph 3	Trends in IGBC, TRM and TES Yield	12
Graph 4	Dynamic Correlations between TES Prices, the IGBC and the TRM	13
Graph 5	Value-at-Risk of a Portfolio in Peso-TES, IGBC and Dollars	13

## II. THE FINANCIAL SYSTEM

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Graph 6	Total Assets Reported by Credit Institutions	17
Graph 7	Investments and the Gross Loan Portfolio as a Share (%) of Total Credit Institution Assets	17
Graph 8	Investments by Credit Institutions	17
Graph 9	Credit Institutions: Real Annual Gross Portfolio Growth	17
Graph 10	Mortgage Loan Disbursements	18
Graph 11	Financial Depth (Portfolio /GDP)	19
Graph 12	Real Annual Growth in Deposits with Credit Institutions, by Type of Deposit	19
Graph 13	Certificates of Deposit as a Share of Total Deposits	20
Graph 14	Share (%) of Exposed Amount, by Agent Category	21
Graph 15	Loan Portfolio Quality (Risky /Gross Portfolio Ratio)	21
Graph 16	Real Annual Risky Loan Portfolio Growth	22
Graph 17	Coverage: Provisioning /Risky Loan Portfolio	22
Graph 18	Real Annual Growth in Profits	23
Graph 19	Makeup of Earnings	23
Graph 20	Return on Assets (ROA)	24
Graph 21	Capital Adequacy Ratio: Credit Institutions	24
Graph 22	Ex ante Spread using Certificate of Deposit Rates	25
Graph 23	Ex post Spread	25
Graph 24	Efficiency: Ratio of Administrative and Labor Costs to Average Assets	26
Graph 25	Pension Fund Real Value and Growth	29
Graph 26	Pension Fund Portfolio Value	30
Graph 27	Monthly Variation in MPF Value	30
Graph 28	Pension Fund Portfolio Composition, by Issuer	30
Graph 29	Pension Fund Portfolio Composition, by Maturity	31
Graph 30	Pension Fund Portfolio Composition, by Currency	31
Graph 31	Percentage of Portfolio Value Denominated in Foreign Currency, without Coverage	32

Graph 32	Value of Insurance Company Investments	32
Graph 33	(A) LIC Fiscal Year Earnings and Return on Investments	33
	(B) GIC Fiscal Year Earnings and Return on Investments	33
Graph 34	Changes in OMF Portfolio Value and Composition	33
Graph 35	OMF and SMF Return on Assets	34
Graph 36	Brokerage House Return on Assets	35
Graph 37	Mutual Investment Fund Portfolio	35
Graph 38	Mutual Investment Fund Portfolio Composition, by Type of Instrument	36
Graph 39	Mutual Investment Fund Portfolio Composition at December (559 b)	36
Table 1	Credit Institution Exposure to Principal Borrowers	20
Table 2	Financial Institutions' Investment Portfolio	28
Table 3	Distribution of Total Outstanding TES among Different Agents	29

### III. CURRENT SITUATION AND OUTLOOK FOR FINANCIAL SYSTEM BORROWERS

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Graph 40	Household Consumption and Investment as a Percentage of GDP	42
Graph 41	Household Consumption (Seasonally Adjusted Series)	43
Graph 42	Unemployment Rate	43
Graph 43	Annual Growth in the Real Wage Index, by Sector	43
Graph 44	Consumer Expectation Index	45
Graph 45	Growth in Household Consumption and the Consumer Expectation Index	45
Graph 46	Home and Durable Goods Buying Perception Index (Balance)	45
Graph 47	Annual Growth in Area Licensed Monthly for Housing, according to Building Permits	45
Graph 48	Real Marginal Rate on the Mortgage and Consumer Loan Portfolio	45
Graph 49	Real New Housing Price Index (NHPI)	45
Graph 50	National Government's Creditworthiness	49
Table 4	NFPS: Gross Debt	48

### IV. POTENTIAL RISKS

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Graph 51	Valuation Losses as a Percentage of Annualized Profits, with a 200 bp Shock	56
Graph 52	Commercial Bank Valuation Losses	56
Graph 53	PFM Valuation Losses as a Percentage of Portfolio Value, with a 200 bp Shock	57
Graph 54	PFM Valuation Losses	57
Graph 55	Stressed Capital Adequacy Ratio - December 2007 (Shock 3)	60
Graph 56	ULR: Credit Institutions	63
Graph 57	Sensitivity Analysis: ULR of Banks and BECH	64
Table 5	Outstanding TES B Valued at Market Prices: Credit Institutions	53
Table 6	Outstanding TES B Valued at Market Prices: Non-bank Financial System	54
Table 7	Variations in TES B Holdings	54
Table 8	Valuation Losses with a 200 bp Shock	58
Table 9	Number of Banks Where the Capital Adequacy Ratio Would Drop Below the Required Minimum (Twelve Months)	59
Table 10	Correction Percentage, February 6, 2007	65
Table 11	Correction Percentage (Volatile Scenario)	65

# EXECUTIVE SUMMARY

In general, 2006 was a positive year for financial stability, as was the case in recent years. However, deterioration in the quality of consumer loans and the highly concentrated nature of the portfolio held by non-bank financial institutions (NBFI) required an additional effort to arrive at a more rigorous measure of the risks to the financial system. In the case of credit institutions, the year was characterized by two opposite trends. On the one hand, traditional intermediation activities increased dramatically, due to the performance of the Colombian economy. On the other hand, the price volatility of domestic financial assets had a negative impact on investment trading (mostly in domestic government bonds). This led institutions to rearrange the composition of their assets in favor of loans (despite the adjustment in prices on tradable investments during the second half of the year). Consequently, the loan portfolio, as a portion of total assets, rose from 50% in December 2005 to 58% in December 2006, while the proportion corresponding to investments (62% in domestic public debt securities) declined from 32% to 24%.

The shift in the portfolio held by credit institutions contributed to a real annual increase of 26.5% in the gross loan portfolio, mainly because of 42.5% more consumer loans and the recovery in commercial and mortgage lending (22.9% and 6.1%, respectively). The growth in loans was accompanied by good quality indicators for the loan portfolio and high coverage (provisioning/risky portfolio). Nevertheless, quality did suffer between December 2005 and 2006, when the indicator went from 5.7% to 6.7% as a result of 44.5% real average growth in risky consumer loans. Deposit taking from the public rose throughout the year. Coupled with good capital adequacy ratios for the financial system, this appears to suggest little or no restrictions on the supply of credit.

Less income from investment valuation affected the momentum in profits, reducing the return on assets for credit institutions from 2.8% in December 2005 to 2.5% in 2006. However, this is still above average for the last four years.

During the first half of 2006, the price volatility of major tradable assets (i.e. domestic public debt securities and stocks) had a negative impact on the NBFI portfolio. Uncertainty about future prices led to large sell-offs of these assets. The result was a reduction of 1.2% in the value of the portfolio compared to 2005. Although not all NBFI reacted the same way during that period, their focus on domestic instruments meant a generalized adverse effect on their returns.

A healthy increase in loans depends not only on a careful assessment of debtor creditworthiness, but also on whatever risk-management practices are adopted jointly by credit institutions and the National Superintendent of Financial Institutions. Interaction within the scope of good regulations, coupled with careful risk-management by these institutions, will be decisive to the future stability of the

financial system. The extent to which the loan portfolio has grown makes it crucial to find ways to measure credit-risk exposure for financial institutions. This is particularly important considering the deterioration we are beginning to see in the quality of consumer loans.

For the most part, credit institutions now are exposed to less market risk. However, the implementation of new regulations in this respect<sup>1</sup> is an important step. It encourages better market-risk measurement and the development of internal models, in addition to prompting other financial institutions to adopt good risk-management practices. This is particularly relevant in the case of NBFI, which continue to have a great deal of exposure given the limited diversification of their portfolios.

Finally, and along the same lines, the adoption of regulations on credit and liquidity risk is extremely important. Exposure to risk of this type will continue to grow if the tendency to substitute tradable investments for loans (i.e. liquid assets) continues. Two regulatory initiatives to this effect are being studied by the National Superintendent of Financial Institutions. One involves anti-cyclical provisioning; the other is the new set of liquidity-risk regulations. Anti-cyclical measures would guarantee enough provisions throughout the credit cycle. This, in turn, would soften the pro-cyclical pattern of the income statement and the supply of credit. The new regulations on liquidity risk would allow elements of market liquidity to be included when calculating exposure. They would also promote more frequent monitoring and a more precise measurement of individual liquidity shortages. The current situation, with good earnings and high levels of capital, is the right time to propose and implement such schemes.

Board of Directors  
Banco de la República  
Junta Directiva del Banco de la República

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<sup>1</sup> New regulations on market risk took effect in January 2007, as stipulated in Chapter 21, External Circular 009/ 2007 issued by the National Superintendent of Financial Institutions in Colombia.

# FINANCIAL STABILITY REPORT

According to its constitutional mandate and Law 31/1992, one of Banco de la República's duties is to ensure price stability. Doing so depends largely on maintaining financial stability. This is achieved when the financial system is able to broker financial flows efficiently. It also helps to improve resource allocation, which is important to preserving macroeconomic stability. Therefore, financial instability has a direct impact on macroeconomic stability and on Banco de la República's capacity to fulfill its constitutional mandate. In short, the need to monitor and maintain financial stability is a crucial one.

Banco de la República performs a variety of tasks to provide for financial stability. First, it must ensure the payment system of the Colombian economy operates properly. Secondly, it extends liquidity to the financial system through its monetary transactions and the exercise of its constitutional faculty as the lender of last resort. Thirdly, being the authority on credit, it also designs financial regulatory

mechanisms to reduce episodes of instability. This is done in conjunction with the Office of the National Superintendent of Financial Institutions. Finally, Banco de la República carefully monitors economic trends that might threaten the country's financial stability.

The *Financial Stability Report* is part of this last task and fulfils two objectives. First, it describes the recent performance of the financial system and its principal debtors, so future trends in that performance can be visualized. Secondly, it identifies the major risks to credit institutions. The reason behind both these objectives is to inform the public of the trends and risks that affect the financial system as a whole.

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# I. THE MACROECONOMIC ENVIRONMENT

*Excellent economic performance in Colombia during 2006 boosted traditional intermediation activities, These conditions will continue. making 2007 a good year for those activities,*

The Colombian financial system in 2006 was marked by a major difference in traditional lending activities compared to investment trading. On the one hand, credit institutions vigorously increased their loan activity, making a healthy contribution to the increase in profits. On the other, investment trading by credit institutions and non-bank financial institutions declined because of high volatility on markets for domestic financial assets. As a result, growth in the financial system's investment portfolio was off by -18% for credit institutions and by -1.2% for the non-bank financial system, making these activities less profitable.

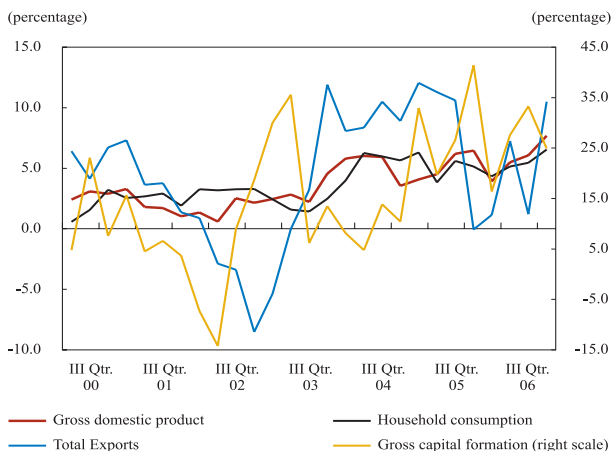
The strong increase in loans (26.52%) during 2006 is explained by the country's good economic performance. Gross domestic product (GDP) was up by 7.68% during the third quarter of 2006 and domestic demand, by 9.7%. The increase on the demand side was due primarily to a sharp rise in household consumption (6.9%), particularly durable and non-durable goods, and to the increase in gross private capital formation (24.9%), chiefly machinery and equipment, construction and buildings (Graph 1). Economic growth on the supply side was the result of good momentum in manufacturing, commerce and construction. In the last edition of the Inflation Report, estimated annual growth for 2006 was between 6.5% and 7.1%.

*Investment trading declined in the face of high volatility on markets for domestic financial assets,*

Investment trading was not favorable during 2006, particularly in the second quarter. Uncertainty about the US economy and US monetary policy made investors more wary of risk. The apprehension was reinforced when the

**GRAPH 1**

**GROWTH IN GDP AND ITS COMPONENTS**

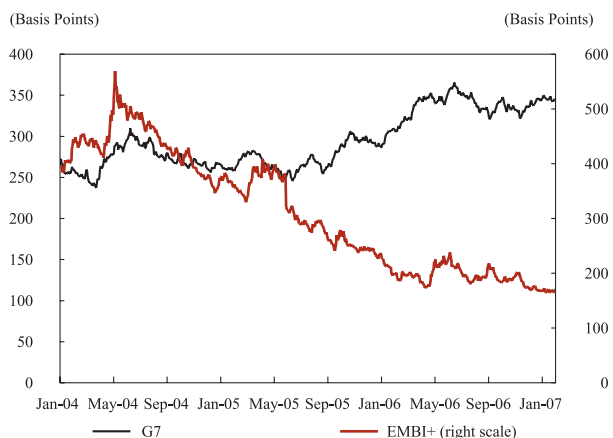


Source: DANE.

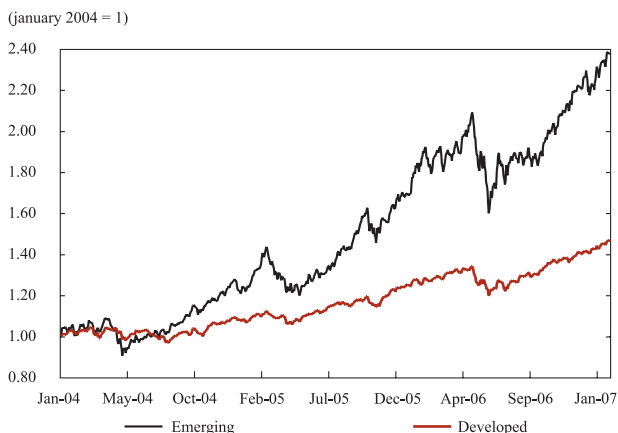
leading central banks raised their reference rates. This lowered the price of financial assets (Graph 2), particularly in the emerging economies. Most of the uncertainty was dispelled during the third and fourth quarters of 2006, when the main economic figures in the United States suggested a slowdown in economic activity. Increased certainty that the US Federal Reserve Bank (the Fed) would stop raising interest rates revived the demand for risky financial instruments, helping the prices of financial assets worldwide to recover from their second-quarter plunge in 2006.

**GRAPH 2**

**(A) CHANGES IN YIELD ON G7 AND EMBI+ SOVEREIGN BONDS**



**(B) STOCK MARKET INDEXES IN EMERGING AND DEVELOPED COUNTRIES**



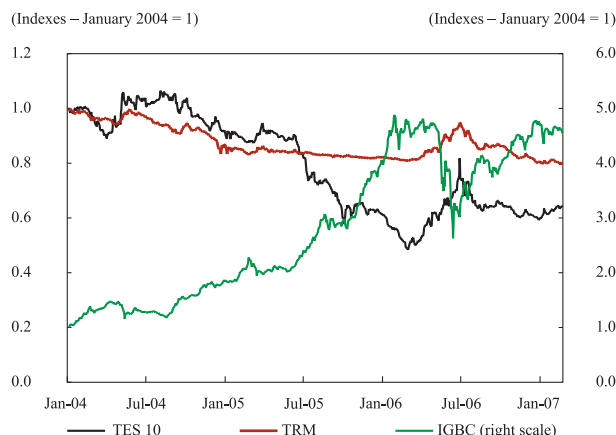
Source: Merrill Lynch, JP Morgan and Morgan Stanley.

The volatility on international financial markets affected the financial markets in Colombia, where the drop in assets prices was dramatic (Graph 3).<sup>1</sup> During January-June, the domestic stock market index (IGBC in Spanish) fell by 34%. In August,

<sup>1</sup> The adjustment was sharp, even compared to the performance of other emerging economies. See the September 2006 edition of the *Financial Stability Report* for a comparison.

**GRAPH 3**

**TREND IN IGBC, TRM AND TES YIELD (PESOS)**



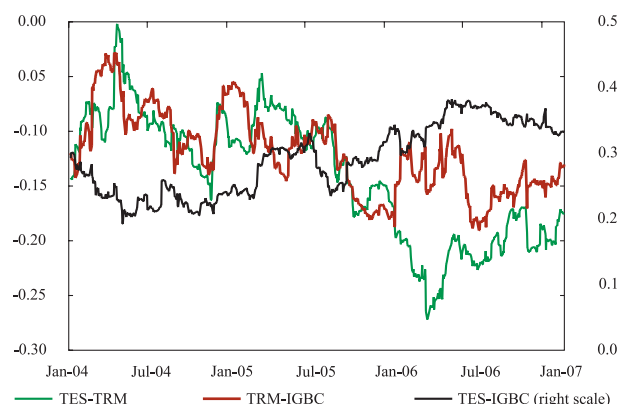
Source: Colombian Stock Exchange (BVC) and Banco de la República.

the IGBC returned to the level observed at the start of 2006, but the values observed in April were not recovered until the end of the year. The price of the dollar rose by Col\$350 during January-June; not until November did it return to the levels witnessed in January. In the case of the public debt, the period from May 10 to June 30 saw respective increases of 122 basis points (bp), 205 bp and 231 bp in the short, medium and long portions of the zero-coupon peso TES curve. By the end of the year, the rates compared to those in June were down by 37 bp, 171 bp and 207 bp for these segments. However, despite this adjustment, TES rates were higher at the end of the year than at the start of 2006. The drastic change in the price of financial assets led to considerable losses in valuation, affecting the profit levels of those holding these assets. Rather than continuing to suffer a drop in price on these instruments, some investors preferred to sell, taking a loss and affecting their flow of earnings.

The plunge in valuation was magnified by at least three factors. To begin with, revaluation of the exchange rate throughout 2005, coupled with the major valuations in domestic public debt securities and stocks prior to the second quarter of 2006, tipped agents' preference towards domestic financial assets, limiting the benefits of diversification. Secondly, the dramatic price changes in these assets were accompanied by an increase in their correlation<sup>2</sup> (Graph 4): the TES/stock price ratio became more positive and the TES/dollar price ratio, more negative. Consequently, the increased volatility of assets and their growing correlation translated into a portfolio with more market-risk exposure (Graph 5). Lastly extensive leveraging by agents, partly because of the large valuations witnessed in 2005, made the losses to investors even worse.

GRAPH 4

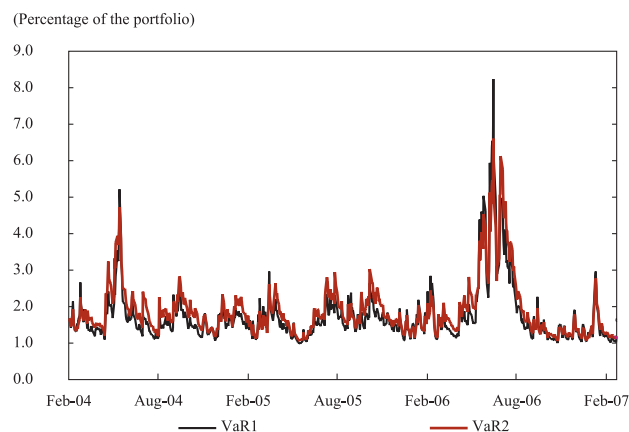
DYNAMIC CORRELATIONS BETWEEN TES PRICES, IGBC AND TRM



Source: BVC and Banco de la República. Banco de la República's calculations

GRAPH 5

VALUE-AT-RISK OF A PORTFOLIO IN PESO-TES, IGBC AND DOLLARS (1% AT ONE DAY) <sup>a/</sup>



a/ VaR1 is a portfolio with equal proportions of TES, IGBC and dollars. VaR2 is a portfolio with 66.6% TES and 33.3% IGBC and dollars.  
Source: BVC. Banco de la República's calculations.

<sup>2</sup> The correlations are estimated with a multivariate GARCH (1.1) model, according to Christoffersen (2003), *Elements of Financial Risk Management*, Academic Press.

Traditional brokerage activities are expected to perform similarly in 2007. According to the last *Inflation Report*, Colombia will continue to see strong economic growth in the 4.5%-to-6.5% range. This means more earnings for the private sector and a greater the demand for credit. In this scenario, debtors in the financial system will remain sound. A proper balance between increased earnings and more prospects for loans, due to decisions by the financial system and borrowers alike, will be decisive to ensuring the future sustainability of credit growth.

The outlook for investment trading in 2007 is not as clear. Colombia's financial markets will be influenced heavily by monetary policy in the United States and by the trend in domestic inflation. In the case of the US economy, the inflationary pressures witnessed in 2006 are expected to ease during 2007, making additional interest rate hikes unnecessary. The efforts of the Board of Directors (BDBR) to normalize the stance of its monetary policy should guarantee the success of the inflation target for 2007 and convergence towards the long-term target.

The reduction in volatility anticipated for 2007 might not happen if economic agents perceive a high level of uncertainty about the future of economic growth and inflation in the United States. Any such perception could generate an increase in the Fed's reference rate and heighten risk aversion the world over, affecting the price of Colombian financial assets. This would cause risky assets to reevaluate and investors would shift their holdings, selling off assets in countries like Colombia and giving more weight to safe assets, such as those of the developed economies. The possibility of an international situation marked by higher interest rates and more aversion to risk would have an impact on the domestic market. The new scenario would translate into a higher exchange rate. As indicated in the last *Inflation Report*, this could raise the risk of domestic inflation, due to the impact on prices for tradable goods and on inflationary expectations. Given that possibility, the BDBR might consider it appropriate to raise the intervention interest rate. This, in turn, would aggravate the devaluation of domestic financial assets.

In short, traditional brokerage activities were fueled by the excellent performance of Colombia's economy in 2006. These conditions will continue, making 2007 a good year for such activities. In contrast to positive loan activity throughout 2006, investment trading suffered a serious setback. Although 2007 is expected to be a less volatile year for financial assets,

there are specific risks that could affect investment valuation. If those risks materialize and the central government (CG) requires less financing, the substitution of loans for tradable investments could increase. The balance sheets of credit institutions already reflect this trend and, if it becomes more pronounced, so would their credit risk.

## II. THE FINANCIAL SYSTEM

*The increase in credit was accompanied by low levels in the quality index and high coverage, as well as favorable growth in the composition and degree of capital adequacy. However, we are beginning to see a decline in the quality of consumer loans.*

### A. CREDIT INSTITUTIONS

Generally speaking, 2006 was a good year for the Colombian economy and the financial sector. Aside from the situation on the public domestic debt (TES) market in the second quarter of the year, the assets of financial institutions continued to grow, thanks to the vigorous expansion in loans. Profits for the financial system remained positive, but did not increase as much as in past years. As a result, the return on assets was slightly less. More deposits from the public, coupled with the amount of capital in the system, appear to suggest there will be no restrictions on loan growth. Therefore, a continuation of efforts to carefully monitoring loan portfolio quality is essential, particularly the quality of consumer loans, which deteriorated slightly during 2006.

#### 1. General Balance-sheet Positions

##### a. Asset Accounts

The country's credit institutions reported Col\$155.9 trillion (t) in total assets at December 2006. This amounts to a real annual increase of 10.6% compared to the same month in 2005 (Graph 6). Although growth slowed during the second half of 2006, when it fell below the average for the year (13.1%), assets performed well, considering the large sell-off of TES during the third quarter.

The sale of securities is even more evident when analyzing the make-up of total assets. Graph 7 confirms the change in the financial system compared to past

*Given the volatility on financial markets, credit institutions sold nearly Col\$3.6 t in TES holdings, cutting back the proportion of their investments in these assets from 36% to 24% between December 2005 and December 2006.*

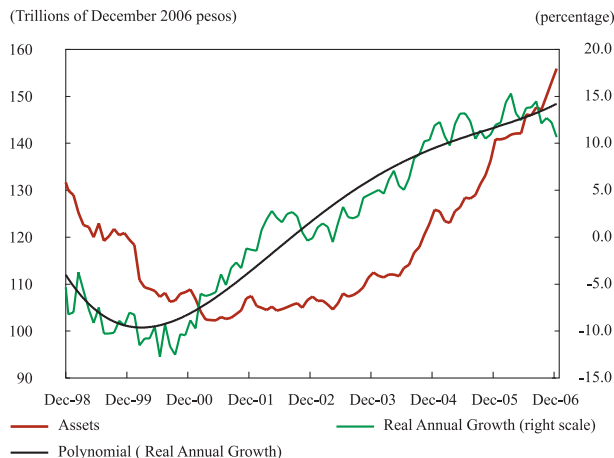
years; namely, the substitution of loans for investments. As a share of total assets, investments declined by 9 percentage points (pp) during 2006 and accounted for 24% in December. The explanation for this phenomenon lies more with market sell-offs of securities during the period of extreme volatility than with depreciation. TES rates declined after the second quarter of 2006, and remained relatively stable until the end of the year. The materialization of market risk, coupled with more demand for credit, prompted credit institutions to sell nearly Col\$3.6 t<sup>3</sup> of their TES position.

These are the main reasons for the decline in investments; although they did manage to stabilize during the final months of the year (Graph 8). By December, they totaled Col\$37.6 t. which amounted to a real annual reduction of 18%. This was the first real decline in investments since the crisis period in 1999. Consequently, the pattern of assets was the determined by the portfolio shift towards loans and

<sup>3</sup> Approximately Col\$3.1 in TES were sold during the third quarter of the year.

GRAPH 6

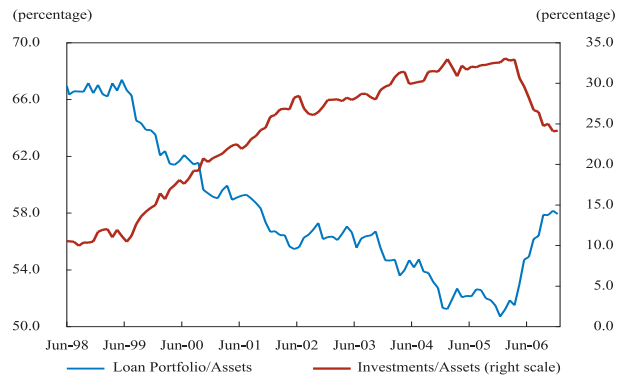
**TOTAL ASSETS REPORTED BY CREDIT INSTITUTIONS**



Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

GRAPH 7

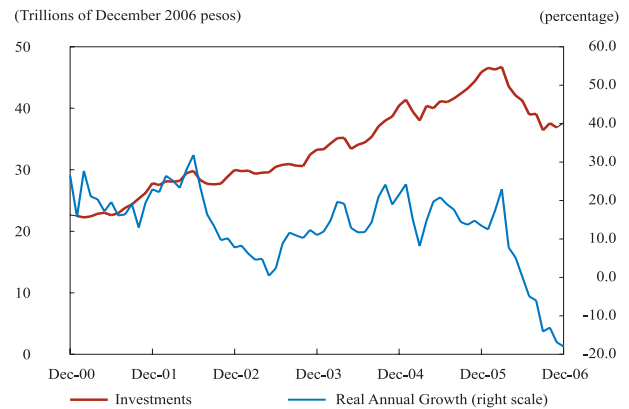
**INVESTMENTS AND THE GROSS LOAN PORTFOLIO AS A SHARE (%) OF TOTAL CREDIT INSTITUTION ASSETS**



Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

GRAPH 8

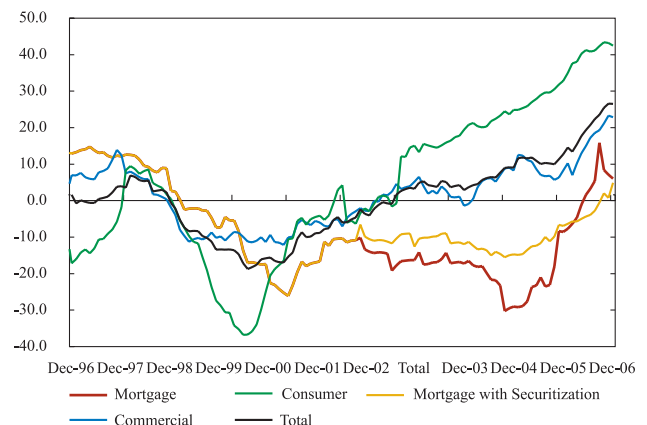
**INVESTMENTS BY CREDIT INSTITUTIONS**



Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

GRAPH 9

**REAL ANNUAL GROSS LOAN PORTFOLIO GROWTH FOR CREDIT INSTITUTIONS**



Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations .

their growth. By December 2006, the real annual rise in the gross loan portfolio came to 26.5% (Graph 9), which is the largest increase in the past decade (Col\$101.9 t).

Consumer loans, as part of the gross loan portfolio, continued to grow and registered a real annual increase of 42.5% by the end of the year. This exceeds the average for 2006 (39.9%) by more than 2.5 pp. Although good news in terms of financial depth (analyzed later in this report), it is important to remember that most of the consumer loan portfolio is not backed by collateral.<sup>4</sup> This reinforces the message conveyed in earlier editions of the *Financial Stability Report* on how important it is for credit institutions to accompany the growth in credit with careful risk analysis.

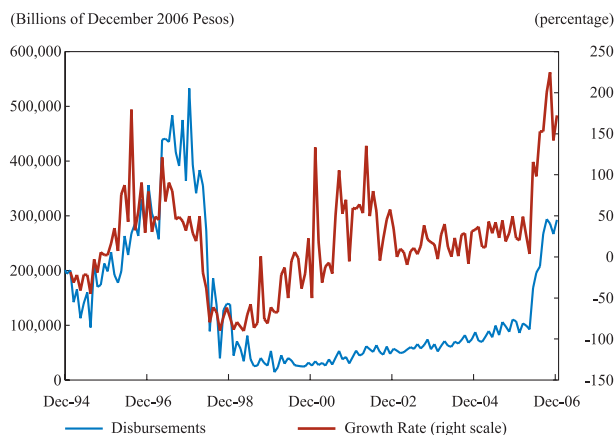
The real annual increase in the commercial loan portfolio came to 22.9% at the close of 2006. This is near to the highs seen in 1995, possibly because this source of funding has become less expensive due to the positive trend in rates on new commercial loans.<sup>5</sup> The momentum in the commercial loan portfolio is an indication that the productive sector continued to rely on credit as a major source of funding.

The mortgage loan portfolio (with or without securitization) ended the year with positive growth rates. In the first instance, real annual growth at December was 4.8%, placing the average fourth-quarter increase at 2.5% (this is the first quarter to see positive growth since the financial crisis in 1999). The mortgage loan portfolio without securitization was up by a real annual rate of 6.1%, which is the least growth observed since August 2006. However, when analyzing the performance of this portfolio, it is important to consider the impact securitization has on the stock of mortgage loans, since it is one of the reasons for the slowdown in the final quarter of the year.<sup>6</sup> Disbursements reflect this situation and have increased substantially

since the start of 2006 (Graph 10). The real average annual increase in new loans during the past year was 113.1%, which is well above the average registered since 2001 (45.5%). Moreover, it involves amounts that are finally beginning to approach those seen during 1995-1997.

**GRAPH 10**

**MORTGAGE LOAN DISBURSEMENTS**



Source: ICAV, Banco de la República's calculations

<sup>4</sup> The consumer loan portfolio now accounts for nearly 25% of the total gross portfolio. Approximately one fifth of that portfolio consists of credit card loans, which are generally short term and have very little collateral.

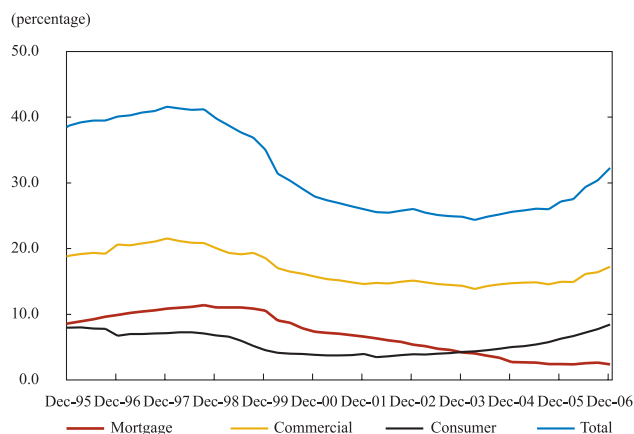
<sup>5</sup> See Point 5 in this sub-section for a more detailed analysis of how these rates performed.

<sup>6</sup> There were two securitizations in 2006: one in October for Col \$796.6 billion (b) and another in December for Col \$620.4 b.



Thanks to the shift towards loans on the part of credit institutions in 2006 and the increased demand for credit, financial depth was 32.3% at December (Graph 11), which is 18.8% more than at December 2005. Although not what it was at the end of the nineties, the positive forecast for economic performance in 2007 and its impact on brokerage activities (analyzed in Chapter I of this report) suggest this indicator will continue to rise.

FINANCIAL DEPTH (LOAN PORTFOLIO/GDP)



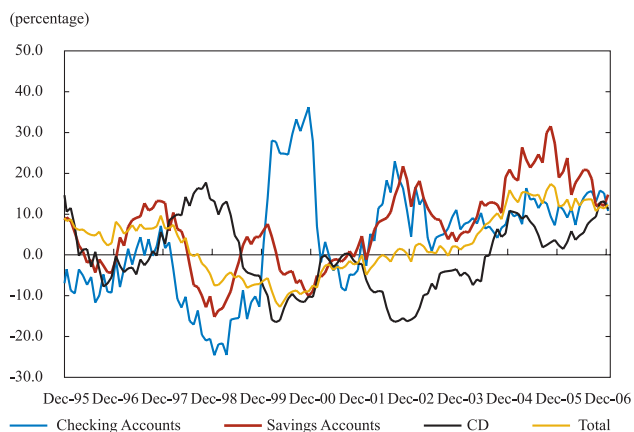
Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

b. *Liability Accounts*

The growth in credit institutions' assets was accompanied by an increase in deposits from the public. These rose by 12.3% during 2006 to Col\$109.8 t, slightly expanding their share of liabilities to 80%. In effect, during the last two years, deposits increased at a real annual rate of 13.6%, on average, a level not seen since 1995, when a similar average was reported.

Graph 12 shows the recent momentum in the major deposit components: savings deposits, checking accounts and certificates of deposit (CD). Contrary to what was noted in the last edition of the *Financial Stability Report*, credit institutions experienced a slight change in the second half of the year with respect to the financing structure that has characterized the system since mid-2005. On the one hand, the increase in saving accounts slowed from a real annual rate of 19.4% in the first half of 2006 to 15.1% in the second. This reduced their share from 47% in June 2006 to 44% at the end of the year. On the other hand, the largest CD increases in recent years occurred during the fourth quarter of 2006, when real annual growth in these certificates averaged 12.4%, which is 9.4 pp more than during the same period in 2005. Thanks to this acceleration, CDs continued to account for 29% of all deposits compared to the year before, despite limited growth during the early quarters of the year. A continuation of this trend in the structure of deposits could make the financial cost of obtaining these resources more expensive.

REAL ANNUAL GROWTH IN DEPOSITS WITH CREDIT INSTITUTIONS BY TYPE OF DEPOSIT



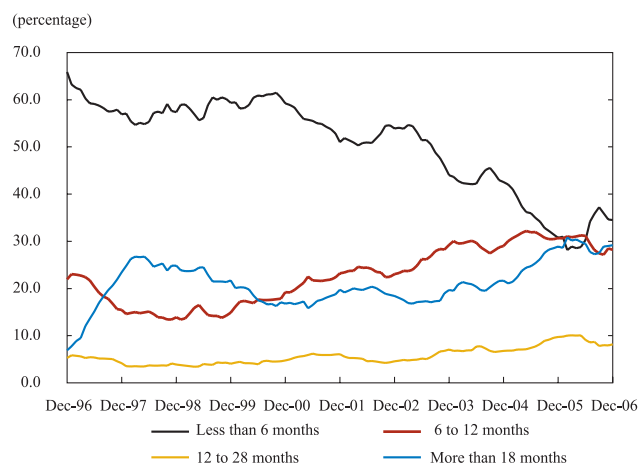
Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

Nonetheless, it is important point out that the growth in deposits through CDs during 2006 was concentrated in maturities under six months (i.e. which are less costly). These were the same instruments that lost the most ground during the period when CDs were replaced by savings accounts; their share

went from nearly 43% to 31% between December 2004 and the same month in 2005. By the end of 2006, they accounted for 35% of all deposits and, together with six to twelve month deposits, represented nearly 63% of all CDs, upholding the predominance of short-term sources of funding (i.e. under one year) (Graph 13).

GRAPH 13

**CERTIFICATES OF DEPOSIT AS A SHARE OF TOTAL DEPOSITS**



Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

**2. Credit Institutions' Exposure to Principal Borrowers**

The real changes in credit institutions' exposure to principal borrowers are summarized in Table 1 for the period from December 2005 to December 2006. As illustrated, the total amount exposed increased by 10.8% in 2006 to Col\$117.84 t.

TABLE 1

**CREDIT INSTITUTIONS' EXPOSURE TO PRINCIPAL BORROWERS**

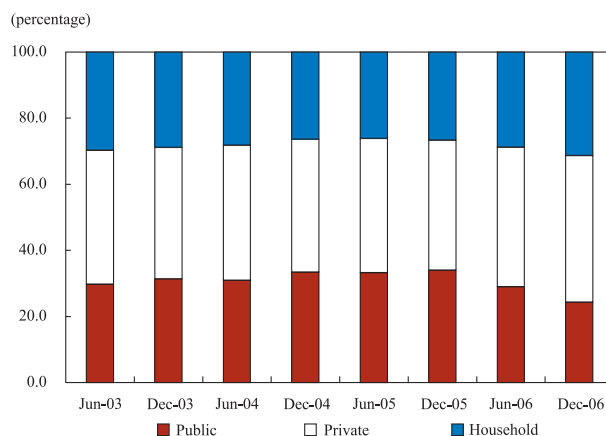
Type	Dec-05		Dec-06		Real annual growth (%)
	Trillions of Dec/06 Pesos	Share (%)	Trillions of Dec/06 Pesos	Share (%)	
<b>Public Sector</b>					
Loans	4.50	4.2	4.38	3.7	(2.6)
Securities	31.63	29.7	24.27	20.6	(23.3)
<b>Total</b>	<b>36.13</b>	<b>34.0</b>	<b>28.65</b>	<b>24.3</b>	<b>(20.7)</b>
<b>Private Corporate Sector</b>					
Loans	41.15	38.7	51.78	43.9	25.8
Securities	0.70	0.7	0.44	0.4	(37.1)
<b>Total</b>	<b>41.85</b>	<b>39.3</b>	<b>52.22</b>	<b>44.3</b>	<b>24.8</b>
<b>Household Sector</b>					
Loans	25.80	24.2	34.16	29.0	32.4
Consumer	18.69	17.6	26.63	22.6	42.5
Mortgage Loans	7.11	6.7	7.54	6.4	6.1
Securitizations	2.61	2.5	2.80	2.4	7.2
<b>Total</b>	<b>28.41</b>	<b>26.7</b>	<b>36.97</b>	<b>31.4</b>	<b>30.1</b>
<b>Total Amount Exposed</b>	<b>106.39</b>	<b>100.0</b>	<b>117.84</b>	<b>100.0</b>	<b>10.8</b>
<b>Exposed Amount over Assets</b>		<b>75.5</b>		<b>75.6</b>	

Source: Office of the National Superintendent of Financial Institutions and Banco de la República.

The public sector's exposure declined by 21% during 2006. Total exposure was 24.2%, due to the sell-off of debt securities by credit establishments. Thanks to the drop in the public sector's exposure, coupled with the sizeable increase in consumer loans (42.5%), households became the second major borrower in the system, accounting for 31.4% of the resources loaned by credit institutions. This is the first time the financial sector is more exposed to households than to the public sector and demonstrates the pronounced shift in the assets they hold (Graph 14).

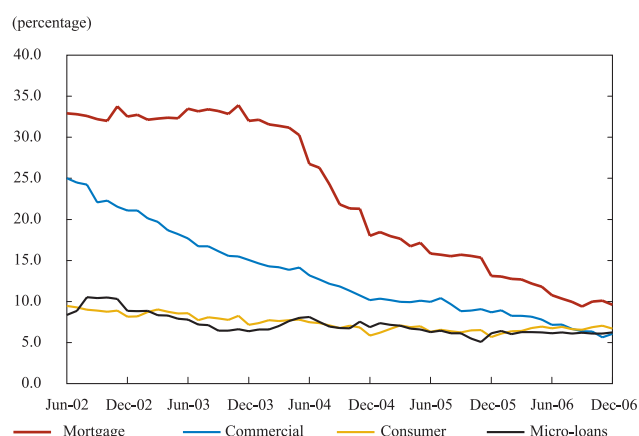
The major borrower in the system is still the private corporate sector (44.4%), which has increased its share throughout the year, thanks to a good situation with respect to its loan portfolio, which was up by 26.1%.

SHARE (%) OF EXPOSED AMOUNT, BY AGENT CATEGORY



Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

LOAN PORTFOLIO QUALITY (RISKY/GROSS LOAN RATIO)



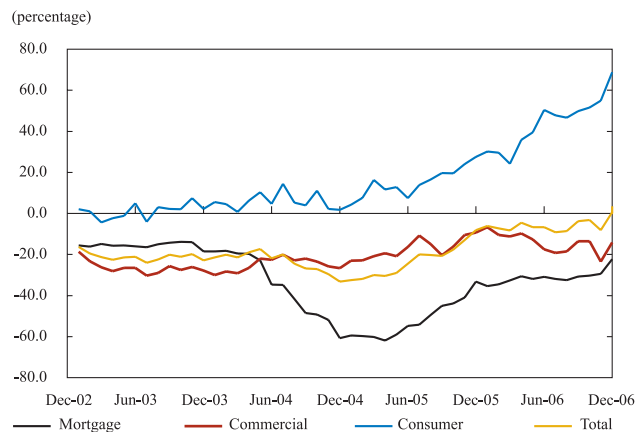
Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations

### 3. Loan Portfolio Quality and Loan-Loss Provisioning

The quality of the financial system's loan portfolio improved steadily throughout 2006. Portfolio quality is assessed as the risky loan<sup>7</sup>/gross loan portfolio ratio. By the end of the year, the quality indicator (QI) was 6.4%, as opposed to 8.1% in December 2005 (Graph 15). This improvement is explained primarily by the commercial loan portfolio; its percentage of all risky loans declined from 8.7% to 6.1% between December 2005 and December 2006. The QI for mortgage loans also performed well during that period, ending the year at 6.2%. This is the lowest it has been in the last five year.

However, the dynamics were not positive for all loan portfolios. The quality of consumer loans was low in December 2006 compared to the same period in 2005 (6.7% versus 5.7%). As mentioned in past editions of the *Financial Stability Report*, the abrupt growth in consumer loans must be accompanied

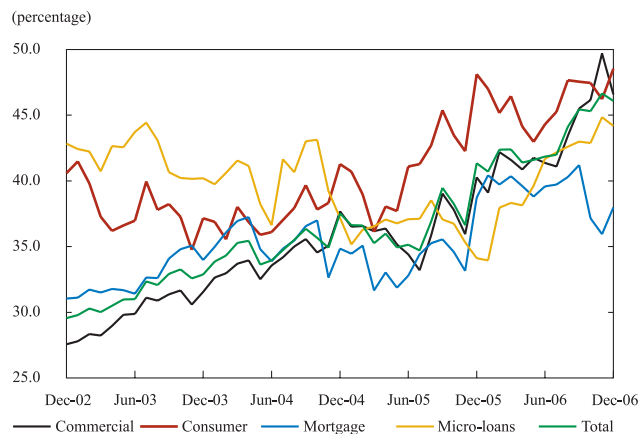
<sup>7</sup> The risky loan portfolio is comprised of all loans with a rating other than A.

**GRAPH 16****REAL ANNUAL RISKY LOAN PORTFOLIO GROWTH**

Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

by careful risk assessment by institutions themselves, so as to avoid less creditworthy borrowers.

The deterioration in this portfolio is particularly evident considering the increase in risky loans in recent years. As illustrated in Graph 16, the high-risk consumer loan portfolio expanded quickly throughout 2006, from a real average annual increase of 15.1% in 2005 to 44.1%. In contrast, the last few years have seen a decline in risky mortgage and commercial loan portfolios. However, this began to change during the last quarter, and there is now less and less of a downturn in risky credit of this type. These factors, and particularly the growth in consumer loans, raised the total risky loan portfolio by 0.6% at December, in real terms, which is the first increase in the last four years.

**GRAPH 17****COVERAGE: PROVISIONING/RISKY LOAN PORTFOLIO**

Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

Provisions for the riskiest loans (measured as the loan-loss provision/ risky loan ratio) continued to rise during 2006, going from 41.4% in December 2005 to 46.1% in December 2006 (Graph 17). The graph shows two aspects worth noting. The first is the increase in provisioning for consumer loans, which is at historically high levels. This is consistent with the decline in loan portfolio quality and the increased risk institutions anticipate. The second is the reduction in mortgage-loan provisioning witnessed in the final quarter of 2006. Despite real growth in this loan portfolio, provisions declined throughout the year.

It is important that provisions be consistent with the risk institutions *expect*. Although the mortgage portfolio is currently favorable, more exposure makes financial brokers more sensitive to any negative shock that might compromise debtors' creditworthiness and the value of collateral.

#### 4. Earnings, Profitability and Capital Soundness

Due to valuation losses on tradable investments in 2006, credit institutions reported a major slowdown in earnings compared to the year before. The

direct result was fewer profits on assets, although they remained historically high. While profit growth was not the same as in 2005, rearrangement of the portfolio in the direction of loans enabled credit institutions to regain a bit of lost ground, through more income from loans. The capital adequacy ratio declined with the increase in loans, due to more risk-weighted assets, but was still above the minimum stipulated by the regulators.

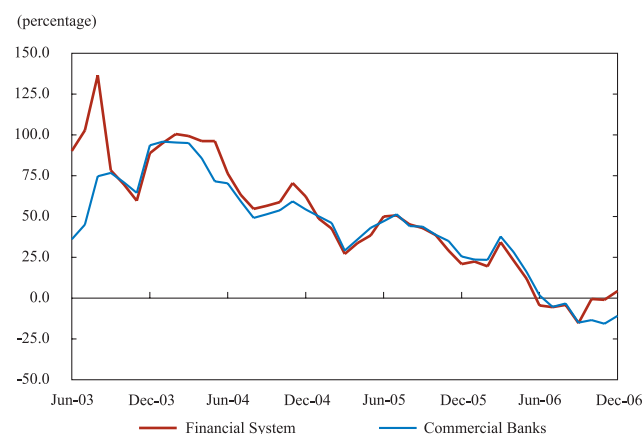
The slowdown in profits is evident when comparing the average for 2006 to that of 2005: annualized profits were up by 7% throughout 2006, on average, as opposed to an average increase of 39% the year before. The effect of valuation losses is even more noticeable in the case of commercial banks; their profits were 10.1% less than those reported at the close of 2005 (Graph 18). However, profits for the financial system and commercial banks were positive by the end of the year: Col\$3.6 t and Col\$2.6 t, respectively.

Less valuation income on investments is apparent in the composition of income reported by credit institutions. As mentioned in the last edition of the *Financial Stability Report*, investment valuation as a share of income accounted for more than 20% of total income in 2005, but declined throughout 2006 and was 10% at December. This is a real annual reduction of 50.3% (Graph 19).

The momentum in income from the loan portfolio and commissions was good. Both are tied to the traditional brokerage business and ended the year with real respective annual increases of 10.1% and 17%, accounting for 58.5% and 12.3% of total income. The growth in loan portfolio income was a high point and occurred in a context of narrower interest rate spreads (analyzed in the next section), which is evidence of the sharp rise.

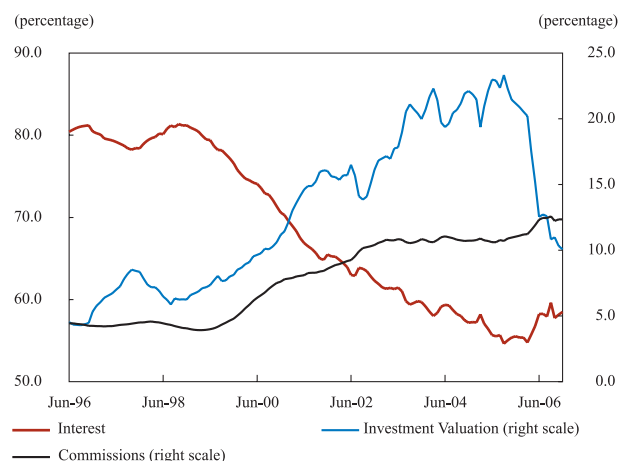
As expected, a direct repercussion of the trend in profits during 2006 was lesser yield per peso in assets. The ratio of profits to assets (ROA) declined

REAL ANNUAL GROWTH IN PROFITS

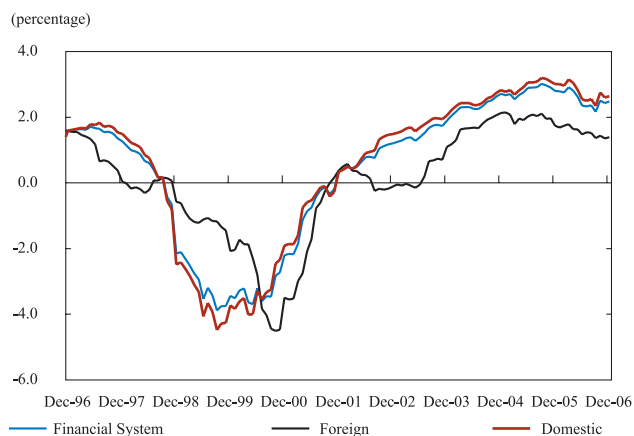


Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

MAKEUP OF EARNINGS



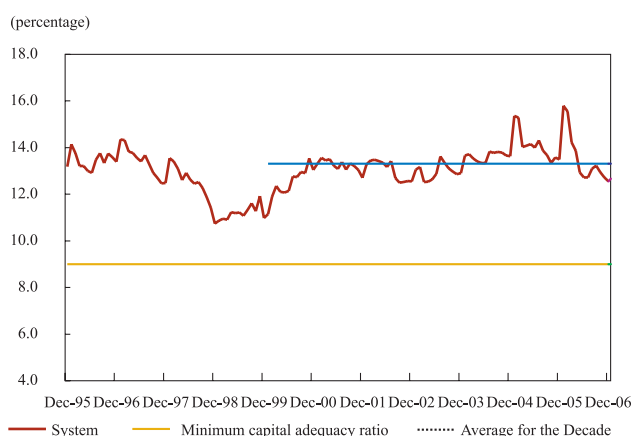
Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

**GRAPH 20****RETURN ON ASSETS (ROA)**

Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

from 2.8% in December 2005 to 2.5% in December 2006 (Graph 20). However, profitability in the financial system remained at historically high levels.

The materialization of market risk associated with the domestic government bond portfolio of credit institutions was a warning of the risk inherent in instruments of this type. However, it does not imply that banks should have no exposure to the public debt market. There is risk associated with any activity, credit included. The message is simple: exposure must reflect the real risk agents are prepared to assume and capital requirements must be consistent with the extent of those risks.

**GRAPH 21****CREDIT INSTITUTIONS' CAPITAL ADEQUACY RATIO**

Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

In this respect, implementation of the new market-risk regulations developed by the Office of the National Superintendent of Financial Institutions is a first step towards creating the incentives credit institutions need to create their own risk models. Incentives of this sort should be extended to all exposure associated with the banking business (i.e. credit risk, liquidity risk, operational risk). Financial brokers are more knowledgeable than anyone about the risks they face.

As to capital soundness, financial institutions reported good capital positions by 2006. Graph 21 shows the change in the capital adequacy ratio, which was 12.8% at December 2006. This is 70 bp less than in December 2005, due to the increase in risky assets (thanks to growth in the loan portfolio). Despite being slightly below the average for the decade (13.3%), the figure at

December 2006 is still more than 3 pp above the minimum required by the regulators.

## 5. Interest Rate Spreads

Previous editions of this report emphasized the sizeable growth in loans, largely due to consumer credit. Also noted was the fact that growth in the consumer loan portfolio has been accompanied by a decline in interest rates, which means a narrower interest rate spread on those loans. The

past year (2006) was no exception and interest rate spreads on consumer loans fell by more than 3 pp between December 2006 and the same month in 2005.

As with consumer credit, interest rates on commercial loans were historically low in recent years, contributing to the added growth in this portfolio. The downward trend in interest rates on commercial loans was interrupted in mid-2006. This was reflected in the *ex ante* spread. It went from 4.3% in June 2006 to 4.7% in December of that year (Graph 22), but is still less than in December 2005 (5.2%).

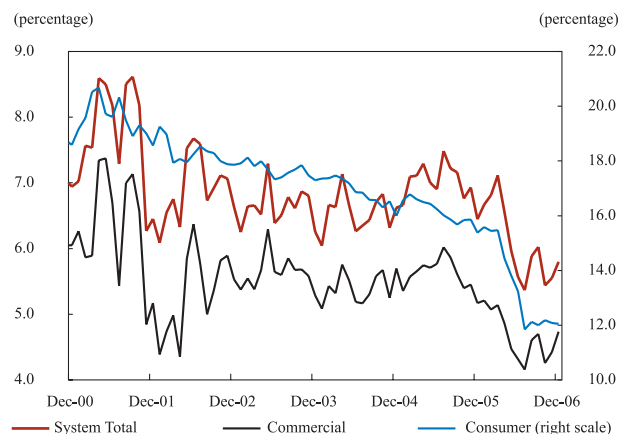
The behavior of the interest rate spread on commercial loans slightly raised the spread for the financial system with respect to the first half of the year. The difference between the lending rate and the deposit rate went from 5.6% in June 2006 to 5.8% in December 2006. Even so, 2006 witnessed a downward trend: the level at December was 65 bp below what it was in December 2005 and the average for the year (6.06%) is the lowest of the last five year.

The final months of 2006 saw a slight increase in the real deposit rate,<sup>8</sup> from 2.27% in June 2006 to 2.40% at the close of the second six months, after being relatively stable since 2002.

A look at the *ex post* spread<sup>9</sup> also reflects this downturn, including a substantial reduction since April 2006, which continued to the end of the year. The real spread for the financial system as a whole went from 8.8% in June 2006 to 8.2% in December 2006.

The total decline in the *ex post* spread is explained almost entirely by a reduction in the real implicit lending rate, which was down by 0.78 pp

EX ANTE SPREAD USING CERTIFICATE OF DEPOSIT RATE



Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

EX POST SPREAD



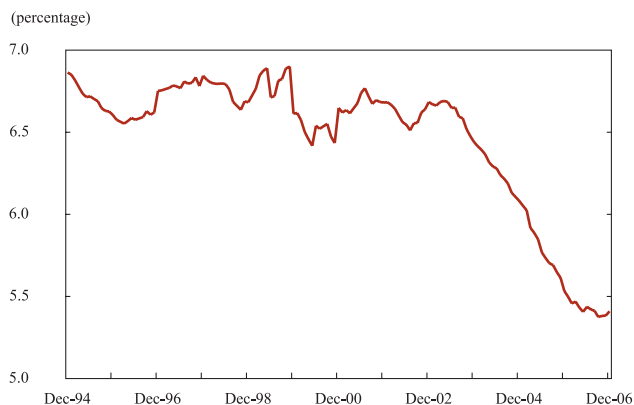
Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

<sup>8</sup> The deposit rate used to calculate the *ex ante* spread is an average of the CD rates at all maturities.

<sup>9</sup> The *ex post* spread is calculated as the difference between the implicit lending and the implicit deposit rates. The first is income from interest, plus indexation as a percentage of the performing portfolio. The latter includes outlays for interest, plus indexation as a percentage of liabilities with cost.



**EFFICIENCY: RATIO OF ADMINISTRATIVE AND LABOR COSTS TO AVERAGE ASSETS**



Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

between June and December 2006. The interest rate on deposits remained constant, at around 5.4% during the same period.

Two factors appear to be responsible for the reduction in interest rate spreads. On the one hand, credit institutions reported historically low levels of efficiency during 2006. The ratio of administrative and labor expenses to assets averaged 5.4% by the end of 2006. This means that only Col\$5.4 of every Col\$100 in assets is earmarked for these expenses (Graph 24). On the other hand, the substitution of loans for investments seems to have increased competition for deposit-taking (which would explain the higher rate on CDs) and for extending new loans (consistent with the decline in lending rates). In short, the positive

behavior of interest rates and the low spreads witnessed throughout the year were decisive to stimulating the demand for credit and the subsequent growth in loans.

## 6. Conclusion

The encouraging trend in traditional loan activities made 2006 a good year for credit institutions. Loan portfolio growth in the financial sector was consolidated and remained vigorous. The increase in lending was financed by a strong rise in deposits; these have acquired added stability thanks to a larger share of CDs. The liquidation of domestic public debt securities also was a key source of financing for the growth in credit. This process has been accompanied by historically low levels with respect to the index of loan portfolio quality, except for the consumer portfolio, and by more coverage (loan-loss provisioning for the risky portfolio) on the part of credit institutions. Moreover, their profits and capital adequacy ratios have been good, which is a guarantee of soundness in the mid-term. The high levels of capital are important to absorbing unexpected losses and suggest there will be no supply-side restrictions on credit.

The current situation made it possible to recover some of the financial depth lost during the last crisis. Moreover, the macroeconomic outlook for 2007 suggests the recovery will continue. This, however, will depend on two factors. One is the careful analysis required of debtors with respect to their future obligations and their possibilities for repayment. Another is the good risk-management practices adopted jointly by credit institutions and the National Superintendent of Financial Institutions.



Clearly, it is the brokers who are most familiar with their market niches, the individual characteristics of their clients and, therefore, the risks they pose. This is why they should create their own risk models to supplement those developed for reference by the Financial Superintendent. Moreover, regulators must provide the conditions required to make sure the actions of individual brokers do not jeopardize financial and macroeconomic stability. Interaction between a responsible regulatory framework supervised by the Financial Superintendent and proper risk management by institutions themselves is crucial to the stability of the financial system. In this context, initiatives such as the anti-cyclical provisions used successfully in the Spanish market are indispensable to guaranteeing the stability of the financial system. Those provisions are now being studied by the Financial Superintendent and are particularly important in a situation where credit is growing, which is precisely when more risks are taken.

## B. NON-BANK FINANCIAL INSTITUTIONS

Growth in the investment portfolio of non-bank financial institutions (NBFI) slowed in 2006 because of the unfavorable results experienced at the end of the second quarter. The negative price shock was a serious blow to the portfolios of these investors, who were heavily exposed to domestic assets, particularly TES and stocks. Recovery within the NBFI group during the second half of the year was not homogeneous. The following is an analysis of the leading NBFI in Colombia, including pension fund managers (PFM), insurance companies, trust funds and brokerage houses. This edition of the *Financial Stability Report* contains a new item: an analysis of the investment portfolio of mutual investment funds.

All of these institutions, but particularly the pension funds, are important to financial stability because they manage household savings and because of their relationship to the financial system in general, either as counterparts or as reference points in domestic markets. Therefore, NBFI play a key role in risk pass-through among agents, particularly because many NBFI are associated with a financial group. In the event of a crisis, be it individual or systemic, the amount of pass-through depends largely on the relationship between the agents and this sector, and the way their portfolio is managed in the various markets.

Table 2 shows the value and relative size of the NBFI portfolio in recent years. As the table indicates, the value of the portfolio held by NBFI investors

TABLE 2

## FINANCIAL INSTITUTIONS' INVESTMENT PORTFOLIO

	2003		2004		2005		2006	
	Trillions de pesos	Percentage of GDP	Trillions of pesos	Percentage of GDP	Trillions of pesos	Percentage of GDP	Trillions of pesos	Percentage of GDP (proj)
<b>Credit Institutions</b>								
Investments	28.81	12.46	36.93	14.30	43.93	15.48	37.65	12.39
Loan Portfolio	57.45	24.85	66.06	25.57	77.09	27.16	101.91	33.54
<b>Total Credit Institutions</b>	<b>86.26</b>	<b>37.31</b>	<b>102.99</b>	<b>39.87</b>	<b>121.02</b>	<b>42.64</b>	<b>139.56</b>	<b>45.92</b>
<b>Non-bank Financial Institutions</b>								
Mandatory Pensions	20.34	8.84	26.45	10.33	36.58	12.86	43.17	14.21
Voluntary Pensions	3.77	1.64	4.49	1.76	7.33	2.58	7.23	2.38
Severance Pay	2.74	1.19	3.13	1.22	3.71	1.30	3.77	1.24
General Insurance	2.47	1.07	2.84	1.11	3.62	1.27	3.35	1.10
Life Insurance	3.55	1.54	4.38	1.71	5.82	2.04	6.19	2.04
OMF	3.98	1.73	4.52	1.77	5.33	1.87	3.79	1.25
SMR	1.83	0.80	1.93	0.75	3.12	1.10	1.54	0.51
Brokerage Firms <sup>a/</sup>	1.77	0.77	2.78	1.09	4.18	1.47	2.94	0.97
Mutual Investment Funds	0.30	0.13	0.40	0.16	0.57	0.20	0.56	0.18
<b>Total Non-bank Financial Institutions</b>	<b>40.75</b>	<b>17.71</b>	<b>50.92</b>	<b>19.89</b>	<b>70.27</b>	<b>24.69</b>	<b>72.54</b>	<b>23.87</b>
<b>Total</b>	<b>127.01</b>	<b>55.02</b>	<b>153.91</b>	<b>59.76</b>	<b>191.29</b>	<b>67.33</b>	<b>212.10</b>	<b>69.79</b>

a/ Own Position

Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

has grown increasingly. However, last year saw a major change: this trend slowed and, in most cases, portfolio value declined.

The increasing role of these institutional investors in the domestic government bond market illustrates their importance to local markets (Table 3). During 2006, the NBFIs replaced the bank financial sector as the leading agent in that market. By December 2006, 27.5% of the TES in circulation were in the hands of the NBFIs; the bank financial sector held 21.7%.

The potential NBFIs demand for securities can be estimated by considering the extent to which pension funds have increased and their growing importance in markets such as those for domestic government bonds. Assuming an increase similar to the one these investors experienced in recent months, the pension funds would be worth more than Col \$61.5 t<sup>10</sup>

<sup>10</sup> The projected value of the fund is calculated with the average rate of growth in recent months, following the adverse scenario in May (1.10% monthly). The same exercise was done with the average growth rate for the past year (1.89%) and for the entire period as of January 2002 (2.26%). At the very least, the value of these funds would increase to Col\$61.7 t.

**DISTRIBUTION OF TOTAL OUTSTANDING TES AMONG DIFFERENT AGENTS  
(PERCENTAGE)**

	2004	2005	2006
Total TES in circulation (trillions of pesos)	58.19	77.91	84.82
<b>Share</b>			
Bank Financial Sector	29.04	28.08	21.69
Total Non-bank Financial Institutions (NBFI)	24.22	24.72	27.48
PFM	15.47	16.51	19.05
Insurance, reinsurance and investment companies	2.61	2.66	3.43
Other NBFI	6.14	5.54	5.00
Productive Sector	17.19	19.38	24.70
Public Sector	22.15	20.59	20.83
Banco de la República	2.88	3.89	3.05
Securities Depositories	4.52	3.33	2.24

Source: Banco de la República.

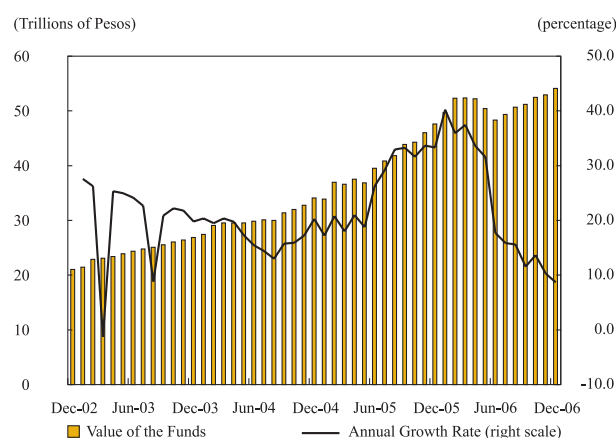
by the end of 2007. If government bonds continue to account for around 50% of their value, the normal growth in these funds would result in a demand for public debt securities valued at approximately Col\$3.7 t. Inasmuch as the government intends to issue approximately \$9.0 t in TES during 2007, one can expect approximately 40% to be absorbed exclusively by the pension funds.

## 1. Pension Fund Managers (PFM)

Growth in the portfolios managed by pension funds (PFM) suffered a major setback in 2006 due to investment losses in the second quarter of the year. The value of the PFM portfolio rose to Col\$54.1 t, which is a real annual increase of 8.7%. This impressive growth slowed dramatically as of the second quarter of the year (Graph 25). However, after the negative scenario on the markets, mandatory pension funds (MPF) began to expand again (Graph 26). The same cannot be said of voluntary pension and severance-pay funds; their recovery has not been significant. In the case of severance-pay funds, the value of their portfolio remained constant throughout the second half of 2005, given the growth in household demand for these resources to purchase homes. The seasonal peaks normally observed each year, in the first quarter, are the result of severance

GRAPH 25

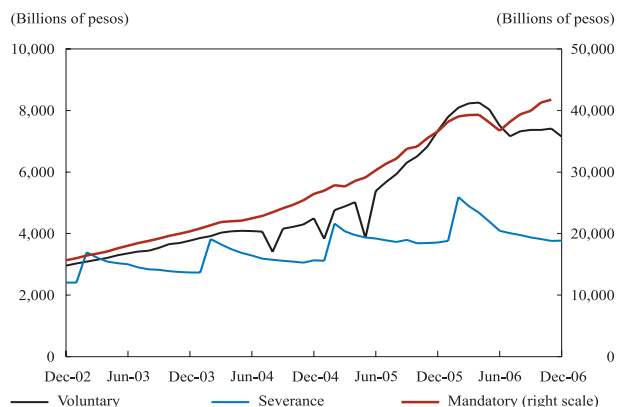
**PENSION FUND VALUE  
AND REAL GROWTH**



Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

**GRAPH 26**

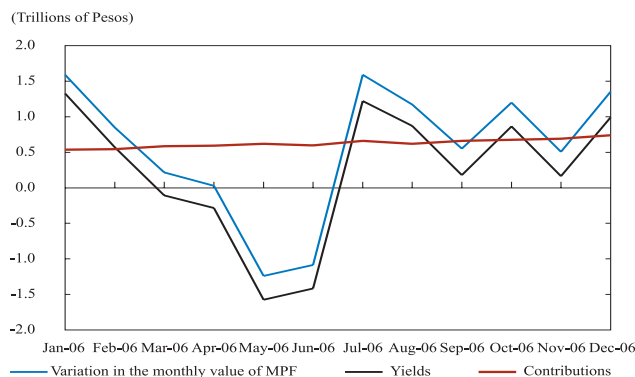
**PENSION FUND PORTFOLIO VALUE**



Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

**GRAPH 27**

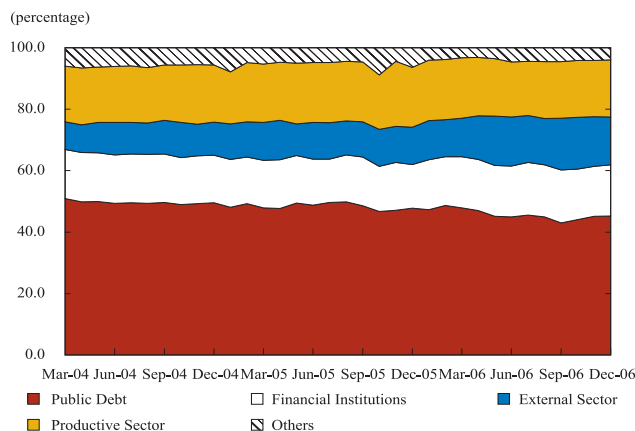
**MONTHLY VARIATION IN MPF VALUE**



Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

**GRAPH 28**

**PENSION FUND PORTFOLIO COMPOSITION BY ISSUER**



Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

pay deposited by employers. In the first quarter of 2007, a total of Col\$1.64 t. in severance pay incurred during 2006 was transferred to these funds; this is an increase of 14% with respect to 2006 year and is the largest amount registered in recent years.

A breakdown of MPF growth, according to the major flows, shows variations in the value of these funds depend primarily on credited yields and not on contributions from affiliates. Because they have remained stable, these contributions give the funds a constant growth rate. Mandatory pension funds received Col \$626 b monthly, on average, during 2006. However, variation in the value of these funds is related closely to what they yield (Graph 27).

*a. Portfolio Composition by Issuer and Maturity*

The PFM characteristically manage portfolios with considerable exposure to the market risk implicit in domestic assets (Graph 28). During the last few years, around 50% of PFM portfolio value has been concentrated in domestic government bonds. This obvious lack diversification, given the high concentration in domestic instruments, is a cause for concern and makes these portfolios sensitive to domestic asset price shocks. A more balanced portfolio that includes another type of assets would allow for better coverage. This, in turn, would optimize the risk-return ratio, which is both desirable and necessary.<sup>11</sup>

<sup>11</sup> For an analysis of this aspect, see "Financial Performance of Mandatory Pension Funds" in the section of this report entitled "Financial Stability Issues".

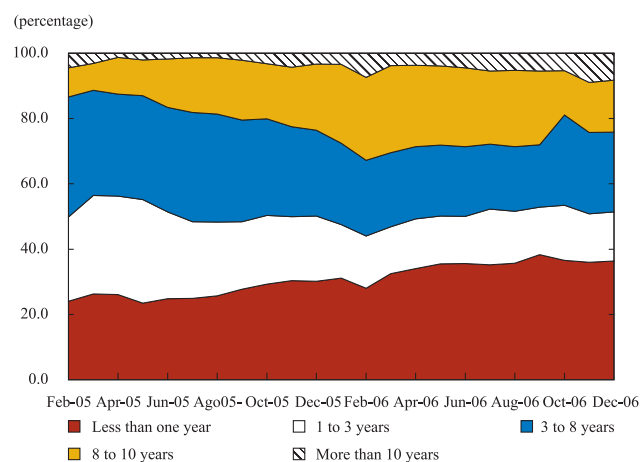
Although PFM investments in recent months have added more exposure to external assets,<sup>12</sup> thereby contributing to diversification, it is important to construct portfolios that are less exposed to variations in domestic asset prices and better reflect the investment horizon of their future obligations.

Another characteristic of pension fund investments is their high concentration in short-term instruments. Only 6% of the portfolio value is invested in instruments that mature in more than ten years (Graph 29). Considering the kind of obligations these funds have, there is an obvious mismatch between the investment horizon and the flow of future pension payments. Having more long-term instruments would create asset positions that are more consistent with the flow of future obligations. For example, at the international level, pension funds are the primary holders of credit instruments derived from mortgage securitization. In the case of Colombia, these accounted for only 0.05% of the value of MPF at December 2006, due to existing tax incentives.<sup>13</sup>

*b. Portfolio Composition by Currency*

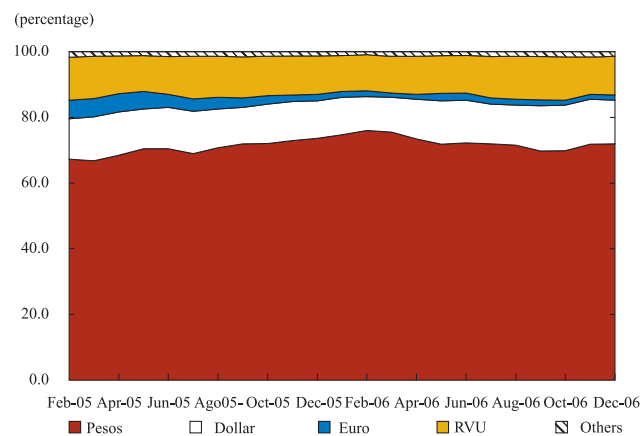
The PFM portfolio denominated in pesos has increased of late and, by December 2006, was denominated largely as such (72.0%) (Graph 30). In terms of exchange exposure, the proportion denominated in foreign currency, without coverage, declined during the second half of the year (Graph 31). In the case of MPF, exposure went from 10.7% in June to 7.6% in December 2006. With respect to the devaluation scenario between April and June 2006, the MPF had increased their exchange exposure as of February, starting with 4.6% of the portfolio value.

**PENSION FUND PORTFOLIO COMPOSITION BY MATURITIES**



Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

**PENSION FUND PORTFOLIO COMPOSITION BY CURRENCY**

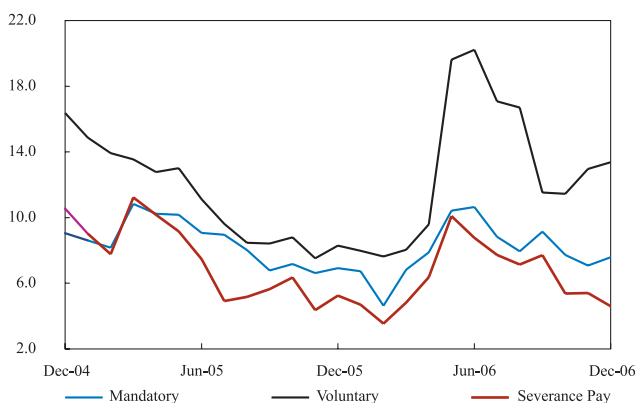


Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

<sup>12</sup> In December 2006, investments in external assets accounted for 15.6% of the portfolio value as opposed to 12.1% in December 2005.

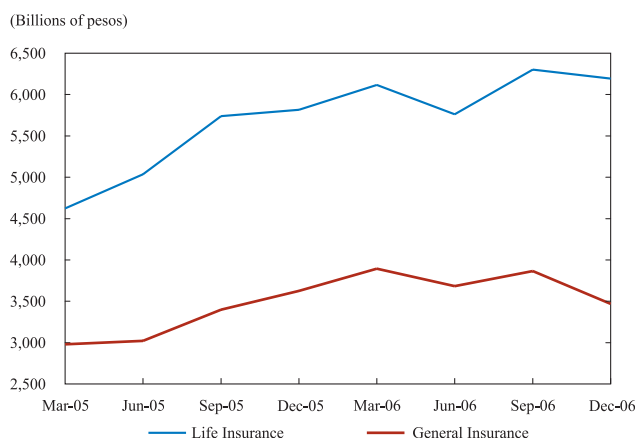
<sup>13</sup> The return on these investments is income-tax except. However, because MPF pay no income tax, there is no incentive for them to purchase these securities, since their implicit rate includes the tax benefit.

PERCENTAGE OF PORTFOLIO VALUE DENOMINATED IN FOREIGN CURRENCY WITHOUT COVERAGE



Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

VALUE OF INSURANCE COMPANY INVESTMENTS



Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

## 2. Life and General Insurance

The investment portfolio of life insurance companies (LIC) was valued at Col\$6.19 t in December 2006. This represents a real annual increase of only 1.92%. The investment portfolio of general insurance companies (GSC) was valued at Col\$3.47 t, which implies negative growth equal to a real annual rate of -8.35%. Although the insurance business has improved of late, earnings have not been good, mainly, because of the return on investments.

The insurance business took a turn for the better in 2006. Issued premiums totaled Col\$7.55 t, which amounts to a real annual increase of 12.06% with respect to the year before. An analysis by company category shows life insurance firms issued 19.4% more premiums; general insurance companies issued 7.48% more. Paid claims also performed well and were up by only 1.3% in the case of general insurance. The increase in life insurance claims was substantial (16.4%); however, because the rate of growth in issued premiums was higher, there was an improvement in insurance activity. With respect to this item, the consolidated variation for the industry as a whole was 7.0%. Thanks to all these factors, the technical outcome, which determines the operational profit or loss for companies in the insurance business, showed some improvement in 2006.<sup>14</sup>

Yet, earnings in general were not favorable: business was off by 59% in the case of LIC and 55% in the case of GIC. Graph 32 shows the value of their

<sup>14</sup> Although technical earnings were down by Col\$59 b in 2006 (to Col-\$133 b), they did improve when excluding income from sell-offs in 2005. The Financial Superintendent ordered some liquidation flows to be classified as operational income. This overvalued the technical market in 2005. When excluding that income, the technical margin for the insurance industry actually increased during 2006.

investment portfolio was seriously undermined during the second quarter of the year, halting an important period of growth for these companies.

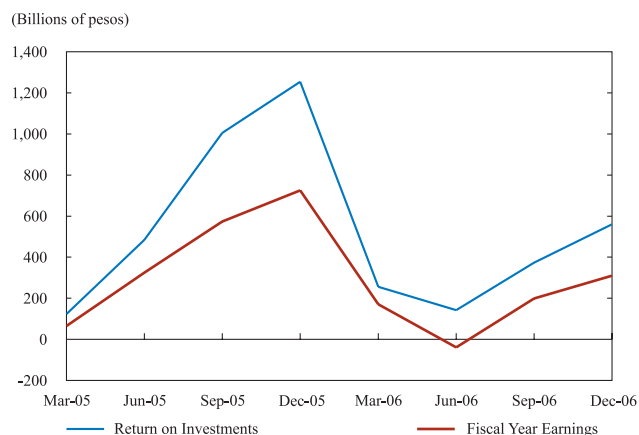
Because the technical margin has moved towards zero in recent years, indicating insurance companies are doing a better job of calculating claims, their performance depends largely on the fate of their investments. The close relationship between these two variables for LIC and GIC is shown in Graph 33. The return on investments and, hence, insurance company earnings for the year dropped sharply during the first six months of 2006. However, they have recovered considerably since the third quarter.

The limited growth reported by insurance companies and the sensitivity of their portfolio to variations in the price of domestic assets is related to their high exposure to domestic instruments. By December 2006, 51% of the LIC portfolio was invested in domestic government bonds and 28% in instruments issued by the productive sector,<sup>15</sup> mainly stocks. That exposure has remained virtually unchanged since the last edition of the *Financial Stability Report*.

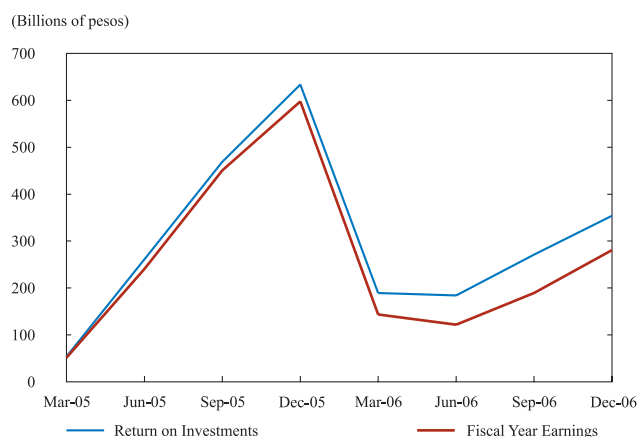
### 3. Ordinary Mutual Funds (OMF) and Special Mutual Funds (SMF)

OMF and SMF managed by trust companies were valued at Col\$3.79 t and Col \$1.53 t, respectively. The decline in these portfolios was substantial: 31.94% for OMF and 52.9% for SMF. Graph 34 shows the change in OMF value and composition. In recent years, these portfolios have concentrated on financial

(A) LIC FISCAL YEAR EARNINGS AND RETURN ON INVESTMENTS

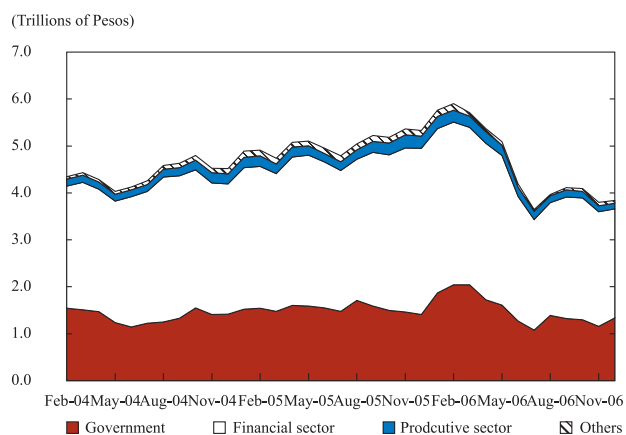


(B) GIC FISCAL YEAR EARNINGS AND RETURN ON INVESTMENTS



Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

CHANGES IN OMF PORTFOLIO VALUE AND COMPOSITION



Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

<sup>15</sup> 5 In the case of general insurance companies (GIC), the respective proportions are 46% and 21%.



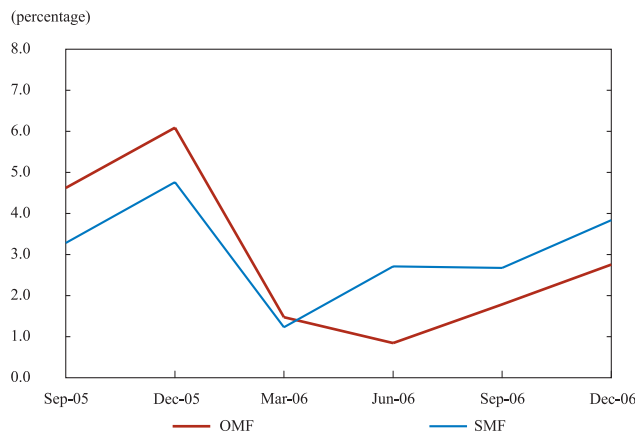
sector instruments (60.44% of OMF value<sup>16</sup> at December 2006), primarily certificates of deposit. After the plunge in market prices during the second quarter of 2006, the value of these funds has yet to recover substantially. This is mainly because of the high demand for withdrawals by investors. The fact that these funds are concentrated in fairly illiquid instruments meant the companies managing them had to sell off government bond and stock positions to meet the demand for resources. Being obliged to liquidate those positions at a time when prices were low has made it difficult for these funds to benefit fully from the subsequent recovery in the market.

The reduced earnings reported by OMF and SMF at December 2006 compared to 2005 also reflect this loss in portfolio value. The OMF reported Col\$313 b in earning and the SMF, Col\$74 b. In real annual terms, these

figures imply respective reductions of 28.18% and 68.95%, mainly due to fewer valuation profits on tradable investments in bonds.<sup>17</sup> Graph 35 shows recent developments in the ratio of profits to return on assets (ROA) for OMF and SMF. This indicator has improved since the second half of 2006; however, an assessment for the entire year shows the levels in December 2006 were still a long ways from those registered during the same month in 2005.

GRAPH 35

OMF AND SMF RETURN ON ASSETS



Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

#### 4. Brokerage Houses (BH)

As indicated in Chapter I, the domestic financial markets were extremely volatile. Balance sheets at December 2006 reflect the inability of brokerage houses to offset less income from investment trading with more income from brokerage activities. The investment portfolios of brokerage houses and the funds they manage declined during 2006. In total, brokerage houses reported Col\$4.18 t. in investments at December 2005. By the end of 2006, these portfolios

<sup>16</sup> In the case of SMF, 53% of the portfolio value was exposed to instruments for which the financial sector is the counterpart.

<sup>17</sup> In the case of OMF, these profits came to Col\$186 b at December 2006, which is a real reduction of 45.34%. SMF valuation profit on tradable investments in bonds was Col\$77 b, which is 63.67% less.

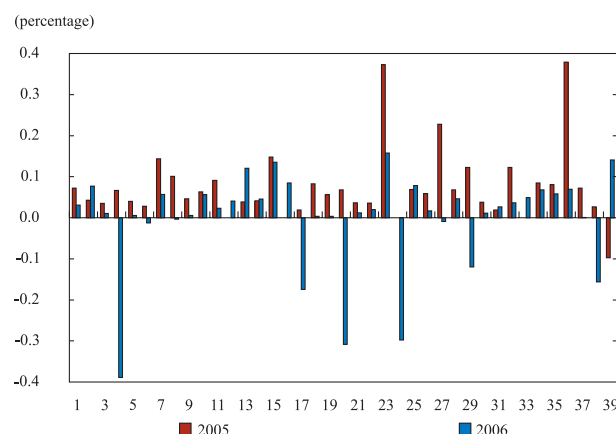


had declined to Col\$3.76 t. The funds brokerage houses manage for third parties came to Col\$1.66 t. In real annual terms, this is a drop of -3.23%.

Brokerage houses reduced their leverage in response to the high volatility on financial markets, particularly domestic ones. The investment/equity ratio was 6.41 in December 2004, 6.1 in December 2005, and 5.1 in December 2006.

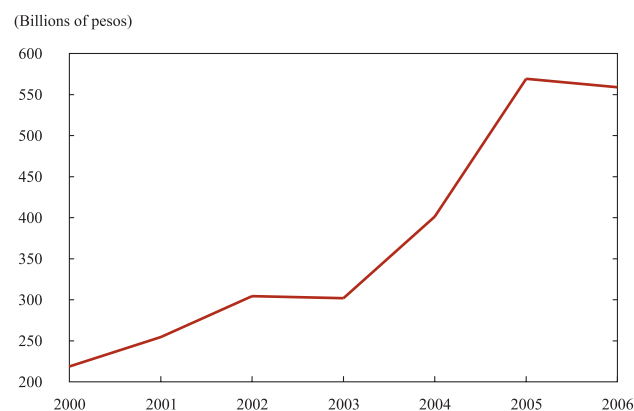
The return on BH assets increased from 2.6% in December 2004 to 4.5% by the end of 2005. However, this substantial growth was affected by the plunge in financial asset prices, and the ROA was 1.74% at December 2006. Although the outcome was generally positive, at the individual level, a number of relatively small brokerage houses experienced negative returns of considerable magnitude (Graph 36).

**BROKERAGE HOUSE RETURN ON ASSETS**



Source: Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

**PORTFOLIO OF MUTUAL INVESTMENT FUNDS**



Source: Office of the National Superintendent of Financial Institutions.

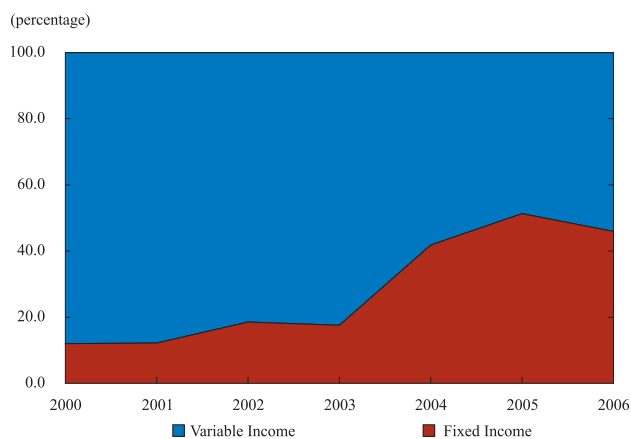
## 5. Mutual Investment Funds (MIF)

The last six years have seen a great deal of growth in mutual investment fund portfolios, which have nearly tripled in value (Graph 37). Nonetheless, the momentum witnessed up until 2005 suffered a slight setback in 2006, given the performance of financial markets during the first six months of the year. As a result, the portfolio at December 2006 (Col\$559 b) represented a real annual decline of 6%.

The previously sharp rise in MIF portfolios is explained by a high concentration in variable income instruments (particularly stocks), which increased from 17.5% as a share of the portfolio value in 2003 to 51.3% by the end of 2005. However, the focus on these instruments was the primary reason for the drop in portfolio value during 2006, given the negative shock experienced by the price of these assets in the second quarter of the year. As a result, their share of the MIF portfolio was down to 45.9% by the end of 2006 (Graph 38).

GRAPH 38

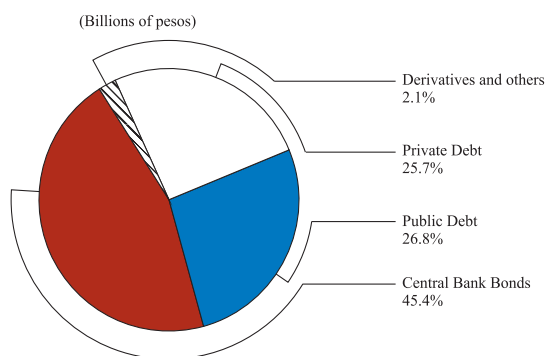
**PORTFOLIO OF MUTUAL INVESTMENT FUNDS:  
COMPOSITION BY TYPE OF INSTRUMENT**



Source: Office of the National Superintendent of Financial Institutions.

GRAPH 39

**PORTFOLIO OF MUTUAL INVESTMENT FUNDS:  
COMPOSITION AT DECEMBER 2006  
(559 B)**



Source: Office of the National Superintendent of Financial Institutions.

A look at the type of debt shows these institutional investors are less exposed to public debt than most non-bank financial institutions (26.8%) and have a similar share of private debt securities (25.7%) (Graph 39). Their fiscal year profits also were affected seriously in 2006, with a drop of 70.94% compared to 2005. This plunge is explained fundamentally by a high degree of exposure to Central Bank bonds.

In short, the increase in NBFI portfolio value slowed because of the adverse situation on domestic markets during the second quarter of the year. High exposure to public debt securities and instruments in the productive sector largely affected its performance. Most NBFI began to recover in the third quarter of 2006; however, a look at their growth for the year as a whole shows less than favorable financial performance.

The increased correlation between the prices of domestic instruments (as mentioned in Chapter I) implies more risk in the case of concentrated portfolios with little diversification. Given the growing importance of these agents in the market and their crucial role in the economy and in development of the financial system, having more balance portfolios that include other types of instruments is both desirable and necessary.

Box 1

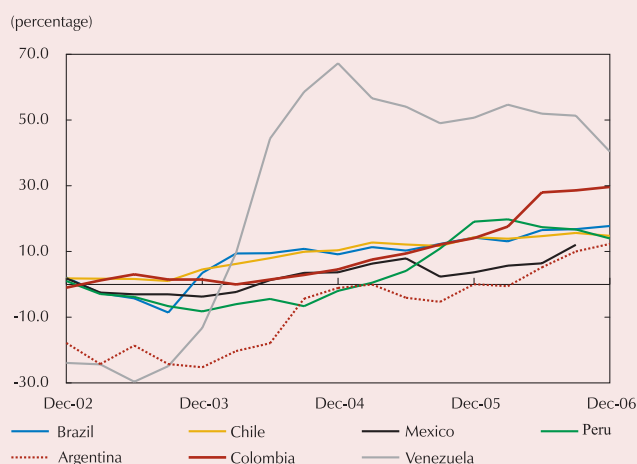
**DOMESTICIONAL INDICATORS**

This section examines several important indicators for the banking system in Colombia and in other Latin American countries.<sup>1</sup> The objective is to determine how our indicators of efficiency, profitability, loan portfolio quality and coverage measure up to Domestictional standards.

<sup>1</sup> Brazil, Chile, Mexico, Peru and Venezuela were the countries included in earlier reports. Argentina has been added to the sample for this edition.

Generally speaking, the loan portfolio in all the financial systems analyzed continues to expand at a vigorous pace. Venezuela still has the highest real rate of gross loan portfolio growth (40.35%), although it has slowed since March 2006. Peru, Chile and Brazil have converged at real rates near 20%, while Mexico witnessed a major increase from 2.3% in September 2005 to 12% in September 2006<sup>2</sup> (Graph B1.1). There was significant recovery in Argentina, where the real annual increase in the loan portfolio was 12.33% at December 2006. The same month in 2005 saw the first real positive growth in recent years: 0.03%.

**GRAPH B1.1**  
**REAL ANNUAL INCREASE IN THE GROSS LOAN PORTFOLIO**



Source: The banking superintendents in each country, Banco Central do Brazil and Banco Central de la República de Argentina. Banco de la República's calculations.

The gross loan portfolio in the Colombian banking system continues to register real increases of considerable magnitude. This was particularly true in 2006, when the portfolio was boosted by consumer loans throughout most of the year and, ultimately, by the commercial loan portfolio.

Although the countries analyzed have seen important loan portfolio growth, it has not been reflected in the financial depth indicator<sup>3</sup> (Table B1.1). Even though all the countries in question experienced an increase in financial depth (gross portfolio / GDP) between 2004 and 2005, Latin America, with the exception of Mexico and Argentina, still is at levels far below those of the developed world. Chile, the country with the highest portfolio/GDP ratio (67.7%, on average, between 2001 and 2005) does not equal the average for the European Union countries during the same period, which was nearly 117%.<sup>4</sup> After Chile and Brazil, Colombia has the most

<sup>2</sup> In the case of Mexico, all the figures are for September 2006. The December figures had not been released at the time this report was written.

<sup>3</sup> The indicator is for 2005, since most of the countries have not released GDP figures for 2006.

**TABLE B1**  
**FINANCIAL DEPTH: GROSS PORTFOLIO/GDP**  
**(PERCENTAGE)**

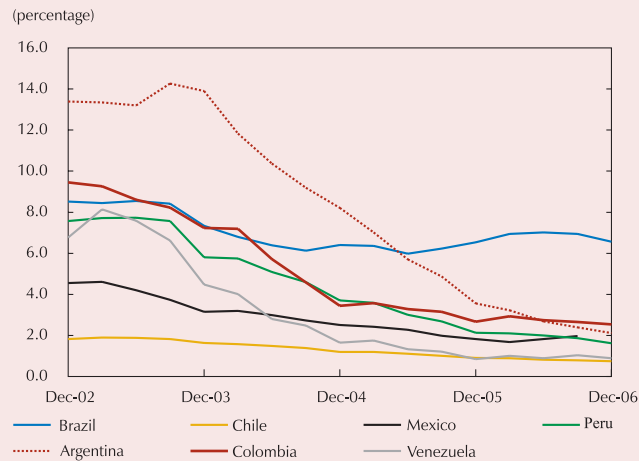
Year	Brazil	Chile	Mexico	Peru	Venezuela	Argentina	Colombia
2001	26.26	69.53	15.78	19.53	11.32	32.51	25.15
2002	26.95	68.35	15.74	18.89	9.32	32.36	24.60
2003	26.28	65.71	14.32	16.65	8.26	20.85	23.28
2004	26.84	65.34	13.96	15.20	10.39	18.37	22.87
2005	29.38	69.46	13.78	16.69	12.60	17.37	23.93

Source: The banking superintendent, central bank and bureau of statistics in each country. Banco de la República's calculations.

financial depth, surpassing the indicator by 20%. Argentina, in particular, is a country where financial depth has declined in the last few years. Once as high as 30%, it is now only 17%.

Indicators of loan portfolio quality continue to decline and are historically low. In December 2006, Chile and Venezuela had the lowest non-performing/total loan ratio: 0.75% and 0.89%, respectively (Graph R1.2). Although Colombia (2.54%) has the largest default indicator, after Brazil (6.56%), it is closer to the countries with a lower indicator than to Brazil.<sup>5</sup> The trend in

**GRAPH B1.2**  
**LOAN PORTFOLIO QUALITY: NON-PERFORMING/GROSS LOAN RATIO**



Source: The banking superintendents in each country, Banco Central do Brasil and Banco Central de la República de Argentina. Banco de la República's calculations.

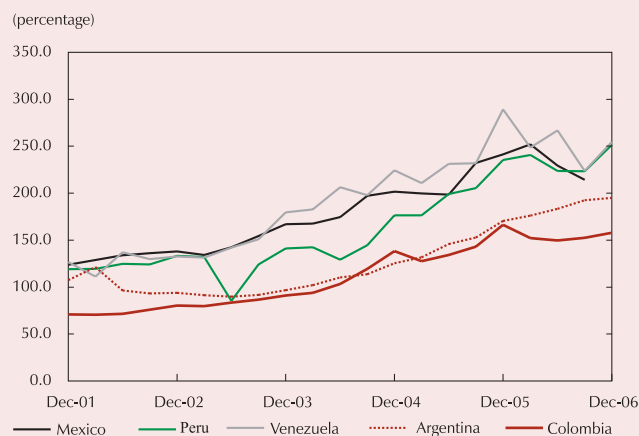
<sup>4</sup> Taken from EU Banking Structures, October 2006, ECB.

the indicator for Mexico has changed. After declining in recent years, it has been on the rise since March 2006. In Peru and Argentina, it continues to drop and is near 2%.

To round out our summary of the loan portfolio, a coverage indicator was constructed for several countries. It is the ratio of loan-loss provisions to non-performing loans. Coverage indicators usually are calculated for the risky loan portfolio. However, this variable is measured differently in each financial system and does not appear on bank balance sheets. As illustrated in Graph B1.3, all the countries in the sample have seen an increase in coverage in recent years, but the levels are different. Colombia is the country with the lowest coverage indicator at each point in time. In December, it was 158%, while Peru, Mexico and Venezuela have indicators above 200%. The indicator in Argentina is now 195%, which also exceeds the one in Colombia. This comes after registering similar levels in years past.

As to yield, the return on assets (ROA) is still near 2%. In Chile, this indicator has remained stable at around 1.2% since 2005 (the lowest ROA in the sample), while Mexican banks have experienced some rebound in yield, as part of a growing trend evident between December 2004 (1.18%) and September 2006 (2.51%). A similar situation has developed in the Peruvian banking system (Graph R1.4). Argentina shows numerous signs of recovery in bank yield. After

**GRAPH B1.3**  
**COVERAGE: PROVISIONS/NON-PERFORMING PORTFOLIO**

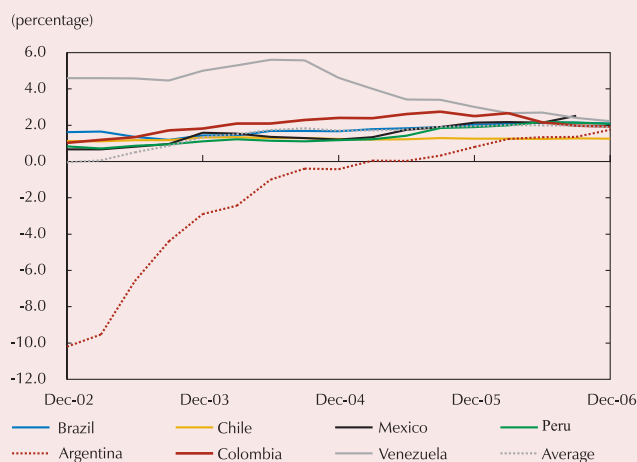


Source: The banking superintendents in each country and Banco Central de la República de Argentina. Banco de la República's calculations.

<sup>5</sup> Bank balance sheets in Brazil do not list total non-performing loans. For the purpose of our analysis, this item is calculated as the sum of loan portfolios type E, F, G and H.

reporting losses up until December 2004, its ROA indicator has increased and was 1.75% by December 2006.

**GRAPH B1.4**  
**RETURN ON ASSETS: NET PROFIT /ASSETS**



Source: The banking superintendents in each country, Banco Central do Brasil and Banco Central de la República de Argentina. Banco de la República's calculations .

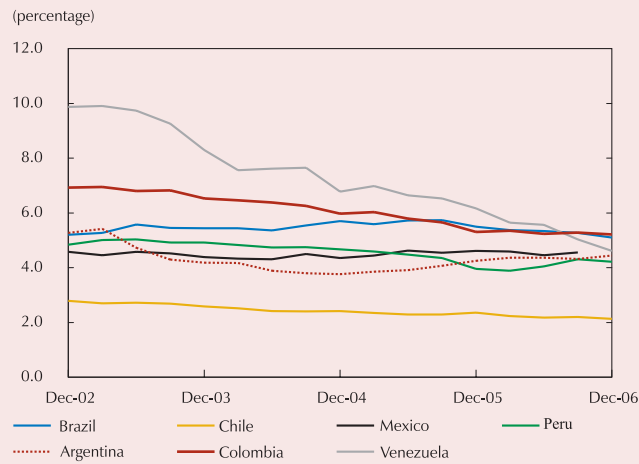
The profitability indicators in Venezuela and Colombia have declined: the first since September 2004 and the second as of March 2006. Despite the sharp drop in the indicator for Venezuela, it was still the highest in the sample at December 2006 (2.22%). For its part, Colombia is now at the average level for the countries in question (1.93%), having been above average during 2004 and 2005.

During the past year, the efficiency indicator was more or less stable for almost all the countries in the sample. The only notable reduction was in Venezuela, where the ratio of administrative and labor cost to assets went from 6.16% in December 2005 to 4.61% in December 2006 (Graph B1.5). Colombia and Brazil had the highest indicators, which is a demonstration of less efficiency compared to the other countries. Chile continued to have the lowest indicator (2.18%, on average, in 2006). This is well below those of the other countries, which are around 4% or more.

In short, the situation for the sample of Latin American banking systems remains favorable. There are good loan portfolio growth rates, accompanied by increasingly better indicators of loan portfolio quality. However, portfolio growth has yet to improve the indicators of financial

depth, and we are still a long ways from the levels seen in the developed countries. In terms of coverage, Colombia is behind the other countries but, like them, exhibits an indicator that is growing. The profitability of the banking systems in the sample is still positive and, on average, has remained at the levels witnessed in recent years. There was no improvement in efficiency during the past year, except in Venezuela. Chile continues to be the benchmark for the other countries; on the whole, it has the healthiest indicators.

**GRAPH B1.5**  
**ALE/ASSETS**



Source: The banking superintendents in each country, Banco Central do Brasil and Banco Central de la República de Argentina. Banco de la República's calculations.

### III. CURRENT SITUATION AND OUTLOOK FOR FINANCIAL SYSTEM BORROWERS

*Financial system borrowers continue to be in a favorable financial situation. The labor market and macroeconomic stability, as well as household expectations, continue to support the growth in consumer and mortgage loan disbursements.*

#### A. HOUSEHOLDS

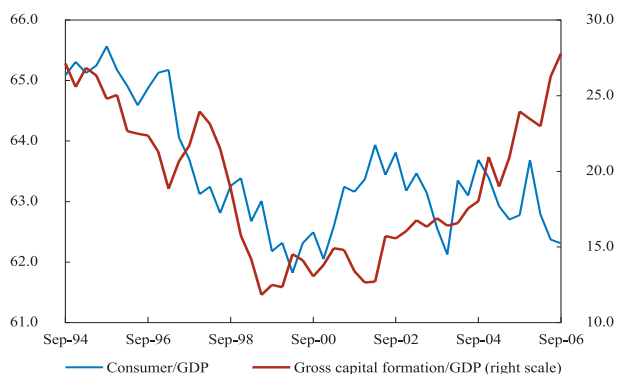
##### 1. Household Finances

The third quarter of 2006 witnessed a slight decline in consumption as a share of GDP, from 64% in the third quarter of 2005 to 62% in the third quarter of 2006. The main reason was an increase in the weight of gross fixed capital formation (Graph 40). Nonetheless, household consumption, as the main determinant of consumer loan portfolio performance, continued to grow, registering a real annual increase of 6.9% in the third quarter of the year. This exceeds the historic high of 6.2%, which occurred in the last

quarter of 2004 (Graph 41). As was the case in the second quarter of 2006, the growth in household spending can be attributed essentially to a real annual growth in spending on durables (22.27%) and non-durables (6.42%), which accounted for nearly 50% of total household consumption. It also is important to mention the rise in durables and semi-durables as a share of household spending, with respective real annual increases of 22.3% and 10.3%. This trend is expected to consolidate during the remainder of the year and to continue during the early quarters of 2007, due to a year-to-year forecast for GDP growth between 4.5% and 6.5%, bolstered largely by private consumption (6.5% year to year).<sup>18</sup>

GRAPH 40

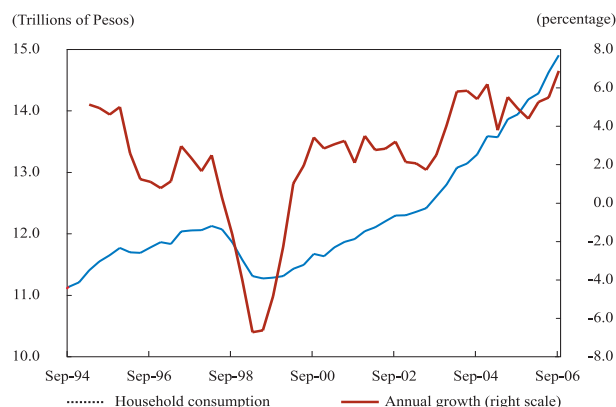
HOUSEHOLD CONSUMPTION AND INVESTMENT AS A PERCENTAGE OF GDP



Source: DANE. Banco de la República's calculations.

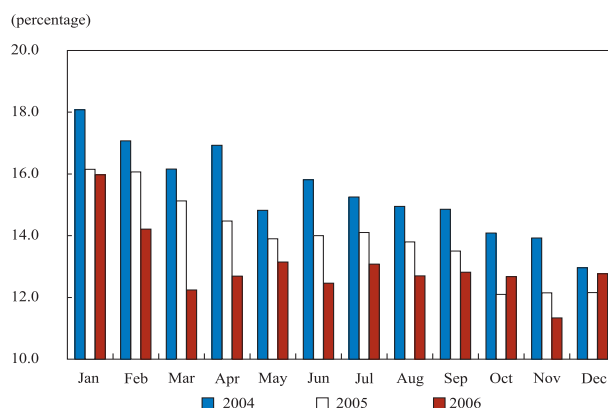


**HOUSEHOLD CONSUMPTION  
(SEASONALLY ADJUSTED SERIES)**



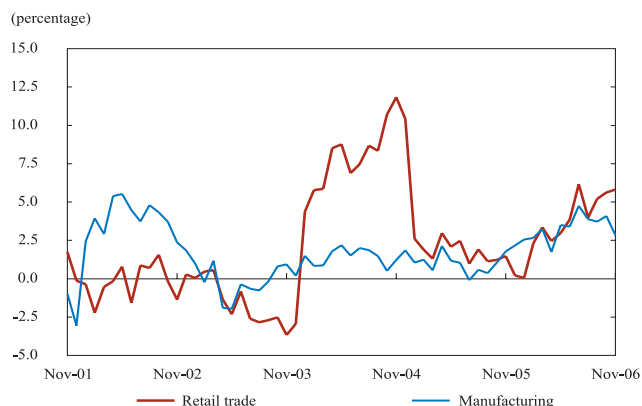
Source: DANE. Banco de la República's calculations.

**UNEMPLOYMENT RATE**



Source: DANE. Banco de la República's calculations.

**ANNUAL GROWTH IN THE REAL WAGE INDEX,  
BY SECTOR**



Source: DANE. Banco de la República's calculations.

The increase in household spending is backed by the performance of the labor market. Although unemployment in the thirteen major cities was up by 5.01% in December 2006, it declined by 6.48%, on average, during the year as a whole. This tendency continued in January 2007, when unemployment went to 14.44%, which represents an annual reduction of 9.6% (Graph 42). This is attributed to 0.05% average annual growth in the economically active population and a drop of 6.49% in the unoccupied population for 2006.

The tendency in real wages continued to favor the situation in the labor market. By November 2006, as part of a trend observed since January 2006, retail wages were up by 5.8% compared to November 2005. The increase in real wages in the manufacturing sector exceeded that of in the two preceding years, but slowed from 4.74% in July to a real annual rate of 2.84% in November 2006 (Graph 43).

In summary, the trend in real wages and the slowdown in unemployment explain the favorable conditions on the labor market, which support the ability of households to pay. However, given the trend in the quality of consumer loans and the increase in household borrowing, it is important to keep a close watch on consumer loan repayment and the variables that can affect the creditworthiness of households.

**2. Prospects**

Household expectations for the Colombian economy remain positive. The Fedesarrollo Consumer Expectation Index (CEI) (Graph 44) was 32.7 in January 2007, which is higher than in the two preceding years (26.6 in January 2005 and

<sup>18</sup> Banco de la República, *Inflation Report* (December 2006) Bogotá, Colombia.

*The buying perception index for homes and durable goods remained at historically high levels. This has led to a great deal of growth in the consumer loan portfolio and in home mortgage loan disbursements.*

3.11 in January 2006). It is important to analyze the relationship between the trend in household consumption and the consumer expectation index. Graph 45 shows a two-quarter delayed positive CEI correlation of 0.66 with the growth in consumption.

The home buying perception index remained positive. In fact, since March 2006, it has stabilized at historically high levels near 40 points. It reached 41.9 points in January 2007, surpassing by one point the level registered a year earlier (Graph 46). Graph 46 also shows a continuation of the upward trend in the durable goods buying perception index. Like the home buying perception index, it has been stable at historically high levels since March 2006. This is attributed to stability in the furniture and electrical appliance buying perception index and a marginal decline in the automobile buying perception index.

The trend in the durable goods buying perception index was reflected in several factors; namely, less real average annual growth in real vehicle sales (26% for 2006 as opposed to 39% for 2005), a real average annual increase in furniture and electrical appliance sales that fluctuated around 23% during the last two years, and an increase of 1.4% in housing.

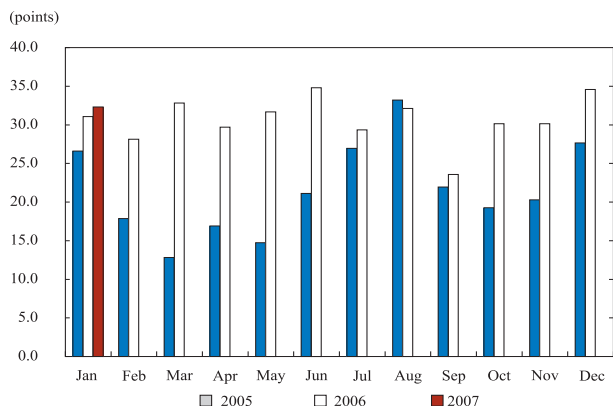
The rise in these components of household spending has been accompanied by considerable growth in the consumer loan portfolio and in disbursements on home loans, which had increased at an annual rate of 172.4% by December 2006 (Graph 10 in Chapter II). An increase of 62.3% in the area licensed for construction reflects that rise (Graph 47). Two factors encouraged this trend. The first involves low interest rates on new mortgages (Graph 48) and the possibility of long-term borrowing at a fixed rate. The second is the upward trend in housing prices since 2003 (Graph 49). This has improved the value of home collateral, allowing for more leverage. If these conditions persist, the coming months could see a continued increase in disbursements and sustained growth in this portfolio.

*If good financial conditions and favorable household expectations continue, the current trend in household loans should continue as well.*

As mentioned in the last edition of the *Financial Stability Report*, if good financial conditions and favorable household expectations persist, the current trend in private consumption should continue. And, insofar as it is financed by the consumer loan portfolio, more growth can be expected. However, a setback in the current economic situation would affect the financial health of households, threatening their ability to pay. This, in turn, would undermine the stability of the financial system. Accordingly, as emphasized earlier, growth in the consumer loan portfolio must lead to further monitoring that effectively measures credit risk.

GRAPH 44

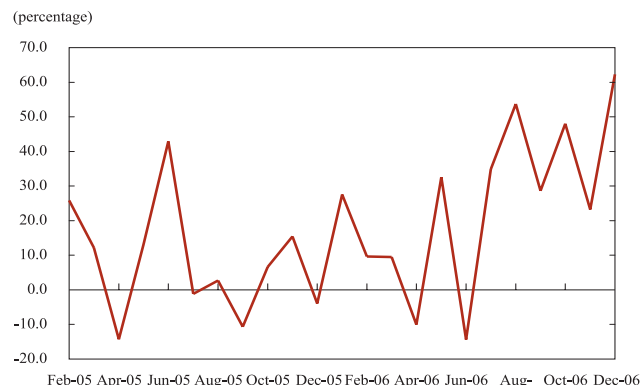
CONSUMER EXPECTATION INDEX



Source: Fedesarrollo. Banco de la República's calculations.

GRAPH 47

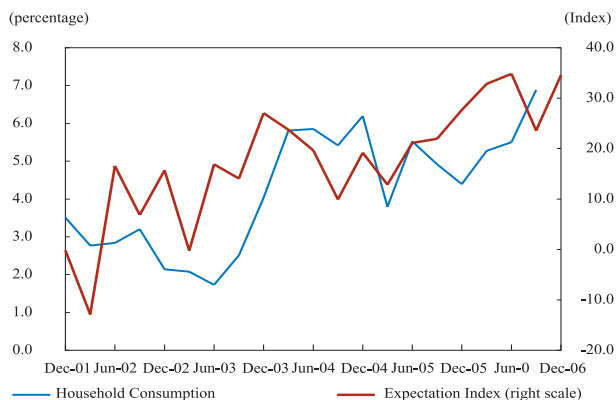
ANNUAL GROWTH IN AREA LICENSED MONTHLY FOR HOUSING, BY PERMITS



Source: DNP. Banco de la República's calculations.

GRAPH 45

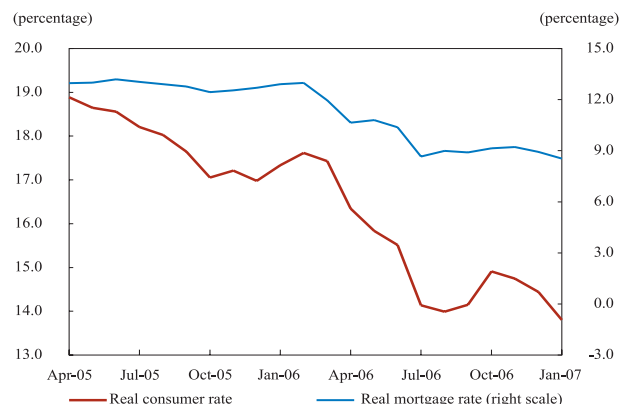
GROWTH IN HOUSEHOLD CONSUMPTION AND THE CONSUMER EXPECTATION INDEX



Source: DANE and Fedesarrollo. Banco de la República's calculations.

GRAPH 48

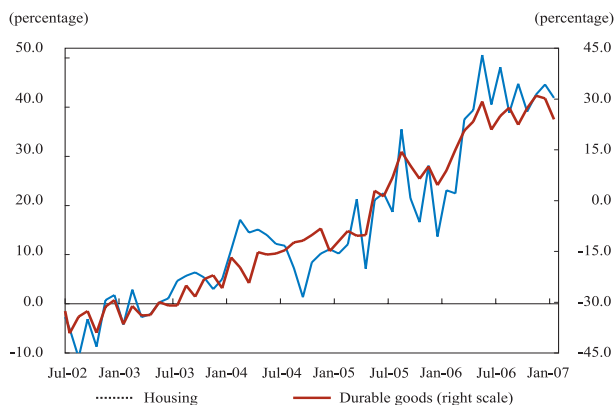
REAL MARGINAL RATE ON THE MORTGAGE AND CONSUMER LOAN PORTFOLIO



Source: Superintendencia Financiera y Superintendencia de Sociedades. Banco de la República's calculations.

GRAPH 46

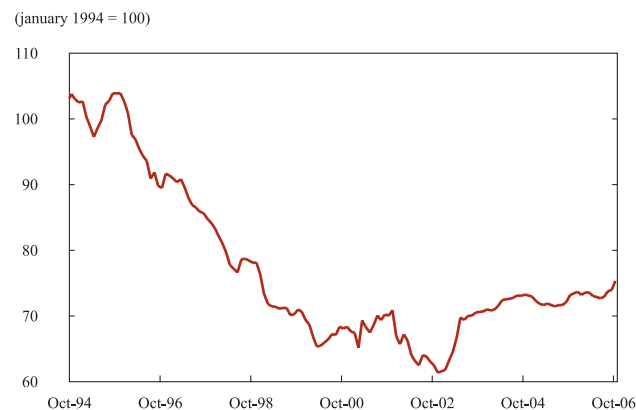
HOME AND DURABLE GOODS BUYING PERCEPTION INDEX<sup>a/</sup> (BALANCE)



a/ of Percentage of households that believe it is a good time to buy, minus the percentage that believe it is not.  
Source: Fedesarrollo. Banco de la República's calculations.

GRAPH 49

REAL NEW HOME PRICE INDEX (NHPI)



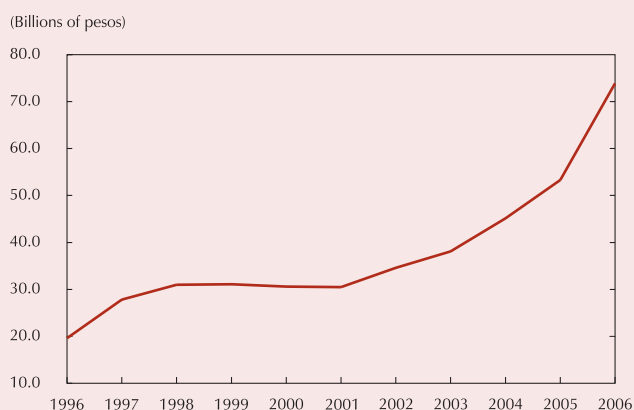
Source: DNP. Banco de la República's calculations.

## ANALYSIS OF HOUSEHOLD BORROWING IN COLOMBIA<sup>1</sup>

The descriptive section of this study contains an analysis of household liabilities and the debt<sup>2</sup>/NFW<sup>3</sup> and debt/earnings<sup>4</sup> ratios from 1996 to 2006<sup>5</sup>.

Between 1999 and 2001, the level of liabilities remained stable, at around Col\$29 t. However, between 2002 and 2006, liabilities increased steadily to slightly more than Col\$70 t<sup>6</sup> (Graph R2.1).

**GRAPH B2.1**  
**HOUSEHOLD LIABILITIES**



Source: DANE. Banco de la República's calculations.

A look at the debt/NFW ratio (Graph R2.2, Box A) shows a sharp downward trend between 1998 and 2000, following a peak in 1997. This is explained by household aversion to loans in the wake of the crisis. During the period from 2000 to 2004, the debt/NFW ratio remained relatively stable and, in 2005 – 2006, it exhibited a slight upward trend. The debt/earnings ratio, like the debt/NFW ratio, declined sharply between 1998 and 2000, then stabilized until 2003, and increased a bit in 2004 (Graph B2.2, Box B). To create two projections for this

<sup>1</sup> A summary of the descriptive section of "Análisis del endeudamiento de los hogares colombianos," a study by Mario Alejandro González (mimeograph), Banco de la República, 2007.

<sup>2</sup> Amount on loan (in billions of pesos)

<sup>3</sup> Net financial wealth is defined as the difference between total household financial assets and liabilities, based on annual financial accounts.

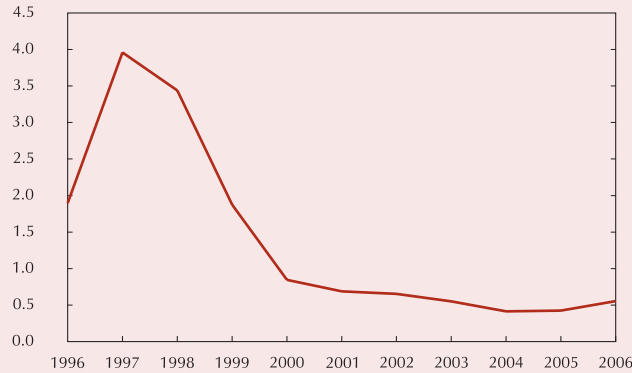
<sup>4</sup> In this case, earnings pertain to "wage earners' compensation" in the annual national accounts kept by DANE.

<sup>5</sup> Taken from Banco de la República's financial accounts.

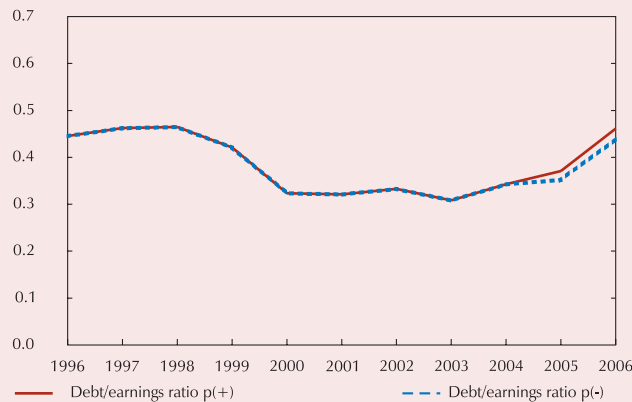
<sup>6</sup> A projection for 2006 was developed with the growth in consumer and mortgage loans.

GRAPH B2.2

(A) DEBT/NFW RATIO



(B) DEBT/EARNINGS RATIO



Source: DANE and Banco de la República. Banco de la República's calculations.

variable between 2005 and 2006, the income for those years had to be projected. The first projection, based on GDP growth, shows an upward trend that approached 44% in 2006 (Graph B2.2). In the second scenario, separate projections were done for income in 2005 and 2006. The projection for 2005 is based on the increase in NFW between 2004 and 2005 (21%). The projection for 2006 does not consider NFW growth and is based on wage earners' compensation as a share of GDP in 2004. Accordingly, in this second step, the debt/earnings ratio ends up being 46% for 2006.

*NFPS borrowing declined during 2006, thanks to more tax revenue. As a result, the national government had less need for financing. This improved its creditworthiness indicator.*

## B. NON-FINANCIAL PUBLIC SECTOR (NFPS)

### 1. NFPS Aggregate Debt

NFPS borrowing, as a percentage of GDP, declined from 55% in 2005 to 51.8% in 2006, thanks to less of an increase in debt levels and better economic performance (Table 4). Exchange exposure (debt in pesos versus debt in foreign currency) remained constant, despite a period of peso revaluation in 2006. This slowdown in debt growth reflects the national government's reduced need for financing, which continues to account for nearly 90% of all NFPS borrowing. Less financing for the national government also is a response to the rise in tax revenue during 2006 (which the government plans to maintain in 2007) and to the resources from privatizations during 2006, which will be used for financing in 2007. As a result, it was possible to reduce the number of TES auctions last year and those planned for 2007, relieving pressure on the public domestic debt market. The national government's creditworthiness and the debt sustainability indicator improved during 2006.

The increase in the NFPS gross debt slowed from 8.08% in 2005 to 5.86% in 2006. Exchange exposure with respect to that debt remained unchanged throughout 2006, with a third denominated in foreign currency and two-thirds in pesos. Taking into account the NFPS net debt, which came to Col\$131 t (80% of the gross debt and 41% of GDP) and rose by 4.92% during 2006, approximately 40% is denominated in foreign currency and 60%, in pesos.

The national government is still the primary agent in the non-financial public sector and accounts for 90% of its debt. There was less growth in the domestic

TABLE 4

#### NFPS: GROSS DEBT

	(Billions of Pesos)			(Percentage of GDP) <sup>b/</sup>			(Share)		(Nominal annual growth)		
	Ic interna <sup>a/</sup>	External	Total	Domestic	External	Total	Domestic	External	Domestic	External	Total
Dec-95	9,929	12,018	21,946	11.8	14.2	26.0	45.2	54.8			
Dec-97	18,774	17,609	36,383	15.4	14.5	29.9	51.6	48.4	48.1	36.2	42.1
Dec-99	32,928	32,879	65,808	21.7	21.7	43.4	50.0	50.0	37.5	34.5	36.0
Dec-01	54,905	50,796	105,701	29.1	26.9	56.1	51.9	48.1	17.7	21.0	19.3
Dec-03	75,078	65,883	140,961	33.0	28.9	61.9	53.3	46.7	10.7	6.3	8.6
Dec-05	102,408	53,343	155,751	36.4	18.7	55.0	65.8	34.2	21.4	(10.8)	8.1
Mar-06	104,686	51,551	156,237	35.7	17.6	53.3	67.0	33.0	17.9	(12.8)	5.6
Jun-06	105,286	58,009	163,296	34.9	19.2	54.1	64.5	35.5	14.7	9.0	12.6
Sep-06	102,675	59,363	162,038	33.5	19.3	52.8	63.4	36.6	7.0	14.0	9.4
Dec-06	106,911	57,961	164,872	33.6	18.2	51.8	64.8	35.2	4.4	8.7	5.9

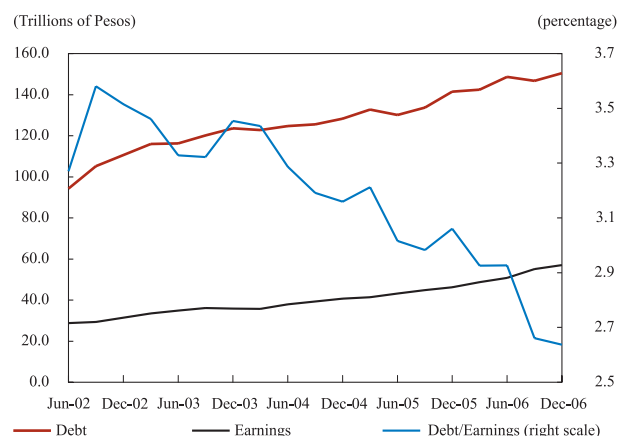
<sup>a/</sup> The national government's domestic debt includes public-bank capitalization bonds.

<sup>b/</sup> GDP in the last 12 months.

Source: Banco de la República, Ministry of Public Finance and Credit

debt because the national government did not need as much financing, thanks mainly to more tax revenue in 2006. In short, better tax collections on the part of DIAN raised tax revenue by 22% between 2005 and 2006 (from Col\$42.3 t to Col\$51.7 t). As a result, fewer TES were placed on the market in 2006 (Col\$23.6 t, including \$8.6 t sold at auction) compared to 2005 (Col\$25 t, including Col\$14.7 t auctioned). An important occurrence in 2006 was the move to replace global TES with domestic borrowing (primarily TES B). This alleviated pressure on the domestic market by diversifying the holders of securities (from domestic to external), and the national government reduced its exchange exposure. The debt sustainability indicator, defined as the ratio of debt placement to debt service, was 93%, having been 167% in 2005.

**NATIONAL GOVERNMENT CREDITWORTHINESS**



Source: Ministry of Public Finance and Credit and Banco de la República.

**2. Creditworthiness**

The national government’s creditworthiness improved during 2006, thanks to more revenue and a slowdown in borrowing. The debt/earnings ratio went from 3.06% to 2.64% between December 2005 and 2006, which is the sharpest drop since 2002 (Graph 50). As noted earlier, the increase in national government revenue (23.5%) was due to better tax collections. Moreover, following accelerated growth in 2005, domestic borrowing was up by 4.4% in 2006, which helped to lower the increases in national government debt levels.

**3. Outlook**

The national government plans to sell Col\$20.8 t in TES during 2007. This is Col\$2.8 t less than in 2006 and Col\$3.5 t less than was planned in June 2006 to finance a projected deficit of Col\$13.5 t.<sup>19</sup> Part of the reduction in the national government’s need for financing is due to higher-than-expected revenue from taxes during a period marked by positive economic growth. Privatizations during 2006 (Granbanco with Col\$1.9 t and Ecogas with Col \$3.6 t) also substantially reduced the amount of placements by auction planned for 2007. In June 2006, the government planned to auction Col\$12.5 t in securities during 2007; by

*The planned reduction in the national government's financing needs for 2007 will allow for a reduction in the amount of TES auctioned on the market.*

<sup>19</sup> Revision of *Plan Financiero* 2007 (February 9, 2007), Ministry of Public Credit, www.minhacienda.gov.co.

February 2007, this amount was down to Col\$9 t. The national government hopes to improve its debt sustainability indicator during 2007, as it did in 2006, and is aiming for a placement/debt service ratio of 76%.

### THE 2006-2010 NATIONAL DEVELOPMENT PLAN AND THE COLOMBIAN FINANCIAL SYSTEM

It is important to know what role the financial system will play in the National Development Plan (NDP) proposed by the current administration. Clearly, it will be one of the fundamental pillars of the government's long-term strategy, given the growing awareness of how important financial depth is to a country's growth. The NDP contains three specific issues of concern to the financial system.

#### 1. The Opportunity Bank

The primary thrust of the policy behind the NDP is to give the poorest sectors of the economy, especially the informal sector, access to financial services such as loans, savings accounts, payments, remittances and insurance. The Opportunity Bank (OB) was created for this reason in November 2006, with Col\$140 b in capital.

The OB is not a bank that offers direct service to the public, which is why it has no offices. It is a policy strategy being implemented through the Opportunity Bank Network, which is comprised of commercial banks, commercial finance companies, non-governmental organizations and family subsidy entities (the Farmer's Bank and BCSC are the pioneer banks of the OB policy). These institutions signed an agreement with the government to facilitate access to financial services for poor Colombians, micro-enterprises, small and medium-sized entrepreneurs and other citizens who do not have access to such services.

The national government has designed a set of instruments to promote the Opportunity Bank by amending a regulatory framework to facilitate the OB policy. In particular, this involves non-bank correspondents,<sup>1</sup> small savings accounts<sup>2</sup> (exempt from the financial transaction tax: 4/

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<sup>1</sup> These are third parties contracted by a credit institution or a cooperative to provide certain financial services. Neighborhood supermarkets or stores are an example. The idea is to expand banking throughout the country.

<sup>2</sup> In the preparatory stage.



1000), rates regulated by the National Superintendent of Financial Institutions according to category, reform of the system of guarantees and a habeas data<sup>3</sup> proposal to regulate the publication of information and the operation of credit-reporting agencies. Hopefully, by the year 2010, every town in Colombia will have at least one financial institution, either with an office of its own or operating through non-bank correspondents.

## **2. Low-income Housing (LIH)**

Given the fact that there is no system to finance low-income housing for families who are part of the informal economy (70% of the demand for LIH), the following is proposed:

- Increase the involvement of the financial and/or solidarity sector in financing low-income housing, based on a review of the limits on interest rates and efforts to encourage the use of LIH collateral made available to the informal sector through the National Insurance Fund.
- Promote access to loans for small builders, NGOs, community-housing organizations and territorial agencies that understand and serve the LIH demand among households linked to the informal sector of the economy.

There are plans to finance approximately 828,000 low-income housing units during 2007-2010 and to have the financial and solidarity sector directly disburse nearly 200,000 loans or micro-loans for LIH during that four year period.

## **3. Financial Reform**

- Amend the law regulating the internal operations of the financial system.
- Improve the structure of the financial system, allowing banks to provide other types of services such as leasing and investment banking.
- Increase the use of electronic payment means, which will help to lower transaction costs for banks and the public and will permit more tax control.
- Improve the credit information system, making it possible to reinforce databases for the benefit of those who use the financial system and the banks.

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<sup>3</sup> Currently being debated by the Senate.

## IV. POTENTIAL RISKS

*Market risk is still the primary threat, even though credit institutions are less exposed. Liquidity risk and credit risk remain historically low, although both are on the rise.*

The first chapters of this edition of the *Financial Stability Report* contain details on how credit institutions have performed of late and the financial soundness of their main borrowers. The conclusion is that, despite problems on financial asset markets throughout the second quarter of 2006, the yield and capital soundness of these institutions continues to be supported by an increase in traditional brokerage activities.

The foregoing means a greater effort is needed to monitor market risk (which materialized in valuation losses and sell-offs during the first half of the year) and credit risk (given the sharp rise in the loan portfolio). The analysis in this chapter shows that market risk is still the primary threat to the system, although credit institutions were less exposed by the end of the year. Credit risk remains low, but the exercises show institutions are taking more risks, without a respective increase in equity. Liquidity risk is limited as yet, but reflects an upward tendency that merits careful monitoring, especially if tradable investments continue to be liquidated.

### A. MARKET RISK

#### 1. The Financial System's Exposure to the TES B Market

Securities were valued with the same method used in previous editions of the *Financial Stability Report*. The value of each security was

assessed with the average price at which the issue traded on the market.<sup>20</sup>

Outstanding TES B valued at market prices<sup>21</sup> are shown in Table 5. Credit institutions held Col\$22.8 t in TES B on February 16 on this year. This is virtually the same amount that was reported on August 29, 2006.<sup>22</sup> Securities held by commercial banks are still the majority, with a proportion equal to 93.7% in February 2007, which also reflects no change with respect to August 2006.

The NBFS<sup>23</sup> had Col\$39.3 t. in its TES B portfolio. This is 33.4% more than in August 2006 and raised its market-risk exposure substantially (Table 6). As in the case of commercial banks, the PFM had the largest portion of all securities held by this sector: 73.1% by February 2007. This is a slight increase between the two dates in question.

*Credit institutions sold off a large portion of their domestic government bond holdings, while the NFPS continued to increase its exposure.*

<sup>20</sup> See the December 2005 edition of the Financial Stability Report for further details on the method used.

<sup>21</sup> All TES B held by agents (tradables, available for sale and at maturity) are included in the valuation exercise.

<sup>22</sup> Although the comparison between February 2007 and August 2006 shows no change in exposure to public debt securities, credit institutions sold off a large portion of those securities during the third quarter of 2006. For more information, see Box 4 in this edition: "Who bought and sold stock and domestic government bonds in 2006?".

<sup>23</sup> With respect to the NBFS analyzed in this section, trust companies include mutual investment funds.

TABLE 5

**OUTSTANDING TES B VALUED AT MARKET PRICES: CREDIT INSTITUTIONS**  
(MILLIONS OF PESOS)

	In Pesos	At Variable Rates	In RVU	Total
<b>Outstanding at August 29, 2006</b>				
Commercial banks	16,581,182	735,187	3,980,665	21,297,035
Commercial finance companies	100,755	0	22,359	123,115
Superior-grade finance cooperatives.	6,469	0	2,944	9,413
Finance corporations	1,037,735	15,278	238,294	1,291,308
<b>Total credit institutions</b>	<b>17,726,142</b>	<b>750,466</b>	<b>4,244,263</b>	<b>22,720,870</b>
<b>Outstanding at February 16, 2007</b>				
Commercial banks	17,456,464	688,580	2,940,052	21,085,096
Commercial finance companies	169,022	3,640	22,157	194,820
Superior-grade finance cooperatives.	24,377	0	0	24,377
Finance corporations	1,309,555	12,228	179,956	1,501,738
<b>Total credit institutions</b>	<b>18,959,418</b>	<b>704,449</b>	<b>3,142,165</b>	<b>22,806,032</b>

Source: Banco de la República.

Although credit institutions made no change in their TES B holdings between August 2006 and February 2007, one does see a slight shift from securities denominated in pesos to those denominated in RVU. In the case of the NBFS, despite increased exposure to fixed-rate securities and those denominated in RVU, the significant increase in fixed-rate securities added to their percentage of the total portfolio.

TABLE 6

**OUTSTANDING TES B VALUED AT MARKET PRICES: NON-BANK FINANCIAL SECTOR**  
(MILLIONS OF PESOS)

	In Pesos	At Variable Rates	In RVU	Total
<b>Outstanding at August 29, 2006</b>				
Brokerage houses	328,094	7,882	166,092	502,068
Insurance and investment companies	1,613,316	183,252	1,384,019	3,180,587
Pension Fund Managers	14,642,049	808,883	5,639,376	21,090,308
Trust companies	4,002,402	241,044	493,760	4,737,206
<b>Total Non-bank Financial Sector</b>	<b>20,585,861</b>	<b>1,241,061</b>	<b>7,683,247</b>	<b>29,510,169</b>
<b>Outstanding at February 16, 2007</b>				
Brokerage houses	437,218	3,854	62,642	503,715
Insurance and investment companies	2,158,812	188,332	1,403,493	3,750,638
Pension Fund Managers	21,717,099	947,677	6,108,733	28,773,509
Trust companies	5,675,462	152,953	518,981	6,347,396
<b>Total non-bank financial sector</b>	<b>29,988,591</b>	<b>1,292,815</b>	<b>8,093,850</b>	<b>39,375,257</b>

Source: Banco de la República.

TABLE 7

**CHANGES IN TES B HOLDINGS<sup>a/</sup>**  
(MILLIONS OF PESOS)

	Quantity Change	Price Change	Total Variation
<b>Total credit institutions</b>	<b>(1,998,638)</b>	<b>2,083,801</b>	<b>85,162</b>
Commercial banks	(2,161,568)	1,949,629	(211,939)
Commercial finance companies	48,480	23,226	71,705
Superior-grade financial cooperatives	7,717	7,248	14,965
Finance corporations	106,733	103,698	210,431
<b>Total non-bank financial sector</b>	<b>3,527,386</b>	<b>6,337,702</b>	<b>9,865,088</b>
Brokerage houses	(53,930)	55,577	1,647
Insurance and investment companies	202,087	367,963	570,051
Pension Fund Managers	2,699,955	4,983,246	7,683,201
Trust companies	679,274	930,916	1,610,190

a/ Changes between August 29, 2006 and February 16, 2007.  
Source: Banco de la República.

A breakdown of the quantity and price variations in TES B holdings is presented in Table 7. The price change is due to a shift towards securities with prices that rose or fell during the period in question and is calculated as the residue between the total change and the change in quantity.

Credit institutions sold off a large quantity of their bond holdings between August 2006 and February 2007. Even so, there was almost no change in their total exposure to market prices. This is explained by the valuation of these securities due to the reduction in rates during the second half of 2006.

Unlike credit institutions, the NBFS increased its exposure to market prices because of changes in both quantity and price. NBFS institutions, primarily PFM, acquired a sizeable quantity of TES B between August 2006 and February 2007; these appreciated during the same period.

*A 200 bp change applicable to all maturities on the zero-coupon yield curve for fixed-rate TES would generate a loss of 20.21% in profits for credit institutions and 2.77% in the value of PFM portfolios.*

## 2. Sensitivity to TES B Rate Increases

The valuation losses that would occur with a 200 bp change for all maturities on the zero-coupon yield curve for fixed-rate TES<sup>24</sup> and RVU-denominated TES<sup>25</sup> was calculated to measure the response in portfolio value to interest rate changes. As with exercises in the past, this one includes only the trading book positions of these securities.<sup>26 27</sup>

Valuation losses were estimated with the portfolio at February 16, 2007 (Table 8). The losses incurred by credit institutions, with a hypothetical increase in the interest rate, came to Col\$721 b. This is equivalent to 20.21% of the profits at December 2006. In the case of commercial banks, the loss came to Col\$683 b and represents 31.49% of the profits during

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<sup>24</sup> For countries other than the G-10, this is the shock suggested by the Basel Committee on Banking Supervision.

<sup>25</sup> An increase in the real spread on the RVU reference rate for TES-RVU is assumed. An increase in inflationary expectations would result in losses only on fixed-rate TES. There would be no change in the real return on TES-RVU.

<sup>26</sup> The trading book is the portfolio of financial instruments each bank holds for the benefits to be derived from their short-term purchase and sale. In the Colombian case, it includes the positions in tradable securities available for sale.

<sup>27</sup> The Risk Metrics method was used to calculate the change in portfolio value. See the December 2005 edition of the Financial Stability Report for a more detailed explanation.

TABLE 8

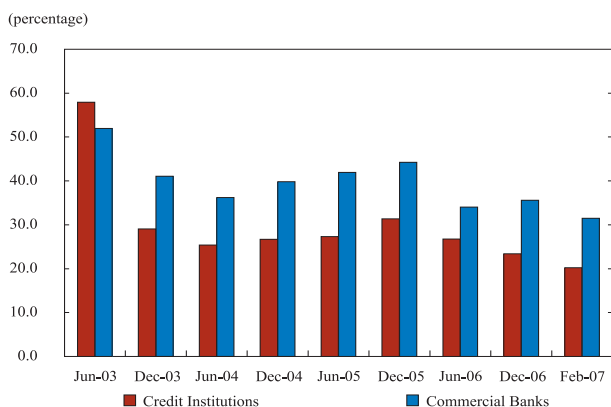
**VALUATION LOSSES WITH A 200 BP SHOCK  
(MILLIONS OF PESOS)**

Portfolio at February 16, 2007	In Pesos	In RVU	Total	Annualized Losses /Profits (december) (%)
<b>Total credit institutions</b>	<b>524,775</b>	<b>196,709</b>	<b>721,484</b>	<b>20.21</b>
Commercial banks	500,594	182,413	683,007	31.49
Commercial finance companies	2,722	1,154	3,876	6.15
Finance corporations	21,458	13,143	34,601	5.03
<b>Pension Fund Managers</b>	<b>1,000,709</b>	<b>495,945</b>	<b>1,496,653</b>	<b>2.77<sup>a/</sup></b>

a/ Loss as a percentage of the total value of the portfolio at December.  
Source: Banco de la República.

GRAPH 51

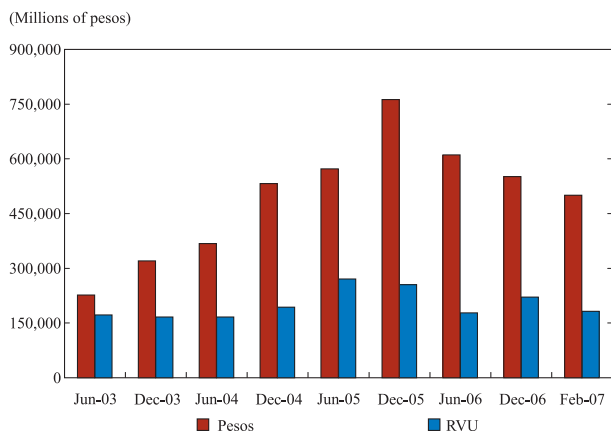
**VALUATION LOSSES AS A PERCENTAGE  
OF ANNUALIZED PROFITS,  
WITH A 200 BP SHOCK**



Source: Banco de la República.

GRAPH 52

**VALUATION LOSSES  
FOR COMMERCIAL BANKS**



Source: Banco de la República.

the same period (Graph 51 allows for a comparison between this outcome and the one in previous periods<sup>28</sup>).

The valuation losses all credit institutions and commercial banks would experience with the February portfolio are the lowest for the period in question. The main reason is because these institutions are less exposed to market risk. The reduction for the last six months is considerable, as the losses in February are compared to the profits perceived in December 2006.<sup>29</sup>

To isolate the effect profit performance has on the outcome obtained for commercial banks, the valuation losses incurred by these institutions are shown in Graph 52 (in millions of pesos). As illustrated, valuation losses have declined steadily since December 2005 for securities in pesos and since June 2005 in the case of TES-RVU, with a brief interruption in December 2006.

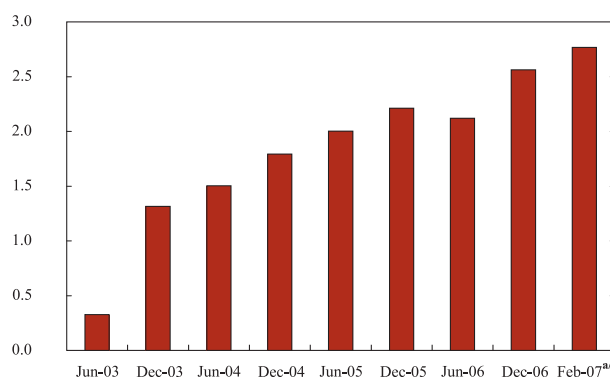
<sup>28</sup> The exercises were conducted for the portfolio on to the last working day of June and December of each year during the 2003-2006 period. The last exercise is for February 16, 2007.

<sup>29</sup> As explained in this report, specifically in the section on credit institutions, the profit growth rate slowed during December 2006 and was negative for commercial banks.

In the same hypothetical case, with an interest rate hike, PFM valuation losses came to Col\$1.4 t and represent 2.77% of the portfolio value at December 2006 (Table 8). Unlike credit institutions, the estimated loss for PFM rose significantly throughout the entire period in question (Graph 53). Considering the final six months alone, the increase went from 2.12% in June 2006 to 2.56% in December 2006 and 2.77% in February 2007.

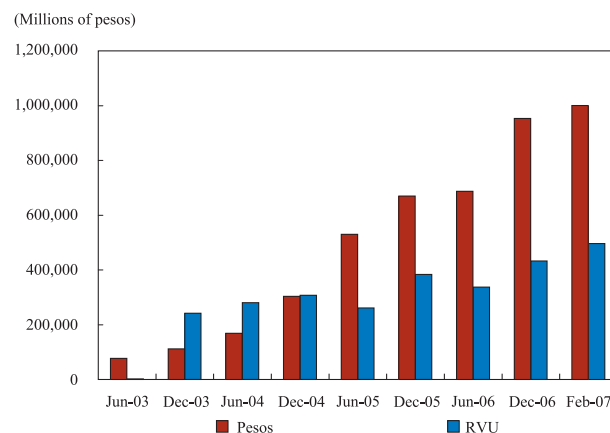
PFM valuation losses in millions of pesos (Graph 54) confirm what was found earlier. In the case of fixed-rate TES, they rose steadily since June 2003 (with the same interruption in June 2006), accelerated as of December 2004, and reached Col \$1 t in February 2007. The trend TES-RUV losses is not as clear, but they also increased greatly during the last part of the period in question.<sup>30</sup>

**PFM VALUATION LOSSES AS A PERCENTAGE OF PORTFOLIO VALUE, WITH A 200 BP SHOCK**



a/ Percentage of the portfolio at December.  
Source: Banco de la República.

**PFM VALUATION LOSSES**



Source: Banco de la República.

<sup>30</sup> At February 2007, pension fund managers held 80% of the TES-RVU auctioned for the first time on January 15 of that year. This might help to explain the increase in losses during the final period, given the increase in the duration (and, therefore, the sensitivity) of the portfolio.

**WHO BOUGHT AND SOLD STOCK AND DOMESTIC GOVERNMENT BONDS DURING 2006?**

Given the sharp movement in domestic financial asset prices, it is important to examine the general reaction of major investors in stock and domestic government bond markets. Table B4.1 shows the net buyers and sellers of stock and TES during the period from July 2005 to December 2006.

**TABLE B4**  
**NET STOCK AND TES PURCHASERS AND SELLERS <sup>a/</sup>**

	Jul-Dec 2005		Jan-Jun 2006		Jul-Dec 2006	
	Stocks	TES	Stocks	TES	Stocks	TES
Pension Fund Managers	516,201	1,620,248	1,089,086	2,005,004	421,369	1,288,669
Insurance companies	(399,916)	246,279	(43,390)	570,490	76,367	291,803
Trust companies	(418,056)	213,042	(310,837)	(854,204)	(102,084)	(64,562)
Mutual funds	(27,818)	93,965	(11,334)	24,698	(41,680)	856,306
Banks	421,065	2,477,054	30,815	(896,960)	48,538	(2,876,777)
CFC and leasing	(572)	8,063	(0)	143,569	0	(42,897)
Cooperatives	(665)	8,113	(4)	656	(1)	7,122
Financial corporations	(9,558)	318,226	(930)	87,487	(365,381)	5,453
SCB	71,936	146,870	15,128	51,393	(87,152)	(90,186)
Private individuals	921,354	(4,893)	(441,820)	727,643	(85,034)	186,322
Legal entities						
and public sector	(1,452,912)	3,407,898	(393,843)	5,525,286	279,859	432,313
Legal entities	n.a.	2,278,210	n.a.	4,290,300	n.a.	1,642,977
Public sector <sup>b/</sup>	n.a.	1,129,688	n.a.	1,234,986	n.a.	(1,210,664)

n.a. Not available.

a/ Figures in millions of pesos

b/ Includes Banco de la República.

In the first half of the year, the major stock sellers were private individuals,<sup>1</sup> legal entities and trust companies. During the second half, private individuals and trust companies continued to sell off these assets, but not as quickly. The table suggests that while private individuals rebalanced their portfolios in favor of TES during the first half of 2006, selling off a large part of the stocks they acquired during 2005, the trust companies reduced their TES and stock portfolios significantly throughout the year. Another noteworthy aspect is that trust companies did most of their selling in the first half of the year, when the drop in prices was most pronounced. Together with trust companies, finance corporations were the major stock sellers during the second half of 2006. The PFM were the institutions that bought the stock sold during the crisis.

In the TES market, the major sellers during 2006 were commercial banks, the public sector and trust companies. The sale of TES by banks was linked to the portfolio shift, with these instruments being replaced by loans, mainly during the second half of the year. The most important TES buyers during 2006 were legal entities. However, in the second half of the year, they drastically reduced the pace at which they had been purchasing these bonds. Together with legal entities, the PFM were the most important buyers of domestic public debt securities.

<sup>1</sup> The information released by the Colombian Stock Exchange on stock buyers and sellers does not allow for a distinction between legal entities and the public sector. However, it is to be expected that an important percentage of the transactions pertain to legal entities.



## B. CREDIT RISK

As summarized earlier, the increase in loans has been accompanied by good loan-portfolio quality and a high degree of loan-loss provisioning. Despite a slight surge in the QI for consumer loans, the current levels are historically low. Coupled with favorable a macroeconomic environment, this suggests that credit risk is not a short-term source of instability for the financial system.

Several exercises, such as those included in previous editions of the *Financial Stability Report*,<sup>31</sup> were conducted to assess how an adverse macroeconomic situation would affect the soundness of financial institutions. The macroeconomic scenario used in these exercises is extreme or highly unlikely.<sup>32</sup> In this report, the soundness of credit institutions is assessed on the basis of their capital adequacy ratio, which measures an institution's capacity to absorb unexpected losses.

The results, shown in Table 9, are for a sample of 17 institutions that account for 89% of the assets held by credit institutions. Here, the suggestion is that credit risk would be a latent problem for the financial system if macroeconomic conditions were to deteriorate sharply, as occurred at the end of the nineties. A

*The good quality of the loan portfolio, coupled with high levels of loan-loss provisioning and a good macroeconomic outlook, suggests that credit risk is not a source of instability in the short term.*

TABLE 9

### NUMBER OF BANKS WHERE THE CAPITAL ADEQUACY RATIO WOULD DROP BELOW THE REQUIRED MINIMUM (12 MONTHS)

	Shock 1 <sup>a/</sup>	Shock 2 <sup>b/</sup>	Shock 3 <sup>c/</sup>
Commercial	0	3	3
Consumer	2	3	4
Mortgage	1	1	1
Total	4	9	12
Current capital adequacy (%)	12.07	12.07	12.07
Stressed capital adequacy at Dec-06 (%)	10.89	8.75	7.95
Stressed capital adequacy at Oct-05 (%)	11.80	9.80	8.90

<sup>a/</sup> Interest rate (consumer and commercial loans) or housing prices (mortgage loans)

<sup>b/</sup> GDP (consumer and mortgage loans) or sales (commercial loans)

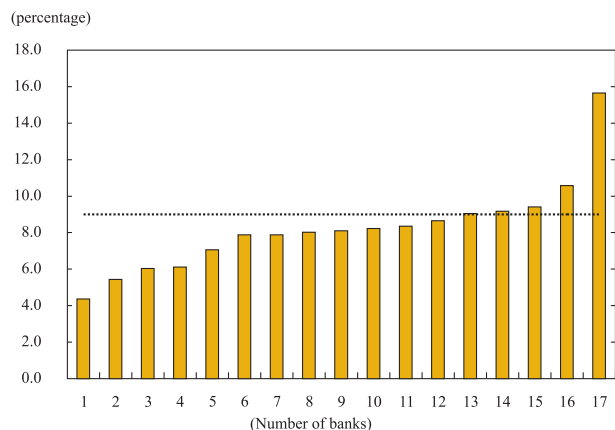
<sup>c/</sup> Combination

Source: Banco de la República.

<sup>31</sup> For a detailed explanation of these exercises, see "Financial Stability Issues," Financial Stability Report, December 2005.

<sup>32</sup> The exercises for consumer and mortgage loans assume a 6.8% decline in economic activity (as occurred in the second quarter of 1999), a 450 bp rise in the interest rate (as was the case between May and June 1998), and a drop of 8% in housing prices. This is equivalent to the average decline during 1996-2000. In the case of commercial loans, the exercise is based on a 9% reduction in sales, as reported during 1999.

**STRESSED CAPITAL ADEQUACY RATIO**



Source: Banco de la República.

brusque rise in interest rates and a drastic reduction in economic activity would place the capital adequacy ratio of 12 banks below the required minimum (9%). At the aggregate level, the capital adequacy ratio would decline from 12.07% to 8%, and would fall below 8% for seven banks (Graph 55).

A comparison between the aggregate capital adequacy ratio in this period and the capital adequacy ratio of the period with figures at October 2005 shows the real drop in this indicator is more pronounced than was calculated previously. This means institutions took more risk, through more loan portfolio growth, without a respective increase in equity.

**Box 5**

**PROBABLE FINANCIAL STABILITY SCENARIOS IN 2007:  
SIMULATIONS OF A GENERAL EQUILIBRIUM  
MODEL OF THE FINANCIAL SYSTEM**

The basic outline of a general equilibrium model of the financial system<sup>1</sup> was introduced in the March 2006 edition of the *Financial Stability Report*, under the title “**A General Equilibrium Approach to Analyzing Financial Stability in Colombia**”. Presented in this section, for the first time, are the results of the simulations of that model using different regulatory and monetary-policy scenarios.<sup>2</sup> Each scenario offers a glimpse of the trends 2007 is likely to witness for different variables of the financial system, the most important being loan-portfolio quality.

These trends should not be taken as forecasts for financial variables, nor do they reflect the official opinion of the Financial Stability Department at Banco de la República with respect to the immediate future of the financial system. They are only simulation exercises developed

<sup>1</sup> For a more detailed version of the model, see Saade, Osorio and Estrada (2006), "A General Equilibrium Approach to Analyzing Financial Stability in Colombia," *Financial Stability Report*, March 2006.

<sup>2</sup> Specifically, the minimum capital adequacy ratio and Banco de la República's intervention rate in different scenarios.

with hypothetical monetary-policy and financial scenarios. For details on the model's calibration, its solution strategy and the values of the relevant parameters used in these exercises, see Saade, Osorio and Estrada (2007).

## **1. An Intervention Interest Rate Increase**

The scenario based on Banco de la República's intervention rate assumes two increases during the year, each equivalent to 25 bp. In this case, the model predicts a slowdown in loan portfolio growth to a level that should stabilize at around Col\$80 t<sup>3</sup> by the end of the year. It also forecasts a sustained increase of 27% in deposits with the financial system by the end of the year (which is more than in 2006). Most importantly, there is still room in this scenario for an increase in loan-portfolio quality, which would end the year at a level slightly below 5% (non-performing/gross loan ratio).

To complicate this scenario, a simulation was done with four rate increases, each equivalent to 25 bp. The conclusions on loan portfolio stabilization and the accelerated increase in deposit taking did not change significantly. However, within this scenario, there were signs of a slight deterioration in loan-portfolio quality, which was 7.7% by the end of the year. This suggests an increase in credit risk during the year and is the result of higher lending rates than would be observed in the economy. The financial institutions in both scenarios would more than comply with the minimum capital adequacy ratio (9%).

## **2. Increase in the Minimum Capital Adequacy Ratio**

New regulations scheduled to take effect in 2007 will imply an increase in the capital requirements for financial institutions. Even without a change in the minimum capital adequacy ratio set by the Superintendent of Financial Institutions, the practical effect of these measures (by requiring more capital) is akin to a rise in the minimum. For this reason, the exercise simulating these new regulatory schemes assumes the minimum capital adequacy ratio will increase from 9% to 12%.

The pattern of the loan portfolio in this scenario reveals a slightly more pronounced slowdown. There is even a minor drop in the loan portfolio of national banks, because there is less available capital. However, it is important to point out that the quality of the loan portfolio would improve somewhat, due to less exposure for financial institutions, given the increase in capital requirements.

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<sup>3</sup> The model includes only commercial banks and the BECH.

## C. LIQUIDITY RISK

This edition of the *Financial Stability Report* presents two complementary measurements of the liquidity risk credit institutions now face. To begin with, as in previous editions, there is an analysis of recent developments in the ratio of uncovered liabilities (ULR). Secondly, a new method is introduced for a more precise analysis of the true impact of that risk. The liquidity adjusted value-at-risk (L-VaR)<sup>33</sup> method is employed to measure the loss an institution can suffer when liquidating a position (e.g. domestic government bonds) during a liquidity crisis.

These two measurements are complementary. The ULR measures liquidity shortage, while the L-VaR method calculates the losses institutions would incur if obliged unexpectedly to liquidate positions on financial markets in order to meet their obligations.

### 1. Uncovered Liabilities Ratio (ULR)

Given the nature of financial brokerage activity, which implies transforming liquid liabilities (such as deposits) into illiquid assets (such as the loan portfolio), financial institutions can find themselves without enough liquid resources to pay their short-term obligations. The uncovered liabilities ratio (ULR) is calculated to measure that potential shortage:

$$ULR = (TrL + LL) - [\lambda TI + (LA - TI)] / TA - LA$$

where *LL* corresponds to liquid liabilities; *TrL*, to the temporary component of all other liabilities; *TI*, to tradable securities; *LA*, to liquid assets and *TA*, to total assets.<sup>34</sup> In this expression, the sum of *LL* and *TrL* represents the liabilities

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<sup>33</sup> For a theoretical explanation of the method, see Dowd, K. (2004) *Measuring Market Risk* 2nd Edition, West Sussex, John Wiley Sans Ltd.

susceptible to redemption. The support institutions have (in square brackets) is the sum of liquid assets other than tradable securities ( $LA - TI$ ), plus tradable securities multiplied by a discount ( $\lambda$ ). This discount means the value of  $TI$  – in terms of liquidity risk – is somewhat less than their market value ( $\lambda < 1$ ), given the market liquidity effect on this value in the event of a liquidity crisis.<sup>35 36</sup>

*Liquidity risk (measured by the ULR) has increased in recent months.*

The ULR reads as follows:

ULR	Motive	Liquidity Risk
Positive	$TrL + LL > \lambda TI + (LA - TI)$	High
Zero	$TrL + LL = \lambda TI + (LA - TI)$	Medium
Negative	$TrL + LL < \lambda TI + (LA - TI)$	Low

### Evolution and stress-testing

Graph 56 shows the recent evolution in the ULR for credit institutions as a whole. From a level near -0.34 in March 2006, the ULR increased gradually during the year, reaching -0.19 in December. The indication is that the incidence of liquidity risk in the banking system rose throughout 2006, following a prolonged period of decline (the graph suggests the indicator went from a level near -0.3 in September 2003 to -0.36 in October 2005). The explanation can be found in several events that were summarized in the first sections of this report. For one thing, market sell-offs of tradable investments meant less liquidity to support the system. In addition, the sharp rise in the loan portfolio spelled implied more risk of a liquidity shortage for credit institutions, and there was less liquidity in

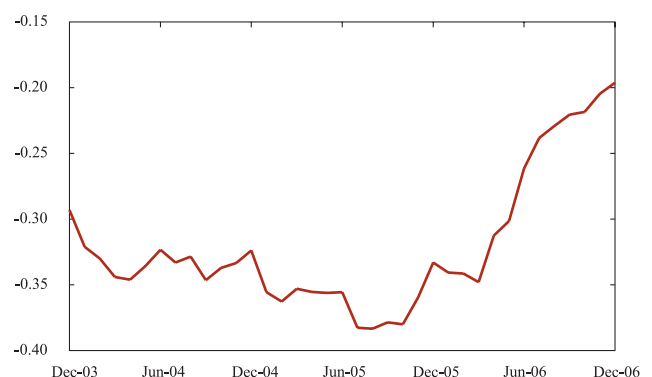
<sup>34</sup> The assumption is that all liquid assets are redeemable at any time. To determine the temporary component of all other liabilities, the Hodrick-Prescott filter is applied to the series of liabilities other than liquid liabilities. See Hodrick and Prescott, "Postwar U.S. Business Cycles: An Empirical Investigation," *Journal of Money, Credit and Banking*, Vol. 29, No. 1, Ohio State University Press, 1997, pp. 1-16.

<sup>35</sup>  $l$  is calculated as (1-haircut), where the haircut is the discount Banco de la República applies to the value of the credit institutions' portfolio in their repo transactions. In this way, using the information on haircuts, it is possible to calculate the value of the tradable securities portfolio discounted for these transactions.

<sup>36</sup> According to Dziobek, Hobbs and Marston, "Toward a Framework for Systemic Liquidity Policy," in IMF Working Document No. 34 (2000), the difference between liabilities susceptible to redemption and liquid assets must be scaled by illiquid assets to prevent the indicators from favoring the largest banks, as the amount of their operations is greater.

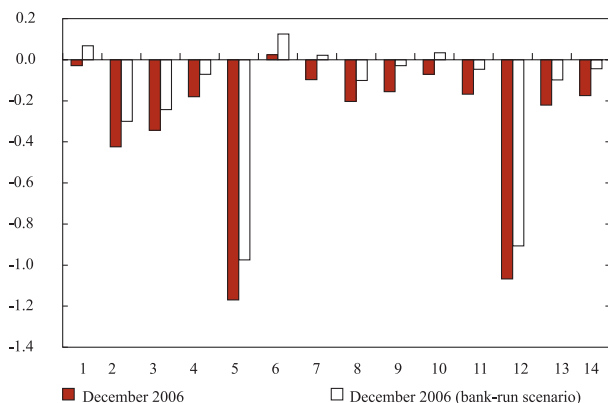
GRAPH 56

ULR: CREDIT INSTITUTIONS



Source: Office of the National Superintendent of Financial Institutions. Calculations provided by Banco de Colombia

**SENSITIVITY ANALYSIS:  
ULR OF BANKS AND BECH**



Source: Office of the National Superintendent of Financial Institutions. Calculations by Banco de Colombia.

financial markets, particularly during the second quarter of the year. Although the risk level remains low (since the ULR is still negative), its trend necessitates a close watch on how the liquidity position of these institutions develops.

The results of an exercise simulating the impact a bank-run equivalent to 12% of deposits<sup>37</sup> would have on the ULR of each institution in the banking system are presented in Graph 57 to assess the system’s sensitivity to an adverse liquidity situation. As illustrated, the increased incidence of liquidity risk at the end of 2006 is reflected in the fact (not observed earlier) that one institution registered a positive ULR in December. Moreover, in a bank-run scenario, four institutions (accounting for nearly 20% of the assets in the system) would have a

ULR above zero. The average ULR of these four institutions would be 0.04. In short, with a bank-run akin the simulation, four major institutions would face serious liquidity problems, which could affect financial system stability. Coupled with the recent trend in the aggregate ULR, the foregoing suggests that, if the set of macroeconomic threats summarized in the first part of this report were to materialize, it is very likely the system’s liquidity position would be affected.

## 2. Liquidity Adjusted Value-at-Risk (L-VaR)

When financial institutions need highly liquid resources to cover their obligations, they will sell some of their tradable investments on financial markets. In addition to a variety of regulatory elements, turning to the market exposes them to market risk, as the value of those investments can change unexpectedly (a measurement of market risk is provided in Chapter IV, Section A of this report). It also exposes institutions to the risk that they might receive a discount value as opposed to the market value of their investments.

This market-liquidity effect on the value of tradable investments necessitates a correction in the traditional measurement of market risk (value at risk,

*If a situation were to occur like the one observed in the second quarter of 2006, the liquidity risk would be three times greater.*

<sup>37</sup> The amount of the simulated withdrawal equals the simple average of the largest monthly decline in the volume of deposits experienced by financial intermediaries during 1994-2006.

VaR), so as to give institutions a better idea of the real value of their investment portfolio in the event of a liquidity crisis. This correction is possible with the L-VaR method, which is used to calculate the percentage by which the traditional VaR should be increased to account for the effect of market liquidity (that percentage is the second liquidity risk measurement analyzed in this edition of the *Financial Stability Report*).<sup>38</sup>

a. *Percentage of Correction for Credit Institutions*

Table 10 shows the percentage of correction for each institution and for the banking system as a whole, calculated on February 6, 2007. At the time this report was written, that was the last day for which figures were available.

For credit institutions as a whole, the traditional VaR should be increased by 11.94% to account for the effect of market liquidity. The percentages within the system vary widely, from 4% to 40%. The percentage that would have been observed had the markets performed as they did during the second quarter of 2006 was calculated to assess their sensitivity to an extreme liquidity situation. As mentioned in various sections throughout this report, it was a highly volatile period that resulted in losses for credit institutions (the percentages of correction with this scenario are shown in Table 11).

According to Table 11, the percentage of correction for these institutions as a whole would be three times higher in a turbulent scenario, such as the one observed during the second quarter of 2006, than in

TABLE 10

PERCENTAGE OF CORRECTION:  
FEBRUARY 6, 2007

Institutions	
1	16.763
2	4.237
3	28.136
4	15.169
5	13.509
6	31.295
7	16.371
8	11.673
9	9.651
10	8.653
11	11.212
12	25.378
13	9.678
14	17.273
15	40.527
16	12.008
17	6.098
<b>Total</b>	<b>11.941</b>

TABLE 11

PERCENTAGE OF CORRECTION  
(VOLATILE SCENARIO)

Institutions	
1	24.931
2	34.136
3	83.142
4	46.475
5	28.120
6	21.610
7	36.085
8	28.823
9	42.950
10	37.985
11	27.488
12	38.944
13	49.198
14	57.373
15	31.934
16	35.264
17	30.079
<b>Total</b>	<b>38.029</b>

<sup>38</sup> For more on the technical details of the L-VaR method and the features of the database that was used, see "Liquidity Adjusted Value-at-Risk (L-VaR) in Colombia" in the section of this report entitled "Financial Stability Issues". The present section is limited to a description of the principal results obtained when applying the method to the domestic government bond portfolios (TES) of credit institutions.

*Liquidity risk exposure is extremely sensitive to changes in the conditions on government bond markets. Hopefully, the regulations now being considered by the Superintendent of Financial Institutions will take this into account.*

the current situation (38.2%). Except for two institutions, the percentage is higher for all of them (in a range of 21% to 83%).

In short, it is important to keep an eye on changes in the liquidity risk credit institutions face. Although the system has a liquid resource surplus (in the form of a negative ULR), it clearly has declined rapidly in recent months. Moreover, the exposure to liquidity risk, given the impact of market liquidity on the real value of tradable investments, which is within normal parameters, is highly sensitive to changes in the conditions on government bond markets.

How all these indicators develop depends largely on what happens in the financial markets institutions use to manage their liquidity and to secure earnings on their tradable investment portfolios. As noted in the first chapter of this report, it is relatively uncertain how those markets will perform in 2007. A change in general conditions can mean a substantial increase in exposure to risk for financial institutions.

To reinforce liquidity-risk supervision and regulations, the Superintendent of Financial Institutions is drafting a new circular that modifies the current system of regulations on liquidity risk. Scheduled to be released for comment, it includes some of the elements suggested by the general contents of the ULR.

## Box 6

### ASSET PRICE OVERVALUATION

One of the primary sources of economic and financial instability is directly and indirectly related to asset and credit price cycles. Specialized literature on the topic<sup>1</sup> seems to agree that an imbalance in any of these variables (understood as sudden increases followed by corrections to

<sup>1</sup> See, among others, Borio y Loewe (2002) "Imbalances or 'Bubbles'? Implications for Monetary and Financial Stability". Asset Price Bubbles. MIT Press; London and Sapanha (2006) "Capital Flows and Credit Booms in Emerging Market Economics". Financial Stability Review. No. 9.



original levels) is, in itself, not the cause of the financial instability that occurs in markets. Hence, it is the *combined* imbalance in these financial variables that must be monitored.

The mechanism whereby imbalances in these variables can affect the stability of the financial system is known as the financial accelerator. When macroeconomic conditions are favorable, agents are very optimistic about their expected income flows. That optimism causes an increase in asset prices,<sup>2</sup> which adds to the wealth of households and companies, altering their consumption patterns (investment) and their financing needs. An increase in the value of assets also means better collateral for financing and, thus, leads to higher levels of credit. An increase in the resources available in the economy stimulates demand and generates additional increases in the price of assets, thereby reinforcing the initial effect.

If the initial increase in asset prices is not founded on plausible expectations of future profits, agents eventually will change their initial forecasts, revising prices downward. At that moment, the wealth of households and companies declines, as does their ability to secure new loans. This seriously affects the decisions both these agents make with respect to spending. It also impacts financial and macroeconomic stability.

This being the case, the combined behavior of these variables must be monitored to determine if possible increases in asset prices are reflected in more borrowing, which could jeopardize debtors' ability to pay if the current situation is reversed. This section is dedicated to finding evidence of asset price overvaluation in Colombia for the mortgage loan market and the stock market, while analyzing loan growth using the credit / GDP ratio.<sup>3</sup>

## 1. Credit

A Hodrick and Prescott filter is used to analyze the current configuration of total credit, consumer and mortgage loan portfolios, and mortgage loan disbursements. It estimates the softened long-term trend in these series.<sup>4</sup> That trend is compared to the actual level of the indicator, so as to calculate the deviation of each series with respect to its long-term value.

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<sup>2</sup> In this specific case, it is important to point out that prices increase because agents expect future income to follow a certain pattern. If their expectations are borne out, the increase in prices will have responded to a change in its fundamental determinants. If not, the increase is a deviation from the value determined by those fundamentals. A deviation of this type is commonly known as an asset price bubble.

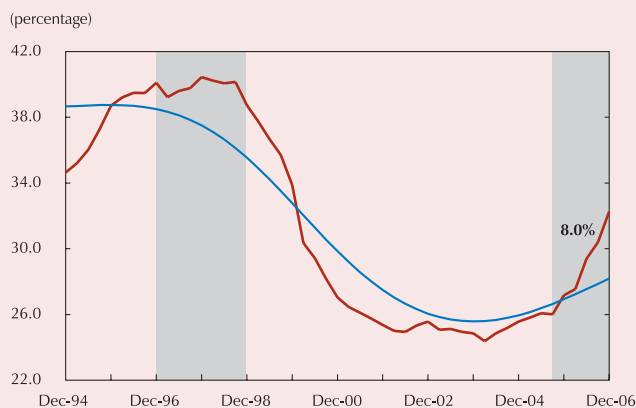
<sup>3</sup> Domestic government bonds (TES) are not included in the analysis, as they account for only a small share of total household and company wealth. The situation with homes and stocks is just the opposite.

<sup>4</sup> The series used pertain to the total loan portfolio and the consumer loan portfolio as a percentage of GDP from December 1994 to December 2006.

According to Graphs B6.1 and B6.2, the total loan and consumer loan portfolios, as a percentage of GDP, were 8% and 12% above their long-term value during 2006, on average. This is a slight increase compared to the averages reported during the period prior to the financial crisis in 1999 (7.8% and 11.4%, respectively).

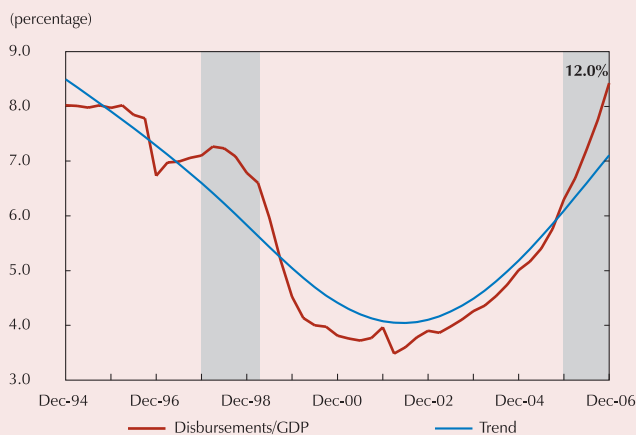
In 2006, the mortgage loan portfolio showed a 30% average deviation from its trend. The average during 1997-1998 was 8% (Graph B6.3). This happened for two reasons. First, the

**GRAPH B6.1**  
**TOTAL LOAN PORTFOLIO/GDP AND TREND**



Source: Office of the National Superintendent of Financial Institutions and DANE. Banco de la República's calculations.

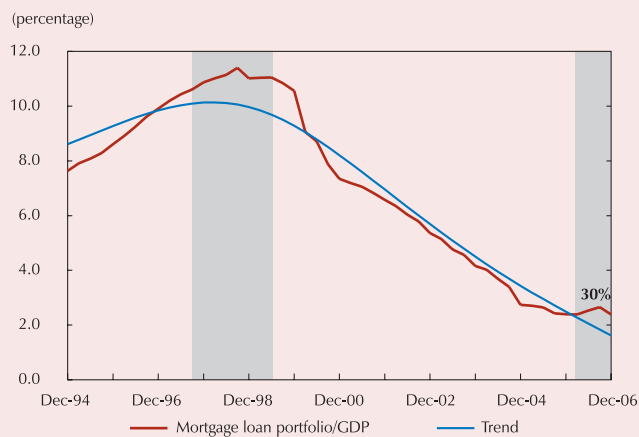
**GRAPH B6.2**  
**CONSUMER LOAN PORTFOLIO/GDP AND TREND**



Source: Office of the National Superintendent of Financial Institutions and DANE. Banco de la República's calculations.

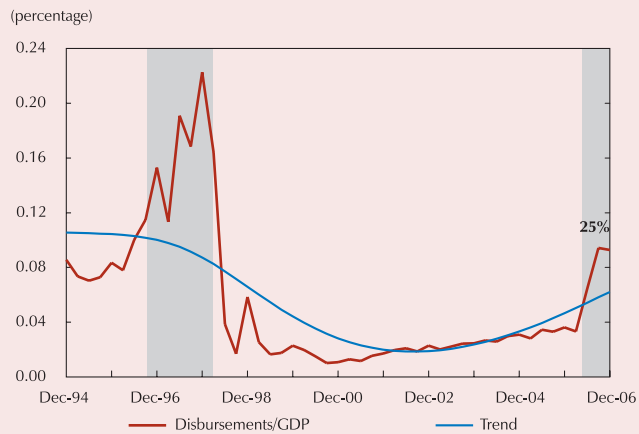
recovery in mortgage loans began in mid-2006. So, it is to be expected that the long-term value calculated this bias as less than what might be anticipated in the months ahead. Secondly, the rapid growth in this indicator is associated with the sharp rise in disbursements, which are nearly 25% above their long-term value. However, they are still a long ways from the levels reported before the crisis, which were more than 100% in some quarters (Graph R6.4).

**GRAPH B6.3**  
**MORTGAGE LOAN PORTFOLIO /GDP AND ITS TREND**



Source: Office of the National Superintendent of Financial Institutions and DANE. Banco de la República's calculations.

**GRAPH B6.4**  
**DISBURSEMENTS/GDP AND ITS TREND**



Source: Office of the National Superintendent of Financial Institutions and DANE. Banco de la República's calculations.

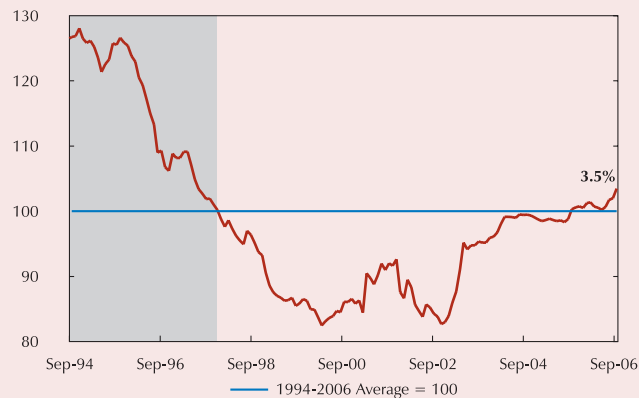
## 2. Mortgage Loan Market<sup>5</sup>

Two indicators were constructed to detect possible overvaluations in the mortgage loan portfolio. One is the ratio of the new-housing price index (NHPI), which is calculated by the National Department of Planning (DNP), to the rent index calculated by Banco de la República<sup>6</sup> (price to earnings). For the other indicator, a Hodrick and Prescott filter is applied to the housing price series to detect deviations from its long-term value.

The first of these indicators is illustrated in Graph R6.5, specifically its deviation from the average for the sample. The indicator has been near the long-term average since 2004, but exhibited a slight upward trend as of August 2006 and approached 3.5% overvaluation in October. This is not significant when compared to the levels observed between 1994 and 1995 (near 30%); however, the current trend in this indicator might show a delayed effect of mortgage loan portfolio growth on housing prices. It is important to be cautious about these findings, as the ratio was constructed with aggregate data.

The second indicator (Graph R6.6) shows the new-housing price index is near the long-term level. Interestingly, both indicators coincide with respect to high home-price levels during 1995-1997 and convergence toward the long-term level in recent years.

**GRAPH B6.5**  
**NEW HOME/RENT PRICE RATIO**

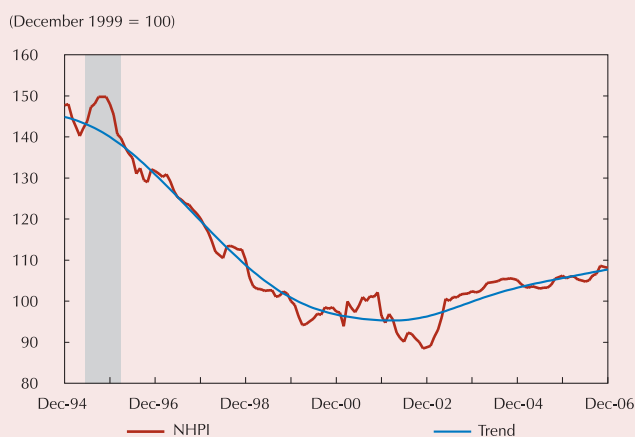


Source: DNP and Banco de la República. Banco de la República's calculations.

<sup>5</sup> Information on overvaluation in the used-home price index (UHPI) is not included, as there is nothing new to add with respect to the information presented in the last edition of the Financial Stability Report.

<sup>6</sup> The rent index is part of the CPI housing component.

**GRAPH B6.6  
NHPI AND ITS TREND**



Source : DNP, Banco de la República's calculations.

### 3. Stock Market

The ratio of the Colombian stock market index (IGBC in Spanish) to a return-on-equity indicator for the companies listed on that exchange is used to assess the existence of stock market overvaluation (Graph R6.7).<sup>7</sup> The graph shows significant overvaluation as of early 2005. It reached a high point during the first quarter of 2006, before dropping in the second, due to uncertainty about interest rate hikes in the United States and the subsequent crash of major world markets. Although this indicator was up again at the end of the year, the extent of overvaluation should be regarded with caution, given the assumptions and limitations implicit in its calculation.<sup>8</sup>

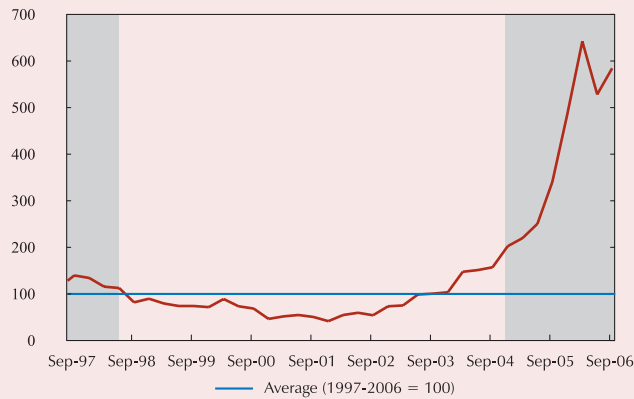
The Hodrick and Prescott filter was applied to the IGBC for a comparison to its long-term trend. The findings show overvaluation of nearly 25% during the period from December 2005 to May 2006. This trend reversed itself at the start of the second half of the year, when the IGBC dropped below the long-term level, before slowly converging in that direction during the final months of 2006 (Graph R6.8).

<sup>7</sup> The method used to calculate this indicator is described in the September 2006 edition of the *Financial Stability Report*.

<sup>8</sup> The primary limitations of this indicator are the following. i) It includes the entire crisis period and only part of the upward phase of the cycle. This tilts the long-term average towards lower levels than those with a full economic cycle. ii) The companies used to calculate the indicator changed considerably throughout the sample, given the entry and exit of firms from the domestic stock market. As a result, the comparison between different periods is less than precise. iii) The growth in the stock market also responds to the added depth of that market in a context of high liquidity worldwide.

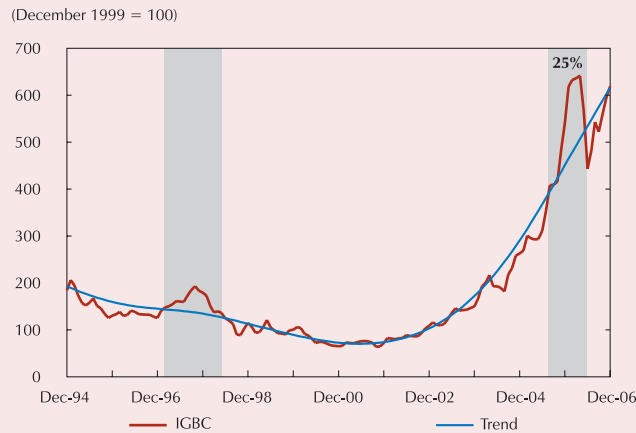
Interestingly, both methods showed a high degree of overvaluation in 2005, as was emphasized in previous editions of the *Financial Stability Report*.

**GRAPH B6.7**  
**IGBC/RETURN ON EQUITY RATIO**



Source: Colombian Stock Exchange and the Office of the National Superintendent of Financial Institutions. Banco de la República's calculations.

**GRAPH B6.8**  
**IGBC AND ITS TREND**



Source: Colombian Stock Exchange. Banco de la República's calculations .

#### 4. Conclusions

The findings suggest the mortgage loan market has yet to exhibit significant overvaluation at the aggregate level. However, a continuation of the upward trend in the mortgage loan portfolio and in disbursements for housing could affect home prices eventually. As to the stock market,

although the methods differ with respect to the extent of overvaluation in 2006, both agree on the high levels that existed in 2005 and schematize the effect volatility had on these assets in the second half of the year. Stock market performance in the future will be subject to the volatility of international markets and to investors' aversion to risk and the course of domestic inflation.

All the portfolio indicators show considerable deviation in 2006 with respect to the long-term level, corroborating what this edition of the *Financial Stability Report* says about vigorous loan portfolio growth and the need to monitor this trend closely.

FINANCIAL PERFORMANCE OF MANDATORY PENSION FUNDS IN COLOMBIA ÓSCAR MARTÍNEZ A. ANDRÉS MURCIA P.	75
INTEREST RATE PASS THROUGH IN COLOMBIA: A MICRO-BANKING PERSPECTIVE ROCÍO BETANCOURT HERNANDO VARGAS NORBERTO RODRÍGUEZ	91
AN INDUSTRIAL ORGANIZATION APPROACH FOR THE COLOMBIAN BANKING SYSTEM SANDRA V. ROZO DIEGO VÁSQUEZ	107
LIQUIDITY ADJUSTED VALUE-AT-RISK IN COLOMBIA JUANITA GONZÁLEZ U. DANIEL OSORIO R.	120

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# FINANCIAL PERFORMANCE OF MANDATORY PENSION FUNDS IN COLOMBIA

Óscar Martínez Amaya  
Andrés Murcia Pabón

Mandatory pension fund (MPF) affiliates in Colombia do not have a great deal of information to gauge the financial performance of pension fund managers (PFM). At present, each PFM publishes a monthly report on average profitability for the preceding 36 months (tri-annual yield). However, this measure is softened and limits a situation analysis of the yield on those funds. A variance approach that adds a portfolio-risk measurement to the available data would allow for a better assessment of MPF financial performance. If those who contribute to these funds have access to more robust measurements of financial performance, they can choose their MPF on the basis of more complete criteria, as opposed to only tri-annual measurements of profitability.

The studies done in Colombia concentrate on evaluating the efficiency of pension funds and on showing the portfolio of these investors is being managed in a financially inefficient way (Jara, Gómez and Pardo, 2005).<sup>1</sup> The primary reason for that inefficiency, according to Jara (2006b), lies with the definition of minimum profitability and the way commissions are structured. These works suggest that pension fund managers lack incentives to perform more efficiently, and propose the application of measures that include MPF portfolio risk. The Sharpe ratio<sup>2</sup> and the information ratio<sup>3</sup> are two examples

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The authors are researchers with the Financial Stability Department at Banco de la República. The valuable comments from Linda Mondragón, Dairo Estrada, Carolina Gómez, Leonardo Villar, Carlos Amaya and Esteban Gómez are gratefully acknowledged. The opinions expressed in this article and any errors it might contain are solely the responsibility of the authors and imply no commitment on the part of Banco de la República or its Board of Directors.

<sup>1</sup> Given a return, an efficient portfolio is one with as little variance as possible.

<sup>2</sup> This is the ratio of excess return on the "riskless" rate of a portfolio to its risk, measured by the variance in those returns.

<sup>3</sup> This measure of performance involves expected returns and the risk implicit in a portfolio.

In addition to tri-annual figures on profitability, the National Superintendent of Financial Institutions (SFI) requires all MPF in Colombia to value the risk posed by a sudden change in asset prices, based on a value-at-risk (VaR) measurement calculated daily. However, it does not require maximum levels for this measurement, nor release of the respective information. This is contrary to the situation with profitability, which must be above a required minimum determined quarterly by SFI.

The purpose of this article is to assess the long-term financial performance of pension funds, not only with a profitability analysis, but also with risk measurements.<sup>4</sup> It proposes that performance indicators such as the Sharpe coefficient and the Jensen equation be calculated, and analyzes the variance in MPF portfolios, based on their primary risk factors. The indicators examined herein point to very different deductions when risk considerations are included. This suggests that MPF performance analysis should not be limited to measurements of profitability alone. Despite the relative stability of MPF returns in recent years, the risk indicators for the same period have increased, undermining the measurements of long-term financial performance. This increase in portfolio volatility was exhibited by the six MPF in Colombia, mainly because their portfolios are focused heavily on assets with a high positive mutual correlation.

What explains the increased variance in returns and stable profitability of MPF in recent years? On the one hand, current regulations do not limit the risk indicators a MPF may adopt. On the other, the commission charged by these funds for their services is calculated according to the contributions received each month. This offers no incentive to secure better profits for their affiliates. Publishing risk-based performance measurements can help to reduce the growing variance in MPF returns. However, better risk policies would limit portfolio volatility without necessarily improving the returns on MPF. Aligning incentives for these funds to obtain better returns for their affiliates depends on the provisions in Law 100, which does not allow them to charge a commission based on the profitability or value of the fund (which is generally how investment fund management commissions are charged).

This article is divided into three parts. Two measurements that consider the risk/return ratio are described and calculated in the first section. These are the Sharpe ratio to measure MPF performance and the Jensen equation to compare MPF financial performance to a benchmark portfolio. In the second, the increase in MPF portfolio risk is examined on the basis of risk factors. The last section contains conclusions and recommendations.

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<sup>4</sup> By long-term, we mean tri-annual indicators.

## I. FINANCIAL PERFORMANCE MEASUREMENTS

In this section, the Sharpe ratio and the Jensen equation are calculated for the MPF portfolio. Both these indicators are among the measurements described by Zurita and Jara (1999) to analyze the financial performance of pension funds in Chile. Based on the Sharpe indicator, we propose a MPF performance measurement that includes risk considerations. With the Jensen equation, the objective is to compare MPF excess return and risk to that of a reference portfolio, which, in this instance, is the PFM portfolio. In both cases, the end result underscores the necessity of adopting risk measurements to assess the financial performance of mandatory pension funds.

### A. The Sharpe Ratio

The Sharpe ratio is a return-to-risk quotient commonly used to measure the financial performance of portfolios. It also offers the possibility of comparing pension funds without having to depend on an asset valuation model or market portfolio identification. The higher the return-to-risk ratio, the better the fund's performance. In this section, we show that the Sharpe ratio for all mandatory pension funds is not correlated to the tri-annual return. In other words, as a measure of financial performance that includes portfolio risk, the Sharpe ratio contains different information than what is provided by the measurement of tri-annual return. The Sharpe ratio ( $S_{it}$ ) for pension fund  $i$  at moment  $t$  is defined as:

$$(1) \quad S_{it} = \frac{r_{it} - r_{ft}}{\sigma_{it}}$$

where the numerator or excess return on the riskless rate is constructed with the difference between the tri-annual return on each fund ( $r_{it}$ ) and the risk-free rate ( $r_{ft}$ ). The Banco de la República minimum expansion rate<sup>5</sup> is used for this variable. The denominator is a portfolio risk measure calculated as the standard deviation of the monthly returns in a three-year period ( $\sigma_{it}$ ). Therefore, it is not a current measure of portfolio risk, but of historical volatility.

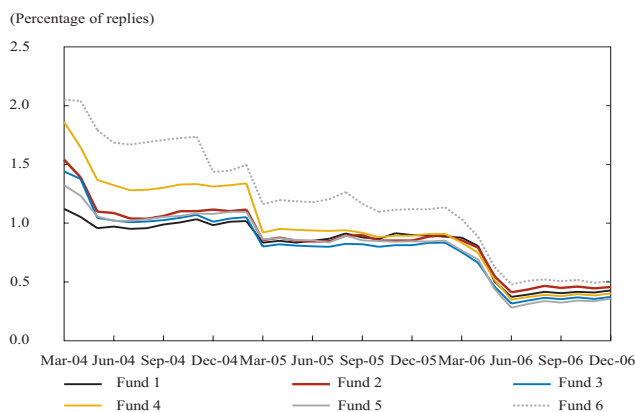
The Sharpe ratio shows a downward trend in all MPF during the period from January 2004 to December 2006 (Graph 1). When analyzing the Sharpe components, we found the decline in the indicator is related more to the increase in portfolio variance (Graph 2) than to portfolio performance, with there being

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<sup>5</sup> It was 7.5% in December 2006.

**GRAPH 1**

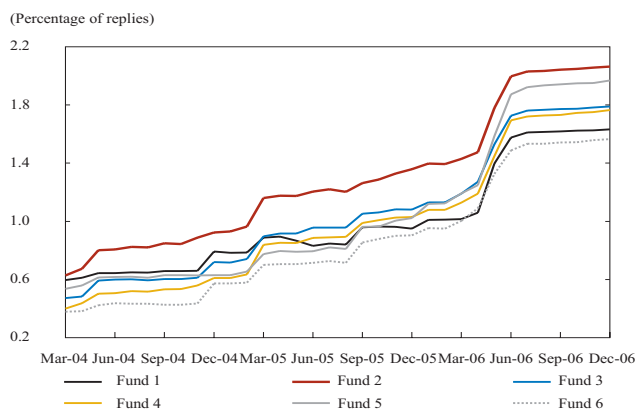
**THE SHARPE RATIO**



Source: Office of the National Superintendent of Financial Institutions and the authors' calculations.

**GRAPH 2**

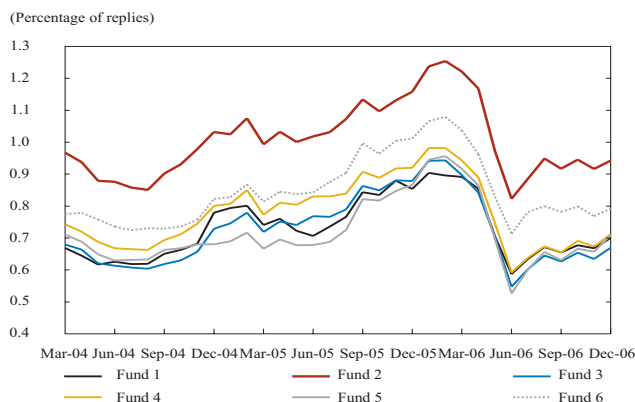
**RISK POSED BY TRI-ANNUAL AVERAGE MONTHLY RETURNS ON MPF**



Source: Office of the National Superintendent of Financial Institutions and the authors' calculations.

**GRAPH 3**

**EXCESS TRI-ANNUAL AVERAGE MONTHLY RETURNS ON MPF**



Source: Office of the National Superintendent of Financial Institutions and the authors' calculations.

no definite trend in returns (Graph 3). On average, the excess return during January 2004 was 0.72% for MPF, which is very similar to what it was in December 2006 (0.75%). However, the variance in monthly returns reported by the six MPF during the last three years has been increasing since January 2004 and, by the end of 2006, was four times higher than at the start of the sample.

The drop in the Sharpe ratio shows a different level of performance than the one obtained with the tri-annual profitability analysis, which shows no evidence of an upward trend in recent years. The correlation coefficient between actual profitability and the Sharpe ratio was calculated for each of the funds to statistically justify the difference between the two series. We worked with the simple correlation (Pearson) and the Spearman correlation, determining the significance level in both cases (Graph 4).<sup>6</sup>

The calculations of the Pearson and Spearman correlations are shown in Table 1, in addition to the *p-value* associated with the significance of this correlation. The results show there is no statistical association between actual profitability and the Sharpe ratio. The null hypothesis that the correlation between the two series is equal to zero, at a 5% significance level, cannot be rejected for any of the pension funds. Therefore, including a risk component in the analysis of MPF financial performance will provide information in addition to what can be obtained with a tri-annual profitability analysis alone.

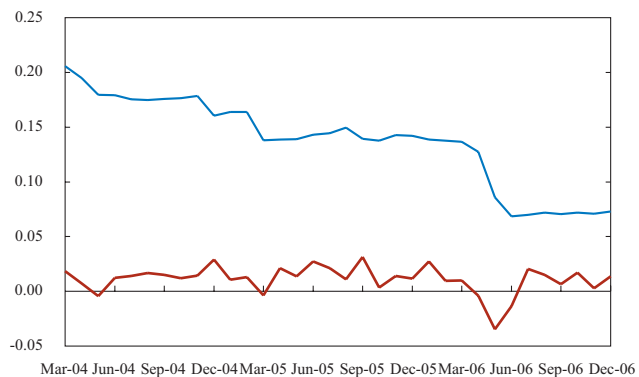
**B. The Jensen Equation**

The Jensen equation enables us to compare the performance of MPF portfolios to a benchmark portfolio.

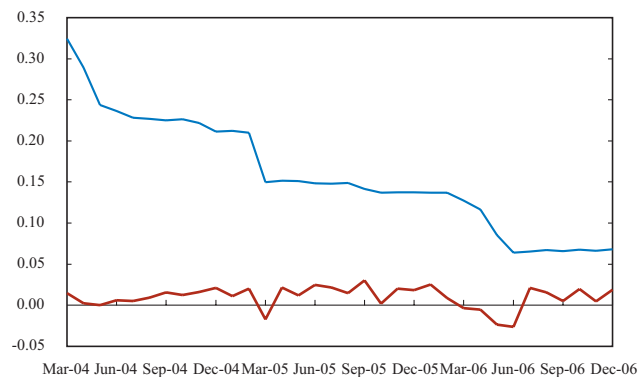
<sup>6</sup> When calculating the simple correlation (Pearson) and its significance level, several assumptions are made about the distribution of data and errors. The Spearman correlation was calculated to avoid assumptions of this type. Being a non-parametric statistic, it does not assume any distribution in the observations.

TRY-ANNUAL YIELD AND SHARPE RATIO OF THE MOF

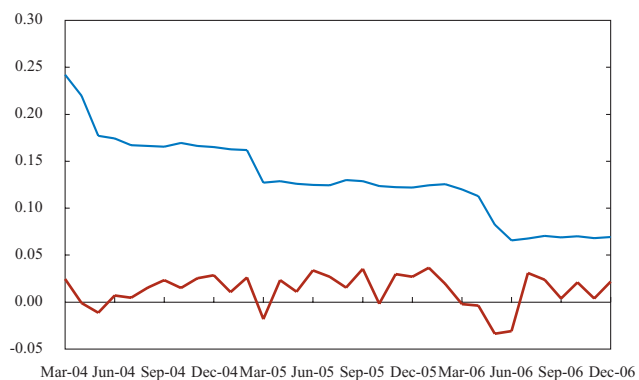
A. FUND 1



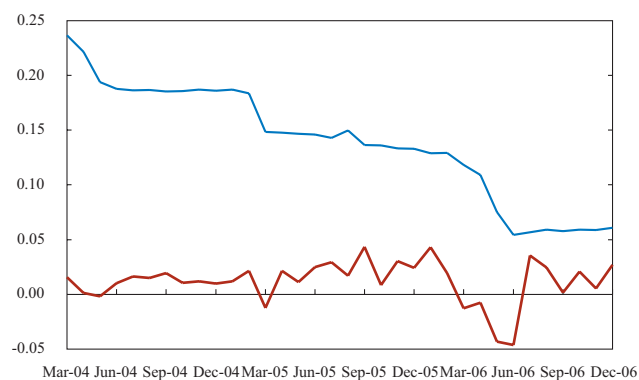
B. FUND 2



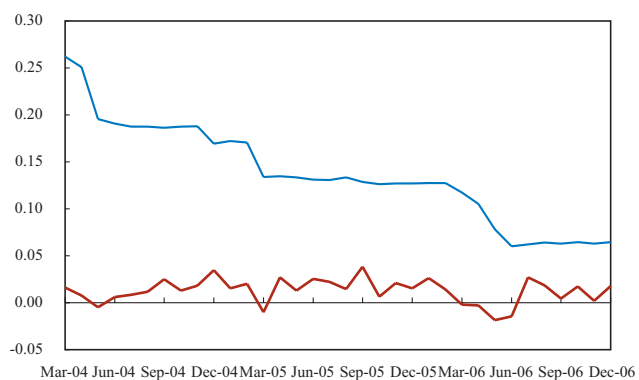
C. FUND 3



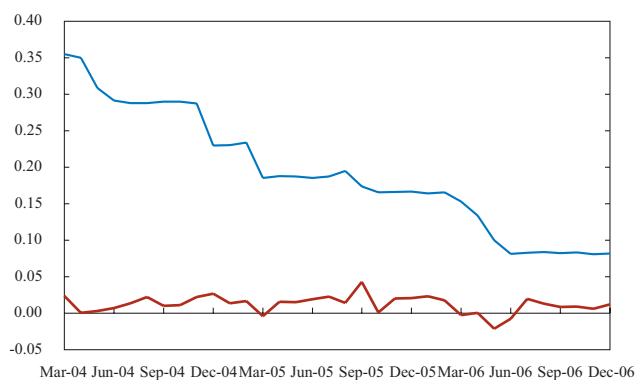
D. FUND 4



E. FUND 5



F. FUND 6



— Sharpe/10

— Tri-annual yield

Source: Office of the National Superintendent of Financial Institutions and the authors' calculations.

## PEARSON AND SPEARMAN CORRELATIONS

Fund	Pearson	<i>p</i> -value	Spearman	<i>p</i> -value
1	0.2862	0.0906	0.2456	0.1489
2	0.1827	0.2861	0.0680	0.6937
3	0.1474	0.3908	0.0546	0.7519
4	0.0957	0.5787	-0.0234	0.8921
5	0.1589	0.3545	-0.0942	0.5847
6	0.2449	0.1499	0.2927	0.0832

Number of observations: 36

Quarterly sample: January 2004 to December 2006

\* Significance: 90%.

Source: Authors' calculations

The profitability of funds comprised of PFM's own capital was used as the benchmark. The results show a close relationship between excess returns on MPF and the selected benchmark portfolios. However, the non-diversifiable risk is greater for MPF than PFM, implying more exposure for these portfolios.

Jensen (1968) focuses on evaluating the line of a defined portfolio, which is given by the following expression:

$$(2) \quad r_{pt} - r_{ft} = \alpha_p + \beta_p (r_{mt} - r_{ft}) + \varepsilon_{pt}$$

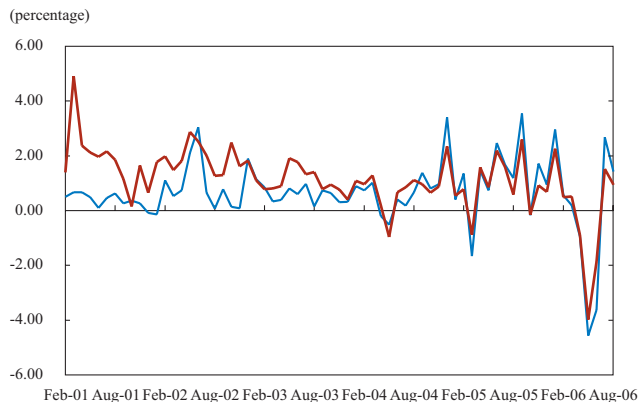
where  $r_{pt}$  is the return on portfolio  $p$  in period  $t$ ;  $r_{ft}$  is the riskless rate in period  $t$ ; and  $r_{mt}$  is the return on the benchmark portfolio in period  $t$ . Coefficient  $\alpha_p$  captures the presence of an imbalance or margin in the portfolio with respect to the benchmark. If this parameter is above zero, the performance of the analyzed portfolio would show more average excess return than the benchmark portfolio. Coefficient  $\beta_p$  shows the ratio of excess return on the analyzed portfolio to that of the benchmark portfolio in terms of their covariance. In other words, this coefficient expresses the non-diversifiable risk of the analyzed portfolio. A coefficient above 1 implies more risk for the analyzed portfolio with respect to the benchmark. Finally,  $\varepsilon_{pt}$  is a random error that is assumed to be independent and distributed normally.

A graphic analysis comparing the monthly excess returns on MPF portfolios <sup>7</sup>(Graph 5) to the monthly excess return of their respective PFM<sup>8</sup> shows

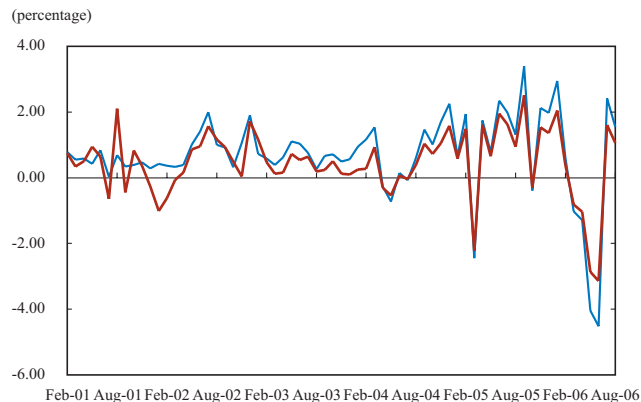
<sup>7</sup> Monthly figures on MPF profitability are not available from SFI. The ratio of returns published for each month to the total balance of the fund presented the preceding month was calculated to estimate monthly profitability (according to Jara, 2006).

COMPARISON BETWEEN PENSION FUND AND PFM PROFIT MARGINS

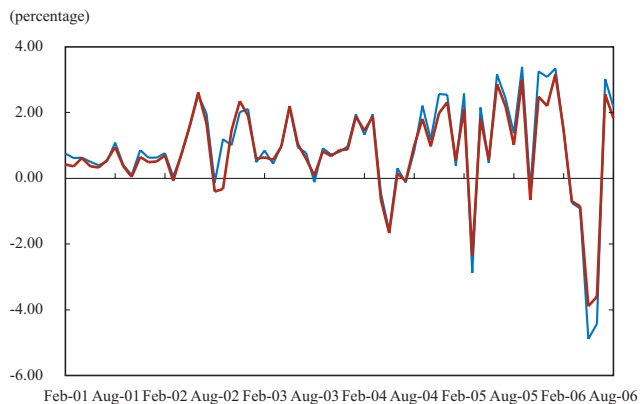
A. FUND 1



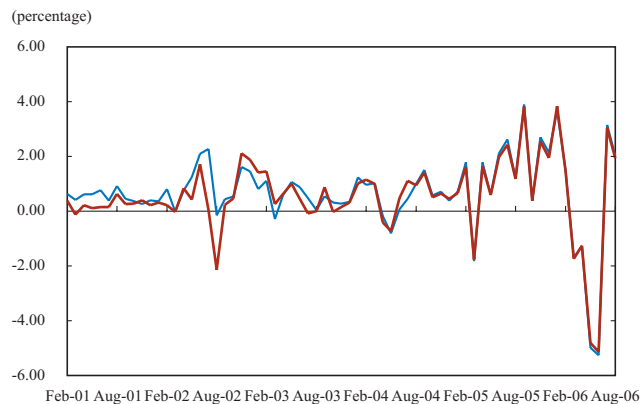
B. FUND 2



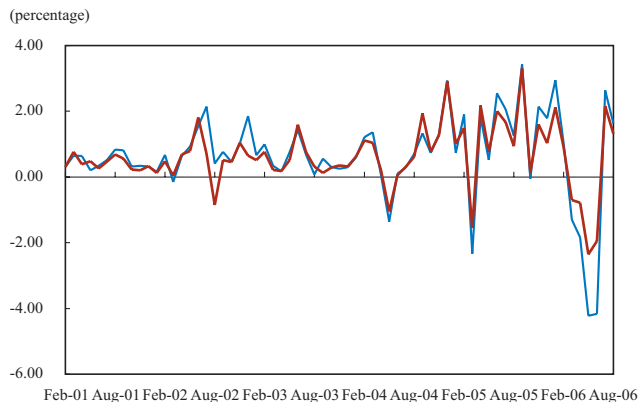
C. FUND 3



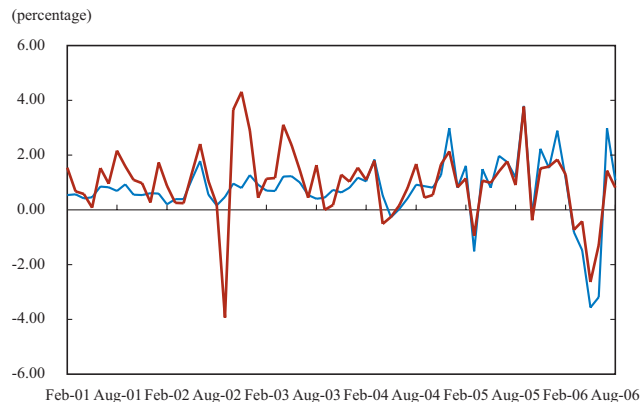
D. FUND 4



E. FUND 5



F. FUND 6



..... MPF

— PFM

Source: Office of the National Superintendent of Financial Institutions and the authors' calculations.

the following. i) There is a high correlation between PFM and MPF returns, especially during the most recent period. ii) On average, the extent of excess return for PFM and MPF is quite similar. iii) Excess return on MPF shows more pronounced increases and declines than excess return on the PFM portfolio, suggesting different degrees of risk aversion.

The Jensen equation was estimated by ordinary least squares (OLS). In most cases, the results show the difference between the two portfolios is not large with respect to average excess return. The coefficient for three of the funds was statistically not different from zero, and was very small in magnitude for the others (Table 2). In short, MPF and PFM are quite similar in terms of average excess return.

An analysis of non-diversifiable risk, based on the  $\beta$  regression coefficient, found several statistically significant coefficients in each case. This indicates a great deal of association between the spread in MPF portfolio returns and the spread in PFM portfolio returns. In the case of three pension funds, this coefficient is statistically greater than one, which means MPF face more portfolio risk than PFM in terms of these funds. The risk is virtually the same in only one case ( $\beta = 1$ ); in the other two, the risk to MPF is statistically

<sup>8</sup> Again, to calculate excess return, Banco de la República's expansion rate was used as the riskless rate.

TABLE 2

RESULTS OF THE OLS ESTIMATE OF THE JENSEN EQUATION FOR EACH OF THE FUNDS

Fund	Alfa			Beta		
	Coefficient	t-test	p-value	Coefficient	t-test	p-value
1	0.000	0.062	0.950	0.731	8.646	0.000
2	-0.001	-1.182	0.237	1.123	41.650	0.000
3	-0.003	-3.123	0.002	1.267	21.485	0.000
4	0.001	0.997	0.319	1.158	20.974	0.000
5	0.002	2.635	0.008	0.954	26.314	0.000
6	0.004	2.750	0.006	0.579	7.205	0.000

Number of observations: 71  
 Monthly sample from February 2001 to December 2006.

\* 90% significance  
 Source: authors' calculations.



less than the risk implicit in the portfolio of their respective PFM. This is no surprise, as both these agents have different objectives. The duration of MPF portfolios and, consequently, their sensitivity to interest rate changes, is greater than for PFM (which is consistent with the nature of their liabilities).

Mandatory pension funds are limited to the types of assets they can invest in and the maximum percentage of their portfolio represented by each type of asset.<sup>9</sup> This is intended to avoid an increase in portfolio volatility attributed to the addition of highly volatile assets and/or little diversification in investments. Nevertheless, our findings show the portfolio volatility of a fund without these restrictions, such as the PFM fund, is less than MPF portfolio volatility in most cases. This means the current restrictions on MPF have not translated into less risk, when compared to a portfolio like that of PFM.

In short, there is no difference in the average excess return on both portfolios. However, MPF portfolio management, in terms of non-diversifiable risk, is not equal to the PFM portfolio. The increased relative volatility of the MPF portfolio, despite current restrictions on admissible investments, underscores the need to disseminate and monitor risk indicators such as the ones proposed in this article.

## II. REASONS FOR THE INCREASE IN MPF VOLATILITY

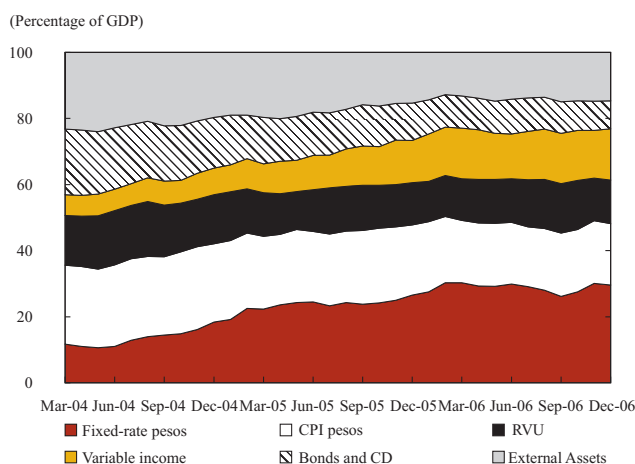
The estimates of the Sharpe ratio for mandatory pension funds show a drop in this measurement of efficiency (Graph 1), which is linked closely to the increase in the risk indicator (Graph 3). This rise in volatility has not brought higher returns with respect to the risk-free rate. Therefore, the increased variance in portfolio returns does not appear to reflect a decision by PFM to make these funds more profitable. This prompts us to depart from our analysis of returns and to concentrate on explaining the increase in portfolio volatility. Therefore, the objective in this section is to examine the possible reasons why the returns on MPF portfolios have made them more volatile.

In terms of construction, portfolio variance should reflect the interaction between volatility and the correlations of the main factors that comprise it. Information on the make-up of MPF portfolios was used to calculate the portion of the fund exposed to each of five factors: fixed-rate pesos,

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<sup>9</sup> SFI has minimum classification requirements (External Circular 034/2005) that limit the assets MPF may invest in. It also imposes limits on principal risk factors as a share of the portfolio (the public debt position is limited to 50% and the uncovered position in foreign currency may account for no more than 20%).

**MPF COMPOSITION,  
BY EXPOSURE FACTOR**



Source: Office of the National Superintendent of Financial Institutions and the authors' calculations.

CPI and RVU pesos, CD and bonds, variable income, and external and derivative assets.

The proportion of the portfolio exposed to each of these five risk factors is shown in Graph 6 for the aggregate MPF. The aggregate MPF portfolio leans heavily towards fixed-rate securities in pesos and CPI and RVU-indexed securities. This proportion was 64% in December 2006 for MPF as a whole. The rest of the portfolio is comprised increasingly of variable income positions, while bonds, certificates of deposit and external and derivative assets have become less important. The six funds essentially reflect this make-up, although Skandia and Porvenir have a larger share of external and derivative assets.

The volatility each of these factors can add to the portfolio was calculated with the profitability indexes for each type of exposure. For fixed-rate securities denominated in pesos, a monthly price index was calculated with the transaction-value-weighted clean price of traded peso TES.<sup>10</sup> A monthly price index was calculated in a similar way, using CPI and RVU-indexed TES for the second factor. In the case of variable income and external assets, we used the IGBC and the peso S&P 500, respectively.<sup>11</sup> Finally, the price of a one-year bond with a domestic rate of return (DRR) equal to the average fixed-term deposit rate (DTF in Spanish) was used as a price indicator associated with bonds and certificates of deposit. Graph 7 shows the tri-annual monthly profitability of these indexes (first column) and the tri-annual volatility of these returns (second column) for the five factors.

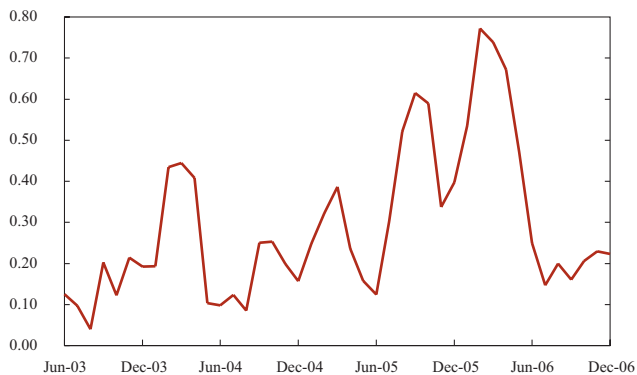
Dispersion in the returns on these factors between 2004 and 2006 (Column Two, Graph 7) has not increased on par with the variance in MPF returns (Graph 2). Only the volatility levels associated with the CPI-RVU and IGBC factors rose appreciably. In the case of fixed-rate pesos, the variance in returns at the end of 2006 was quite similar to what it was at the beginning of 2004. The most stable factor with respect to yield has been the CD; its returns have reduced its limited variability between 2004

<sup>10</sup> The clean price of a TES does not include the effect of coupon payment proximity. It is, therefore, a more exact measure of the bond's transaction value and is calculated as  $P_t = P_s - 100 \left[ (1+c)^A - 1 \right]$ , where  $P_s$  is the dirty price,  $c$  is the coupon and  $A$  is the annualized time since the last coupon payment.

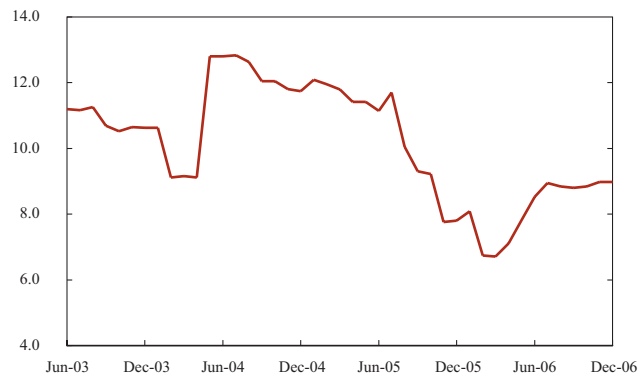
<sup>11</sup> The peso S&P500 is a measure of external stock market yield in pesos that considers the exchange rate. The results presented herein would not vary if the representative market rate of exchange (TRM in Spanish) were used as the yield index for external and derivative assets. This factor assumes that portfolio assets denominated in foreign currency are uncovered; it does not take into account that a portion might be covered for exchange risk.

YIELD AND VARIANCE OF RETURNS ON EXPOSURE FACTORS

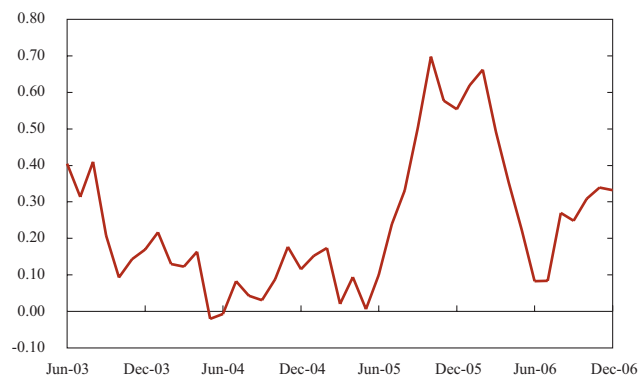
A. IPTES-PESO RETURNS



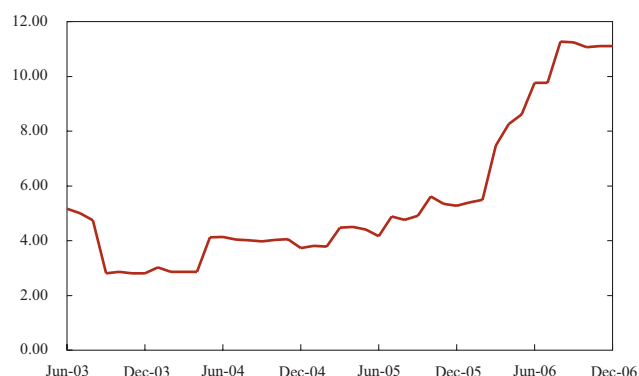
B. VOLATILITY OF IPTES-PESO RETURNS



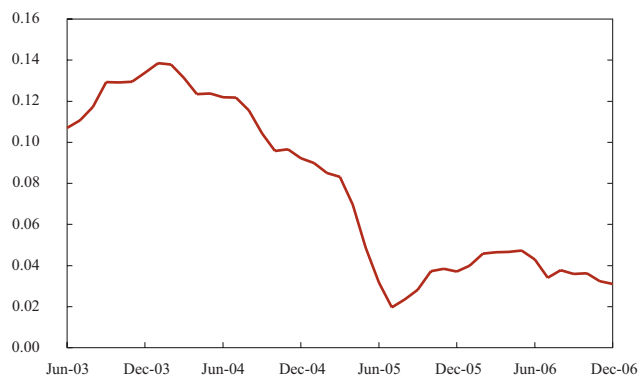
C. IPTES-CPI-RVU RETURNS



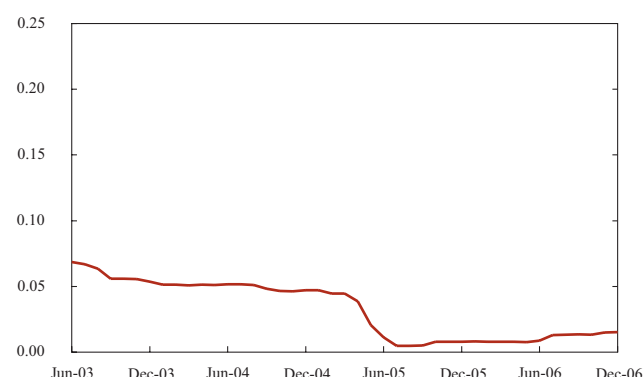
D. VOLATILITY OF IPTES-CPI-RVU RETURNS



E. RETURNS ON DTF AND BONDS

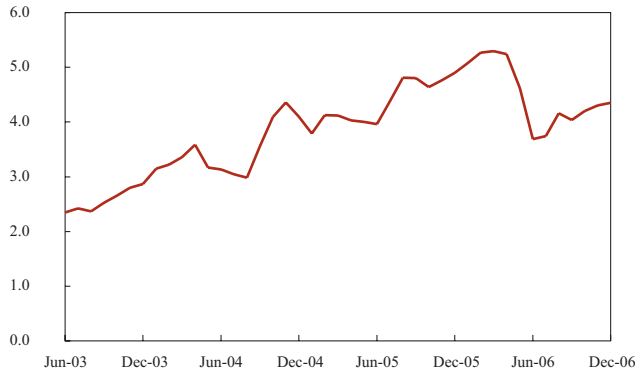


F. VOLATILITY OF RETURNS ON DTF AND BONDS

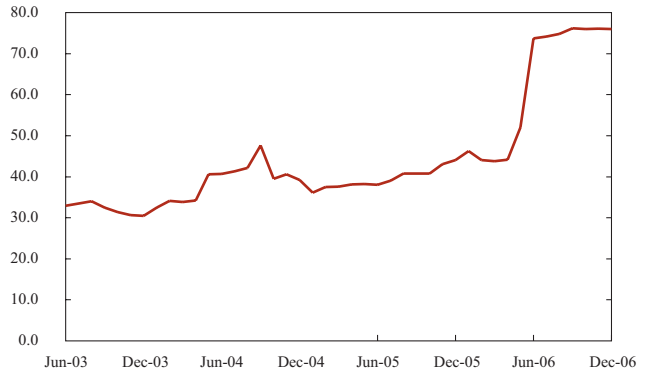


YIELD AND VARIANCE OF RETURNS ON EXPOSURE FACTORS

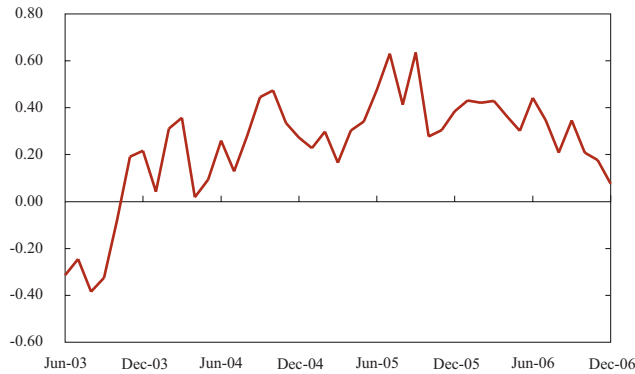
G. IGBC RETURNS



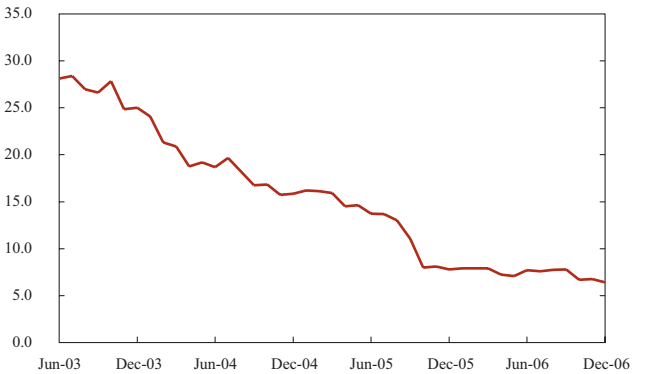
H. VOLATILITY OF IGBC RETURNS



I. PESO S&P500 RETURNS



J. VOLATILITY OF PESO S&P500 RETURNS



Note: The return of each factor is calculated as the tri-annual average of the monthly geometric yield \* 100. Volatility is the variance of this yield.  
Source: Bloomberg and the Colombian Stock Exchange. Authors' calculations

and 2006. The uncertainty associated with the yield on external assets declined during the same period. Therefore, the increased volatility in portfolio returns (Graph 2) is not the result of higher risk levels for all the factors that make up the portfolios.

The approximate variance of each MPF portfolio over time was calculated to include the correlations between these factors in the analysis:

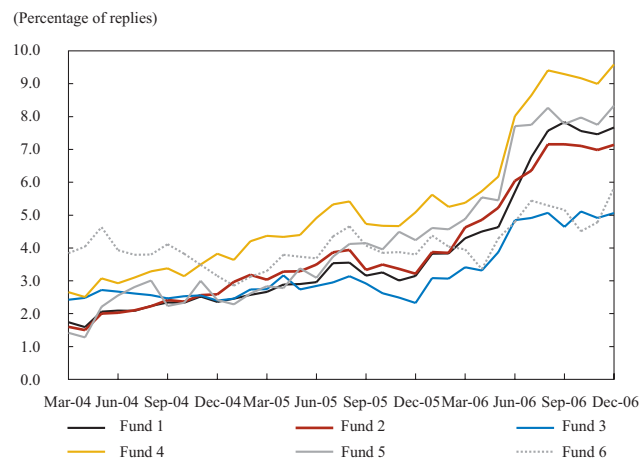
$$(3) \quad \begin{aligned} \sigma_{Port,t}^2 &= \omega_t' \Sigma_t \omega_t \\ &= \sum_{i=1}^5 \sum_{j=1}^5 \omega_{i,t} \omega_{j,t} \sigma_{ij,t} \end{aligned}$$

where  $\omega_{i,t}$  is the weight of factor  $i$  in the portfolio;  $\sigma_{ij,t}$  is the covariance between the returns on factors  $i$  and  $j$ ;  $\omega_t$  is the weight vector;  $\Sigma_t$  is the variance and covariance matrix, and  $\sigma_{Port,t}^2$  is the portfolio variance. The calculations of this approximate variance for the six funds in 2004-2006 appear in Graph 8.<sup>12</sup>

The portfolio variance for all MPF shows an upward pattern consistent with the one reported in Graph 2. MPF portfolio volatility more than tripled between January 2004 and December 2006. This is not due to increased profitability on the part of PFM (Graph 2) or more dispersion of all returns on the exposure factors (Column 2, Graph 7), but because of the limited diversification of these factors in the portfolio. Up to three-fourths of all MPF are concentrated in fixed-rate securities denominated in pesos, CPI and RVU-indexed securities in pesos, and variable-rate securities (IGBC). There are positive historical correlations above 0.5 among these factors, which have increased in the course of time, particularly in May 2004 and May 2006 (Graph 9). The rise in portfolio volatility is the result of concentration on assets with high and positively correlated returns.

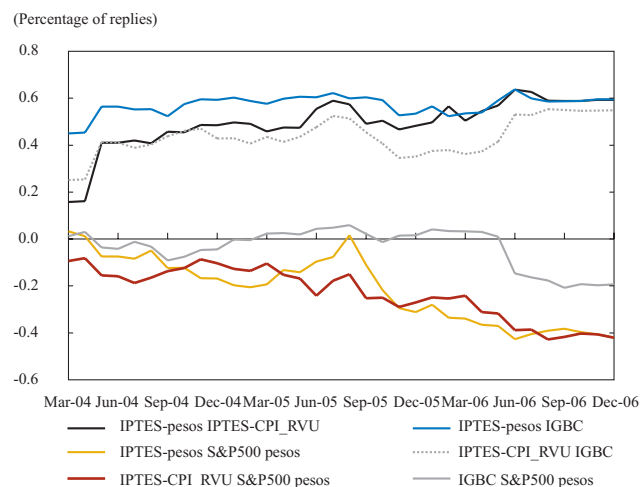
The narrow supply of long-term instruments suited to the investment timeline of a mandatory pension fund, coupled with the limited development of capital markets, make portfolio diversification difficult to achieve on the basis of domestic market assets. The profitability of these funds and their risk situation during the second quarter of 2006 is proof of their vulnerability to price changes for the principal factors. Portfolio concentration on domestic assets with highly correlated returns tripled the risk or volatility of portfolio returns for almost all MPF. Although an increase in portfolio risk of this sort is a cause for concern, as the long-term savings of affiliates are at stake, it is even more surprising that the added risk taken by these funds has not made them more profitable.

**MPF PORTFOLIO VARIANCE  
BASED ON ITS FACTORS**



Source: Office of the National Superintendent of Financial Institutions and the authors' calculations.

**HISTORICAL CORRELATIONS  
AMONG THE PRINCIPAL FACTORS**



Source: Office of the National Superintendent of Financial Institutions and the authors' calculations.

<sup>12</sup> All the components of matrix  $\Sigma$  were calculated as historical variances and covariances of the tri-annual monthly returns for each factor. In all the calculations,  $\Sigma$  is a positive semi-defined matrix. This guarantees a positive portfolio variance.

The question is: Why does MPF volatility increase while returns remain stable? It is important to point out that current regulations do not consider MPF portfolio risk management; they merely restrict investment to assets that are not high risk. The VaR calculations these funds present to SFI have no regulatory implications that might impose a maximum for this measurement. Better risk indicators that use daily information on portfolio composition and/or include a risk factor in the analysis would contribute to the measures needed to regulate portfolio volatility. Although better risk policies would limit the volatility of these portfolios, they would not necessarily enhance their returns.

Given the incentives currently available to MPF, pension fund managers concentrate more on finding new affiliates than on increasing the profitability of these funds, much less reducing their volatility. The commission charged to manage pension funds is calculated as 3% of the wage subject to contributions each month (approximately 22% of the monthly contribution). This was a good way to bring people into the system initially, but does not encourage PFM to make the portfolio more profitable. They are more interested in maintaining a good flow of contributors than in building the fund's stock or value. The requirement in the stabilization provision, which indicates that 1% of the value of the fund must come from the manager's own resources, is designed to guarantee resources in the event minimum profitability is not achieved. This requirement offers PFM no incentive to improve yields.

Investment fund managers other than PFM generally charge a commission in proportion to the fund's value or stock. With this system, the aim of generating more returns also is relevant for the manager. His commission will increase insofar as profitability increases and is reinvested in the fund (adding to its size and, hence, to the manager's commission). However, when the commission is not a percentage of the managed amount, PFM have no incentive to increase the value of their affiliates' savings. How can the current system be changed to one where both the PFM and those who contribute to the fund will benefit from an increase in its profitability? Article 104 of Law 100 authorizes SFI to set caps and conditions for the commissions charged to manage funds. However, Article 101 of the same law does not allow commissions on MPF to be calculated according to the profitability or return on amounts contributed by their affiliates. It states specifically that "all yield obtained through the management of pension funds shall be credited to the individual pension accounts of affiliates, in proportion to the amounts accumulated in each account and the duration of those amounts during the respective period."

### III. CONCLUSIONS AND RECOMMENDATIONS

Affiliates do not have a great deal of information to assess the financial performance of mandatory pension funds. Tri-annual profitability, which is the only regulatory requirement, has been stable of late. However, when taking into account indicators that include risk considerations (measured as the distribution of returns), one sees the financial performance of MPF has declined. The increased volatility of returns can be explained by the concentration in assets that are highly and positively correlated. Moreover, a comparison of excess MPF return to a benchmark portfolio showed less financial performance for most MPF. Despite average returns similar to those of the benchmark portfolio, the variability of these funds was greater.

The use of financial performance indicators that include risk considerations is recommended. As the domestic capital market grows and tax distortions among certain assets are eliminated, an increase in the presence of long-term instruments will lead to asset positions that are more consistent with the flow of future obligations.<sup>13</sup> The incentives for PFM will have to be aligned to make MPF more profitable. Although the current system of commissions was consistent with the initial aim, which was to increase the number of affiliates, it affords PFM no incentive to make these funds more profitable. Given an acceptable level of risk, the latter is desirable from the standpoint of future pensioners.

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<sup>13</sup> Long-term securities, such as those derived from mortgage portfolio securitization (TIPS and TECH), are not sought after by MPF. The yield on these investments is income-tax exempt. However, MPF pay no income tax, so they have no incentive to purchase these securities, as the tax benefit is included in their implicit rate.

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# TRANSMISIÓN DE TASAS DE INTERÉS EN COLOMBIA: UNA VISIÓN MICROBANCARIA\*

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## INTRODUCCIÓN

La importancia del sector bancario en la transmisión de tasas de interés ha sido recientemente reconocida en la literatura de mecanismos de transmisión de la política monetaria. En particular, el canal de tasa de interés, el cual opera cuando los bancos transfieren los cambios en la tasa de política a las tasas de interés de sus clientes, depende de la reacción de dichas entidades a diferentes Shocks y al estado de la economía,

El grado de rigidez de las tasas de interés a corto plazo ante un cambio en la tasa de política ha sido explicado, principalmente, por diferentes características de la estructura financiera, como lo son el grado de competencia en el sector bancario, el tamaño de los bancos, los tipos de clientes y el nivel de riesgo de crédito al que se enfrentan estas instituciones financieras,

Adicionalmente, la estructura financiera puede influenciar la transmisión de tasas de interés, afectando la respuesta de los mercados financieros a las condiciones macroeconómicas; en este sentido, un Shock macroeconómico puede impactar directamente las tasas de interés del mercado, al tiempo que la tasa de política responde a este Shock. de esta forma, es importante que al determinar la política monetaria las autoridades tengan en cuenta el comportamiento de los bancos bajo diferentes condiciones de la economía,

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