



REPUBLIC OF CHILE
Ministry of Finance

PENSION RESERVE FUND

Second Quarter, 2009

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I. BACKGROUND

The Pension Reserve Fund (PRF) was established under the Finance Ministry's Law N° 20,128 (2006). The first contribution into the fund was made on December 28, 2006. The fund's management was entrusted to the Central Bank of Chile (CBC) which acts as Fiscal Agent^{1,2} and invests its assets according to instructions given by the Finance Ministry.³

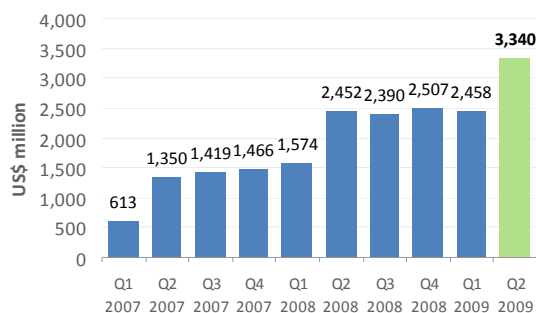
Under the PRF's current investment policy, its assets are held exclusively as international fixed-income instruments with credit ratings as set out in Appendix VII.2.

This report includes a review of the markets that affect the PRF's performance prepared by the CBC in its role as Fiscal Agent (Section VI).

II. SUMMARY OF THE QUARTER

At the close of the second quarter, the PRF held assets that, at market prices, were worth US\$3,339.80 million. The change in its value as compared to March 31 was explained by contributions for US\$836.71 million, interest income of US\$16.12 million and a US\$28.52 million increase in the market value of its assets (net of management and custody fees).

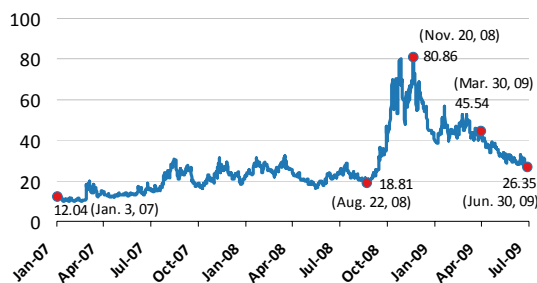
Figure 1: Market Value (2007-2009)



Source: Dipres

International financial volatility diminished as from the second quarter of this year, returning to the levels seen before the subprime crisis. This is reflected in indicators such as the VIX⁴ which, after peaking in November 2008, began to drop slowly to levels close to those of September 2008 (Figure 2).

Figure 2: VIX since start-2007



Source: Bloomberg

¹ Under the Finance Ministry's Supreme Decree N° 1.383.

² Acceptation Agreement adopted by the Central Bank Board in Ordinary Meeting N° 1.321, held on February 22, 2007.

³ The Finance Minister determines the PRF's investment policy with the advice of an external Financial Committee.

⁴ The VIX is a financial indicator used to measure market risk. By definition, it measures the implicit volatility of a group of S&P options.

III. MARKET VALUE OF THE FUND

As of June 30, the PRF had a value of US\$3,339.80 million. As compared to the close of the first quarter, this represented an increase of US\$881.53 million.

The change in the PRF's value was explained by contributions for US\$836.71 million,⁵ interest income of US\$16.51 million and capital gains of US\$28.52 million (after management and custody costs).

Capital gains were mainly the result of a 5.34% appreciation of the euro against the dollar as compared to the previous quarter, with a positive impact on the value of the PRF's investments denominated in euros. However, upward movements in international interest rates negatively affected its return, partly offsetting the exchange-rate effect.

In April, the PRF showed a capital loss of US\$15.70 million due to the negative impact of exchange-rate and interest-rate movements. A depreciation of the euro meant a loss of US\$0.71 million while the loss on account of higher interest rates reached US\$14.99 million.

In May, the fund showed a capital gain of US\$60.70 million. The gain was due mainly to a rise in the exchange rate which increased the fund's value in US\$66.22 million. This effect was partly offset by the negative impact of higher interest rates, which caused a loss of US\$5.52 million.

In June, the fund went on to experience a loss of US\$16.48 million. This was explained principally by the lower value in dollars of its assets denominated in euros and yens (US\$14.41 million).

Since its inception, the value of the PRF at market prices has shown a net increase of US\$253.13 million in capital and interest income. Taking into account all net flows (contributions, withdrawals and others), this is equivalent to an IRR in dollars of 6.00%.

Table 1: Historical Summary of PRF
(Since inception)

US\$ million	2006	2007	2008	Q1	Abr	2009 May	Jun	Summary Q2	Summary Total
Starting Value	0.00	604.63	604.63	2,506.76	2,458.07	2,447.63	2,514.81	2,458.07	0.00
Contributions	604.54	736.35	909.07	0.00	0.00	0.00	836.71	836.71	3,086.67
Withdrawals	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest Income*	0.00	45.62	71.25	16.12	5.25	6.48	4.77	16.51	149.49
Change in value	0.09	79.75	921.81	-64.81	-15.70	60.70	-16.48	28.52	103.64
Final Value	604.63	1,466.35	2,506.76	2,458.07	2,447.63	2,514.81	3,339.80	3,339.80	3,339.80

* includes interest from the securities lending program

Source: Dipres

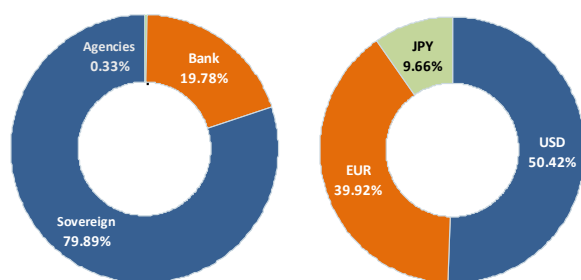
⁵ In accordance with the Law N° 20,128, the PRF received a new contribution for a total amount of US\$836.71 million, representing the 0.5% of 2008's GDP. The contribution was made with Instruction N°698 issued by the Finance Ministry in June 2009.

IV. INVESTMENT PORTFOLIO

Under the PRF's present investment guidelines, 100% of its assets can be held as sovereign-risk instruments, 60% as multilateral instruments, 50% in banking institutions and up to 30% in agencies (Appendix VII.2). In addition, the guidelines establish a currency allocation⁶ of 50% in US dollars, 40% in euros and 10% in yens.

At the close of the second quarter, 79.89% of the PRF's portfolio was invested in sovereign bonds while 19.78% was held as bank deposits and 0.33% in agencies. In the case of its currency allocation, 50.42% corresponded to dollars, 39.92% to euros and 9.66% to yens.

Figure 3: Investment Portfolio by Asset Class and Currency
June 30, 2009



Source: Dipres based on data provided by JP Morgan.

At the end of the quarter, the PRF's holdings of sovereign bonds amounted to US\$2,668.31 million, its bank instruments to US\$660.54 million and its agency instruments to US\$10.95 million. The currency distribution was US\$1,683.97 million in dollars, US\$1,333.09 million in euros and US\$322.74 million in yens.

As shown in Table 2, the duration of the fund's financial investments was 2.28 years, equivalent to an average duration of 832 days.

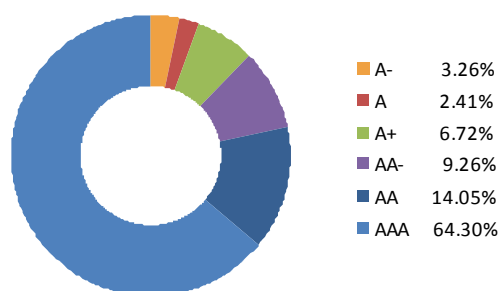
Table 2: Summary of PRF Investments

Assets	Original currency	2 nd Quarter 2009 US\$ million		
		Apr	May	Jun
Sovereign	USD	993.72	1,053.46	1,356.82
	EUR	837.72	864.02	1,087.74
	YEN	168.94	166.99	223.76
Agencies	USD	10.94	10.94	10.95
	EUR	0.00	0.00	0.00
	YEN	0.00	0.00	0.00
Banks	USD	214.12	198.01	316.23
	EUR	154.76	147.90	245.30
	YEN	67.43	73.50	99.00
Total		2,447.63	2,514.81	3,339.80
Duration (years)		2.51	2.43	2.28

Source: Dipres based on data provided by JP Morgan.

In addition, the PRF's investment guidelines allow it to maintain up to 100% of its assets in instruments with an AAA credit rating (Appendix VII.2). As of June 30, 64.30% of its assets were invested in this category while only 3.26% corresponded to an A- rating.

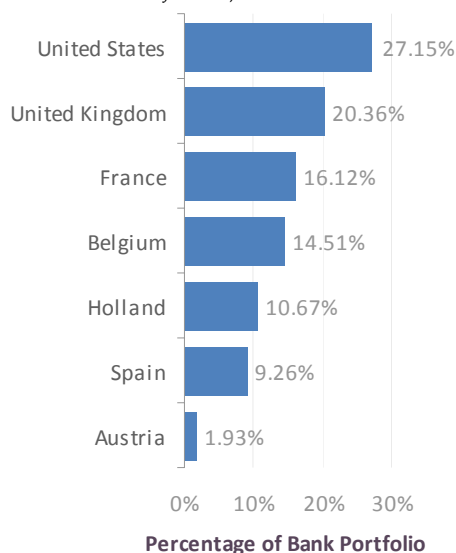
Figure 4: Investment Portfolio by Risk Classification
June 30, 2009



Source: Dipres based on data provided by JP Morgan.

As of June 30, 63.63% of the PRF's bank-risk investments were held in the United States, United Kingdom and France (Figure 5). The resources allocated to these countries totaled US\$420.30 million while Belgium, Holland, Spain and Austria accounted for a total of US\$240.24 million.

⁶ A variation of +/- 5% is permitted in currency allocation.

Figure 5: Investment Portfolio by Bank Risk
June 30, 2009

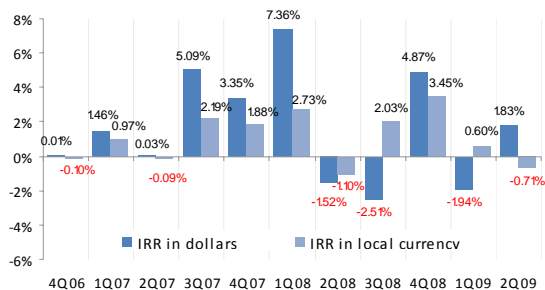
Source: Dipres based on data provided by CBC.

IV.1. Investment Portfolio Returns

The indicator used to measure returns on the PRF's portfolio is the Internal Rate of Return (IRR).⁷ This represents the effective return received by investors and takes account of all flows during the period.

In the second quarter, the IRR on the PRF, measured in dollars, was 1.83%, reflecting the appreciation of the euro and the yen against the dollar, while increases in interest rates had a negative impact on the PRF's return, partly offsetting the positive exchange-rate effect. The exchange-rate and interest-rate effects meant a return of 2.54% and -0.71%, respectively.

Since its inception, the PRF's IRR in dollars reached 6.00%, explained principally by the results of the third and fourth quarters of 2007 and the first and fourth quarters of 2008.

Figure 6⁸: Quarterly IRR in Dollars and Local Currency⁹

Source: Dipres based on data provided by JP Morgan and CBC.

International market volatility was reflected in an increase in risk level as shown by the VIX which, in 2008, reached its record level. In 2008, the IRR also dropped to its lowest level ever, with negative results in two consecutive quarters. This coincided with the deepening of the subprime crisis. However, as from the beginning of the second quarter of this year, the VIX began to show a sustained drop, returning to pre-crisis levels with an effect on the fund's portfolio that has so far been positive.

IV.2. Investment Portfolio Performance

The Time-Weighted Rate of Return (TWRR)¹⁰ is used to measure the PRF's performance relative to its benchmark.

In order to measure its performance over a period of time, an index is calculated based on daily variations in the portfolio's market value in dollars. The base value is 100 as of March 31, 2007, the date established to start comparisons with its benchmark.

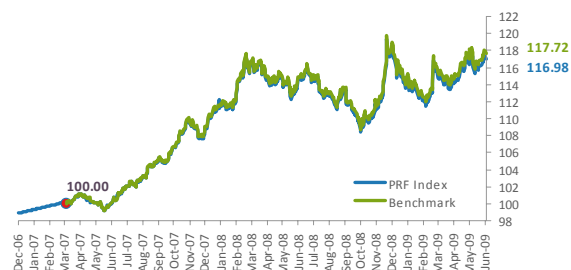
⁸ Data on returns may differ from previous reports since, as from 2009, these were recalculated to include cost flows.

⁹ The Internal Rate of Return (IRR) is the compound non-annualized rate for the quarter and considers all flows. The IRR in local currency is the result of excluding the exchange-rate effect.

¹⁰ See Glossary.

⁷ See Glossary.

Figure 7: TWRR on the PRF vs. Benchmark
(March 31, 2007 = 100)



Source: Dipres based on data provided by JP Morgan and CBC.

In the second quarter of 2009, the index showed a return of 1.83% in comparison to 1.99% for the benchmark. In relative terms, this means that the PRF's performance was 16 basis points (bps) below its benchmark.

Since the PRF's inception, the TWRR has been 7.21% or 30 bps short of its benchmark. This difference is explained mainly by the relatively lower contribution of the returns in local currency¹¹ (Table 3).

Table 3: Returns

Return indicators	2Q 09	Since inception ¹
IRR ²	1.83%	6.00%
TWRR	1.83%	7.21%
Benchmark	1.99%	7.51%
Differential	-0.16%	-0.30%
PRF Local currency	-0.67%	4.99%
BMK Local currency	-0.52%	5.29%
Risk-adjusted return	2Q 09	Since inception ¹
TWRR PRF	0.42	1.06
Benchmark	0.45	1.10

¹ March 31, 2007

Source: Dipres

² December 28, 2006

The ex-post tracking error (TE_{ep})¹² is an indicator that provides information about the risk level of investments as compared to the benchmark. For passively-managed portfolios that comprise exclusively fixed-income instruments, it can run

at between 50 and 70 bps. In the case of the PRF, the TE_{ep}, measured in annual terms since the fund's inception, reached 0.19% or 19 bps. This implies that, on average since the PRF's inception, the differences between its returns and the benchmark have been small, also reflecting conservative management of the fund by the Fiscal Agent.

A summary of the main risk indicators is shown in Table 4.

Table 4: Risk Indicators

Risk indicators	2Q 09	Since inception ¹
Standard deviation PRF	4.36%	6.83%
Standard deviation BMK	4.38%	6.83%
Ex-post tracking error	-	0.19%
Information ratio	-	-1.55

¹ March 31, 2007

Source: Dipres

¹¹ See Glossary.

¹² The TE considers the return differential since the fund's inception expressed in annual terms.

V. OTHER FLOWS

V.1. Securities Lending

The securities lending program consists in the temporary loan of financial instruments under which the lender and borrower establish the conditions and/or collateral with which the latter undertakes to comply.

The PRF's securities lending program is managed by the custodian institution (JP Morgan), using the financial assets held in the fund's portfolio as established in the Custody Contract with JP Morgan. In the second quarter, operations of this type generated additional income of US\$51,202 for the PRF.

V.2. Costs

In the second quarter, management and custody costs totaled US\$44,672 of which US\$30,000 corresponded to the management services provided by the CBC and US\$14,672 to custody fees paid to JP Morgan.

Table 5: Summary of Other Quarterly Flows

<i>Other Flows (US\$)</i>	<i>Q2</i>
Management (CBC)	-30,000
Custody (JP Morgan)	-14,672
Other costs	0
Total costs	-44,672
Securities Lending	51,202
Total other Flows	6,530

Source: Dipres based on data provided by JP Morgan and CBC.

VI. BEHAVIOR OF RELEVANT MARKETS

VI.1. General Situation

During the second quarter of 2009, the world's main central banks adopted divergent decisions about their respective monetary-policy interest rates. In the United States, the Federal Open Market Committee (FOMC) held its target range for the federal funds rate at 0% to 0.25%¹³ while the Bank of Japan maintained its monetary-policy rate at 0.1%. However, the European Central Bank (ECB) reduced its rate by 50 bps to 1%.

In the context of the international financial crisis, world economic attention focused on important developments that generated optimism as to an early recovery of the global economy. In May, the results of stress tests¹⁴ on the main US banks showed that, if the financial crisis were to deepen, only ten of the country's largest 19 banks would require additional capitalization for a total of US\$74,600 million and that this requirement would be concentrated in only four institutions.¹⁵ In June, in a bid to restore confidence in the country's financial system, the US government proposed a far-reaching reform of financial regulation, based on the importance of establishing tighter norms within a free-market framework.¹⁶ In addition, the US Treasury

authorized the pre-payment of debt to the government by ten financial institutions,¹⁷ pointing the way to the state's exit from those institutions in which it had taken a stake as a result of their bail-out. Lastly, the ECB lent Euro Zone banks a total of €442,241 million, its largest injection of liquidity ever, in order to facilitate economic agents' access to credit.

In the second quarter of 2009, the yield curves of different economic zones steepened and the world's major currencies appreciated against the dollar. This was explained mainly by the positive results reported by monthly indicators of expectations, which the market interpreted as a turning point in the financial crisis. The improved outlook for the world economy was reflected in an increase in commodity prices, particularly those related to the energy sector, which rose by around 30% in the second quarter. This was due partly to the strength shown by domestic demand in China, which was the key factor in the 7.9% second-quarter expansion of this country's GDP.¹⁸

VI.2. Main Economic Trends

• United States

In the second quarter, the principal indicators of confidence in the United States¹⁹ showed a robust increase with respect to the last figures for the first quarter. However, they remain at historically

¹³ It should be noted that the US government maintained its program of acquisitions of corporate and sovereign bonds.

¹⁴ These tests consisted in calculating the additional capital that the main US banks would require in the hypothetical case of a sharp worsening of the international financial crisis. This negative scenario corresponded to a situation in which unemployment in the US reached 10.3%, output dropped by 3.3%, and house prices fell by 22% from their level at the time of the tests.

¹⁵ These institutions and the amounts of additional financing they would require are: Bank of America (US\$33,900 million), Wells Fargo (US\$13,700 million), GMAC (US\$11,700 million) and Citigroup (US\$5,500 million).

¹⁶ The main measures envisaged under this proposal include: (1) adjustment of the minimum capital requirement for all financial institutions, with stricter requirements for the largest institutions; (2) the creation of a Financial Services Oversight Council, reporting to the Treasury, to assess potential systemic risks and coordinate the different regulatory agencies; (3) the creation of a consumer protection agency to supervise products related to credit cards and mortgages; (4) increased power and authority for the Federal Reserve to supervise those institutions whose bankruptcy could pose a threat to the financial

system (as in the case of Lehman Brothers); and, (5) tighter control of hedge funds, which have until now been outside regulatory supervision, and of products identified as playing an important role in triggering the current financial crisis, such as mortgage-backed securities and derivatives including credit default swaps (CDS).

¹⁷ It should be noted that, at the close of this report, JP Morgan N.A., the current custodian institution for Chile's sovereign wealth funds, had pre-paid the US\$25,000 million in help it received from the US government.

¹⁸ This boosted confidence that China will achieve annual growth of 8% in 2009 in line with its government's expectations.

¹⁹ University of Michigan Survey of Consumer Confidence Sentiment and Conference Board Consumer Confidence.

low levels, reflecting the uncertainty prevailing in the US economy.

The Leading Index, which provides an indication of GDP performance over a three to six-month horizon, rose by 1.0% in May and 1.2% in June, comparing positively with previous quarters. Industrial output continued to drop, but at an average rate that was considerably slower than in the previous quarter (-0.7% vs. -1.6%). Unemployment increased from 8.5% to 9.5% while job creation maintained its negative trend, with an average monthly loss of approximately 430,000 jobs. This was, however, a significant drop from the average of 650,000 seen in the first quarter. Prices continued to show a downward trend due principally to weak domestic demand, contributing to a drop in annual inflation from -0.4% to -1.4%, while annual core inflation decreased marginally from 1.8% to 1.7%.

In the second quarter of 2009, the yield curve steepened significantly in the US. The evolution of the structure of interest rates implied that the yield on 2-year Treasury bills increased by 31 bps while that on 10-year Treasury bills rose by 87 bps.²⁰

• Euro Zone

In Europe, the main indicators of confidence²¹ also showed an important increase on the last figures for the first quarter. However, they remain historically low and well below their levels before the financial crisis.

Germany's ZEW survey, which provides an indication of the performance of economic activity in Europe, closed the second quarter with an important increase with respect to the last survey of the first quarter, reaching its highest level in

three years. Industrial output also showed a recovery in the second quarter, reducing its annual contraction from 19.3% to 17%. Unemployment rose to 9.5%, up from 8.9% at the end of the first quarter.²² Annual inflation fell from 0.6% to -0.1% while annual core inflation showed a slight drop from 1.5% to 1.4% at the end of the second quarter.

In the Euro Zone, the relevant yield curve showed a marked steepening.²³ The yield on 2-year German bonds rose by 13 bps while that on 10-year bonds increased by 39 basis points.

• Japan

As in Europe, Japan's main indicators of confidence²⁴ also strengthened as compared to the first quarter, but remain historically low, reflecting consumers' lack of confidence in the recovery of the Japanese economy.

After a significant deterioration of economic conditions in Japan, a change of trend gradually began to become apparent in the second quarter. Some economic data, such as domestic demand and employment, continues to be negative but there are more positive signs in both the external and manufacturing sectors. Industrial output showed a recovery in the second quarter, with its annual contraction dropping from 34.2% to 29.5%. However, unemployment rose from 4.8% to 5.2%²⁵ in line with the weakening of domestic demand. Annual inflation fell from -0.3% at the end of the first quarter to -1.1% while core inflation dropped from -0.3% to -0.5% at the end of the second quarter.

²⁰ The economic stimulus plans implemented by the government entail the risk that long-term interest rates could eventually rise due to the increased emission of debt that will potentially be required to finance the growing US fiscal deficit.

²¹ Euro Zone indicators of confidence published by the European Commission.

²² Figures for industrial output and unemployment in the Euro Zone are for May 2009 and were the latest available at the close of this report.

²³ The yield curve referred to by Bloomberg as EUR German Sovereign.

²⁴ Japan Consumer Confidence Overall Nationwide NSA and Japan Consumer Confidence Households NSA.

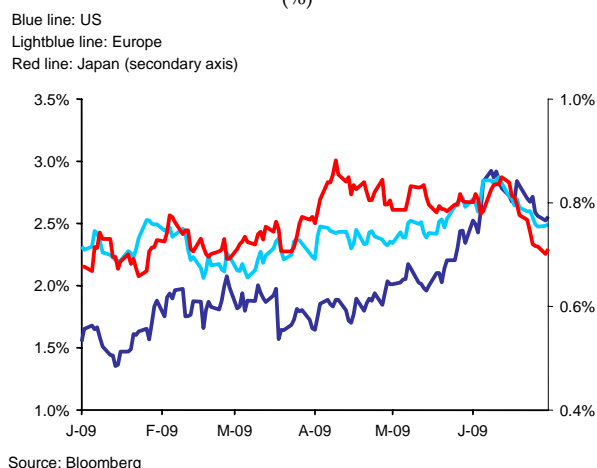
²⁵ Figures for industrial output and unemployment in Japan are for May 2009 and were the latest available at the close of this report.

In the second quarter, there was a slight steepening of Japan's yield curve. This was reflected in the yield on 2-year Japanese sovereign bonds which fell by 10 bps while that on 10-year bonds rose by 1 bps.

VI.3. Fixed-Income Market

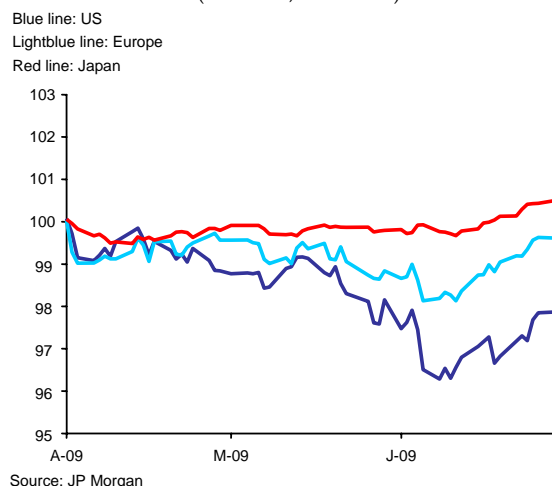
In the fixed-income market, the interest rates on 5-year US and European sovereign bonds showed an increase while that on 5-year Japanese sovereign bonds decreased (Figure 8).

Figure 8: Interest rates on 5-year Sovereign Bonds (%)



As a result, the different fixed-income markets showed a mixed performance in the second quarter as regards total returns. These were negative in both the United States and Europe but positive in Japan, particularly during June (Figure 9).

Figure 9: Total returns (5-year fixed-income) (March 31, 2009 = 100)



VI.4. Main Spreads on Portfolio Securities

The spread on 5-year agency bonds dropped by approximately 50 bps during the second quarter (Figure 10). As a result, their return²⁶ was higher than that on 5-year US Treasury bills.

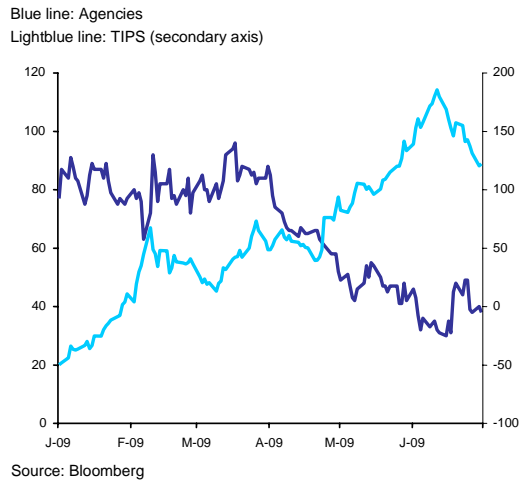
US Inflation-Linked Bonds (TIPS) also showed a higher return than (nominal) US Treasury bills of an equivalent maturity.²⁷ This was reflected in the spread on TIPS²⁸ which increased by 88 bps in response to expectations of a medium-term increase in inflation.

²⁶ Strictly, the return on 5-year US agency bonds in the second quarter (-1.9%) was less negative than that on Treasury bills of the same maturity (-12.2%).

²⁷ Strictly, the return on 5-year inflation-linked bonds in the second quarter (-0.6%) was less negative than that on Treasury bills of the same maturity (-12.2%).

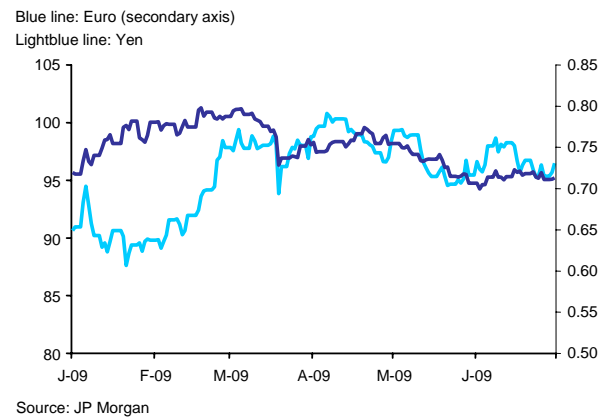
²⁸ TIPS spread: Return on a US Treasury bill minus the return on TIPS of an equivalent maturity.

Figure 10: Spread Agency and TIPS vs. Treasuries
(spread in bps compared to 5-year duration T-Bills)



yen/euro exchange rate showed an appreciation of 3.2% over the same period.

Figure 11: Exchange rates
(against the dollar)



VI.5. Exchange Rates

In the second quarter of 2009, the euro and the yen appreciated against the US dollar by 5.3% and 2.3%, respectively (Figure 11). As a result, the

VII. APPENDIX

VII.1. Positions with Sovereign Issuers and Financial Institutions

The Fiscal Agency has investments in **Sovereign Bonds** of the United States, Germany, France, Japan, Greece, Portugal, Italy and Belgium.

ESSF and PRF Banks with Deposits, June 30, 2009

1	ABN AMRO Bank NV
2	Bank of Scotland Plc
3	Bayerische Hypo-und Vereinsbank AG
4	Bayerische Landesbank
5	Caixa Geral de Depósitos S.A.
6	Caja de Ahorros y Monte de Piedad de Madrid
7	Crédit Industriel et Commercial (CIC)
8	DekaBank Deutsche Girozentrale
9	Dexia Bank Belgium SA
10	Erste Group Bank AG
11	Fortis Bank NV/SA
12	HSBC France
13	ING Bank NV
14	Intesa Sanpaolo SpA
15	KBC Bank NV
16	Landesbank Baden-Württemberg
17	Mizuho Corporate Bank Ltd.
18	National Australia Bank Ltd
19	Norddeutsche Landesbank Girozentrale
20	Raiffeisen Zentralbank Österreich AG (RZB)
21	Sumitomo Mitsui Banking Corporation
22	The Royal Bank of Scotland Plc
23	Unicredit SpA

VII.2. Investment Limits

A. Credit Risk

The PRF's investments must fulfill the following credit-risk conditions and requirements:

The eligible issuers are:

Asset Class (Risk)	Upper Limit
Sovereigns	100%
Multilaterals	60%
Banks	50%
Agencies	30%

A.1 Sovereign Risk

The eligible countries are those, other than Chile, that over the previous 24 months have held a long-term risk classification equivalent to **A-** or higher issued at least by two of the following international credit rating agencies: Fitch, Moody's and Standard & Poor's.

Investment limits for eligible sovereign risk (between **AAA** and **A-**) are:

Risk Classification	Upper Limit
AAA	100%
AA+	90%
AA	
AA-	
A+	30%
A	
A-	

A.2 Supranational or Multilateral Risk

The eligible international organizations are those with a long-term risk classification equivalent to **AA-** or higher issued at least by two of the following international credit rating agencies: Fitch, Moody's and Standard & Poor's.

Investment limits for eligible multilateral risk (between **AAA** and **AA-**) are:

Risk Classification		Upper Limit (US\$ million)
AAA	Aaa	800
AA+	Aa1	600
AA	Aa2	
AA-	Aa3	

A.3 Bank Risk

The methodology for selecting banking institutions and assigning limits is based on international risk classifications and the size of the institutions.

Eligible institutions are those that have a long-term risk classification of A- or higher issued at least by two of the following international credit rating agencies: Fitch, Moody's and Standard & Poor's, and a minimum shareholders' equity equivalent to **US\$1,000 million**.

Investment limits by institution are expressed in discrete intervals according to the table below:

Risk Classification		Upper Limit (US\$ million)
AAA	Aaa	600
AA+	Aa1	400
AA	Aa2	
AA-	Aa3	
A+	A1	300
A	A2	
A-	A3	

A.4 Agency Risk

The eligible agencies are those in the United States with a long-term risk classification equivalent to **AAA** issued at least by two of the following international credit rating agencies: Fitch, Moody's and Standard & Poor's, and a minimum shareholders' equity equivalent to **US\$1,000 million**. Investment in any one agency may not exceed **US\$800 million**.

VII.3. Methods of Calculating Estimated Returns

The method used to calculate the return on a portfolio depends on the nature of the fund and on whether the return to the investor or the performance of the portfolio manager is being evaluated.

In the Quarterly Report, two main methods are used: the **Time-Weighted Rate of Return (TWRR)** and the **Internal Rate of Return (IRR)**, with the latter serving as a measure of money-weighted return. While the

TWRR is used to analyze the performance of the fund's management relative to the chosen benchmark, the IRR is used to determine the effective fund's return to the Republic.

A conceptual description of each of these methods is provided below, along with a discussion of their general use in the financial market and their application to Chile's sovereign wealth funds, followed by some brief final comments.

VII.3.1 Internal Rate of Return (IRR)

The Internal Rate of Return (IRR) on the net flows of a given period is the rate of return actually received by an investor.

The Association for Investment Management and Research (AIMR) recommends using the IRR to measure return on investments in instruments that are not publicly traded (property, private equity, etc.) since, in these cases, the portfolio manager has greater control over the amount and timing of cash flows.

The IRR is the implicit return at which the initial investment equals the present value of flows and interest or, in other words, the discount rate at which the present value of all cash flows equals zero. This is equivalent to resolving the following equation:

$$\sum_{i=0}^{i=T} \frac{CF_i}{(1+r)^i} = 0, \text{ with } CF_i = \text{net flow of day } i.$$

Rates of return calculated using the iterative IRR method are affected by the timing and size of net cash flows during the period.²⁹

VII.3.2 Time-Weighted Rate of Return (TWRR)

This method is used by market participants to measure the performance of funds invested in publicly-traded instruments. In the case of these instruments, fund managers tend not to control investors' cash flows because they are constantly buying and selling.

The TWRR³⁰ is the rate of growth measured as a percentage of the change in the value of an asset over a given period without considering the effect of cash flows. In order to obtain the TWRR for the period, the

²⁹ Alternatively, the IRR can be calculated using the Modified Dietz Method (MDM):

$$MDM \text{ Return} = \frac{EMV - BMV - CF}{BMV + Net \text{ Adjusted Cash Flow}}$$

where:

- *EMV* is the market value at the end of the period plus accrued interest.
- *BMV* is the market value at the beginning of the period plus accrued interest.
- *CF* is net cash flow during the period.

Net Adjusted Cash Flow is the average of each individual cash flow weighted by the length of time (as a percentage of the total period) during which the flow affected the portfolio.

³⁰ Fabozzi and Frank, *Investment Management*, © 1995, pgs 611-618.

daily returns are net of contributions and withdrawals as well as costs³¹ and income from the securities lending program.

$$TWRR_{period} = \prod_i^{period} (1 + r_i) - 1$$

where:

$$r_i = \frac{value_assets_i - contributions + withdrawals + costs - securities_lending}{value_assets_{i-1}}$$

The TWRR measures the ability of a fund manager to generate value through a defined investment policy, independently of the contributions and/or withdrawals made during the period analyzed.

In the case of Chile's sovereign wealth funds, it allows their performance to be compared with the benchmark. This is achieved by converting daily returns (measured as the difference in market value from one day to another, excluding cash flows during the latter) into an index.

VII.3.3 TWRR vs. IRR

The TWRR is utilized to measure the performance of a fund manager or managers against the chosen benchmark. An alternative method of measurement is to assume that the resources are permanently invested in a portfolio that generates the same daily return as the benchmark and to compare the value of this hypothetical portfolio with that of the actual portfolio. However, under this latter method, it is more difficult to build the benchmark and verify its results.

The usual practice in financial markets is, therefore, to use the TWRR to measure a fund manager's performance and to be able to compare this with a benchmark that it is easily constructed by an external party.

The IRR, on the other hand, serves to measure a fund's performance from the point of view of the investor, in this case the State of Chile.

Although the two indicators measure different aspects of an investment, both are considered necessary in order to properly evaluate performance.

VII.4. Calculation of PRF Benchmark

The reference portfolio (benchmark) has three main components:

³¹ Only includes custody and consultancy costs.

- ✓ **Short-term money market instruments:** 6-month LIBID and 6-month T-bill rates in dollars, euros and yens are used, with a 90-day lag to simulate a portfolio of 3-month deposits.
- ✓ **Nominal bonds:** JP Morgan GBIs for sovereign bonds of 1-3 years, 3-5 years, 5-7 years and 7-10 years in the three currencies are used.
- ✓ **Inflation-linked bonds:** Barclays US Govt. Inflation-Linked Bond Index (US TIPS) is used. This index monitors sovereign bonds with a duration between 1 and 10 years.

The weight of each of these components is as follows:

Composition	USD	EUR	JPY	Total
Money Market (*)	15.0%	12.0%	3.0%	30.0%
6-month LIBID	7.5%	6.0%	1.5%	15.0%
6-month T-bill rate	7.5%	6.0%	1.5%	15.0%
Nominal Sovereign Bonds	31.5%	28.0%	7.0%	66.5%
JP Morgan GBI 1-3 years	14.2%	12.6%	3.2%	29.9%
JP Morgan GBI 3-4 years	9.5%	8.4%	2.1%	20.0%
JP Morgan GBI 5-7 years	3.9%	3.5%	0.9%	8.3%
JP Morgan GBI 7-10 years	3.9%	3.5%	0.9%	8.3%
Inflation-Indexed Sovereign Bonds	3.5%			3.5%
Barclays US Govt. Inflation-Linked Bond Index	3.5%			3.5%
TOTAL	50.0%	40.0%	10.0%	100.0%

VII.4.1 Calculation of LIBID and T-Bill Benchmark

Data on LIBID³² rates is obtained from Bloomberg. Daily returns are calculated with a lag of 90 days as follows:

$$Ret_Libid_t^{USD} = \frac{Libid_{t-90}^{USD}}{360} \quad Ret_Libid_t^{EUR} = \frac{Libid_{t-90}^{EUR}}{360} \quad Ret_Libid_t^{JPY} = \frac{Libid_{t-90}^{JPY}}{360}$$

LIBID rates in euros and yens are adjusted by the exchange rate in order to express them in dollars. The daily return of the LIBID benchmark is:

$$Ret_Libid_t = 7.5\% \cdot Ret_Libid_t^{USD} + 6.0\% \cdot \left[\left(1 + Ret_Libid_t^{EUR} \right) \cdot \frac{EUR_t}{EUR_{t-1}} - 1 \right] + 1.5\% \cdot \left[\left(1 + Ret_Libid_t^{JPY} \right) \cdot \frac{JPY_t}{JPY_{t-1}} - 1 \right]$$

The rates are adjusted using the same day's exchange rate (without a lag).

Similarly, for T-bills, the daily return of each index is:

³² According to convention, the LIBID rate is equal to LIBOR less 1/8 or 0.125.

$$\text{Ret_TBill}_t^{\text{USD}} = \frac{\text{TBill}_{t-90}^{\text{USD}}}{360} \quad \text{Ret_TBill}_t^{\text{EUR}} = \frac{\text{TBill}_{t-90}^{\text{EUR}}}{360} \quad \text{Ret_TBill}_t^{\text{JPY}} = \frac{\text{TBill}_{t-90}^{\text{JPY}}}{360}$$

$$\text{Ret_TBill}_t = 7.5\% \cdot \text{Ret_TBill}_t^{\text{USD}} + 6.0\% \cdot \left[\left(1 + \text{Ret_TBill}_t^{\text{EUR}} \right) \cdot \frac{\text{EUR}_t}{\text{EUR}_{t-1}} - 1 \right] + 1.5\% \cdot \left[\left(1 + \text{Ret_TBill}_t^{\text{JPY}} \right) \cdot \frac{\text{JPY}_t}{\text{JPY}_{t-1}} - 1 \right]$$

VII.4.2 Calculation of Nominal Bond Benchmark

The benchmark for sovereign bonds is calculated using the different JP Morgan GBI³³ indexes, with durations of 1 to 3 years, 3 to 5 years, 5 to 7 years and 7 to 10 years for the United States (USD), Germany (EUR) and Japan (JPY). The daily return of each index in its local currency is:

$$\text{Ret_JPM}_t = \frac{\text{Idx_JPM}_t}{\text{Idx_JPM}_{t-1}} - 1$$

The benchmark's daily return in dollars for each country is:

$$\text{Ret_BNom_USD}_t = \sum_{\text{duration}} \text{Ret_Idx_USD}_t^{\text{duration}} \cdot w_{\text{USD}}^{\text{duration}}$$

$$\text{Ret_BNom_EUR}_t = \sum_{\text{duration}} \left[\left(1 + \text{Ret_Idx_EUR}_t^{\text{duration}} \right) \cdot \frac{\text{EUR}_t}{\text{EUR}_{t-1}} - 1 \right] \cdot w_{\text{EUR}}^{\text{duration}}$$

$$\text{Ret_BNom_JPY}_t = \sum_{\text{duration}} \left[\left(1 + \text{Ret_Idx_JPY}_t^{\text{duration}} \right) \cdot \frac{\text{JPY}_t}{\text{JPY}_{t-1}} - 1 \right] \cdot w_{\text{JPY}}^{\text{duration}}$$

where:

$$w_{\text{USD}} = \begin{cases} \text{duration 1 - 3 years} = 14.1750\% \\ \text{duration 3 - 5 years} = 9.4500\% \\ \text{duration 5 - 7 years} = 3.9375\% \\ \text{duration 7 - 10 years} = 3.9375\% \end{cases} \quad w_{\text{EUR}} = \begin{cases} \text{duration 1 - 3 years} = 12.6000\% \\ \text{duration 3 - 5 years} = 8.4000\% \\ \text{duration 5 - 7 years} = 3.5000\% \\ \text{duration 7 - 10 years} = 3.5000\% \end{cases}$$

$$w_{\text{JPY}} = \begin{cases} \text{duration 1 - 3 years} = 3.1500\% \\ \text{duration 3 - 5 years} = 2.1000\% \\ \text{duration 5 - 7 years} = 0.8750\% \\ \text{duration 7 - 10 years} = 0.8750\% \end{cases}$$

³³ Government Bond Indexes.

The indexes are expressed in their local currency and adjusted by the exchange rate to obtain the return in dollars.

Finally, the benchmark for nominal bonds in USD is:

$$Ret_BNom_t = Ret_BNom_USD_t + Ret_BNom_EUR_t + Ret_BNom_JPY_t$$

VII.4.3 Calculation of Inflation-Linked Bond Benchmark

The benchmark for inflation-linked bonds is simply:

$$Ret_TIPS_t = 3.5\% \cdot \left(\frac{Idx_TIPS_t}{Idx_TIPS_{t-1}} - 1 \right)$$

VII.4.4 Calculation of Benchmark for the Funds

The daily return on the benchmark for the funds is:

$$Ret_Libid_t + Ret_TBill_t + Ret_BNom_t + Ret_TIPS_t$$

VII.4.5 Formula for Exchange-Rate Adjustment

Exchange-rate adjustment follows from:

$$asset_return_t^{EUR}[EUR] = \frac{asset_price_t^{EUR}}{asset_price_{t-1}^{EUR}} - 1 \quad (1)$$

$$EUR_return_t = \frac{EUR_t}{EUR_{t-1}} - 1 \quad (2)$$

$$asset_return_t^{EUR}[USD] = \frac{asset_price_t^{EUR} \cdot EUR_t}{asset_price_{t-1}^{EUR} \cdot EUR_{t-1}} - 1 = \frac{asset_price_t^{EUR}}{asset_price_{t-1}^{EUR}} \cdot \frac{EUR_t}{EUR_{t-1}} - 1 \quad (3)$$

Replacing (1) in (3):

$$asset_return_t^{EUR}[USD] = \left(1 + asset_return_t^{EUR}[EUR] \right) \cdot \frac{EUR_t}{EUR_{t-1}} - 1 \quad (4)$$

Y, finally, replacing (2) in (4):

$$asset_return_t^{EUR}[USD] = \left(1 + asset_return_t^{EUR}[EUR] \right) \cdot \left(1 + EUR_return_t \right) - 1 \quad (5)$$

VIII. GLOSSARY³⁴

Accrued interest: Interest earned in a given period that has yet to be withdrawn or paid.

Bank risk: The risk associated to an investment in bank financial instruments; refers to the different risks faced by banking institutions in the course of their activities. This normally varies in line with the institution's line of business. These risks include credit, liquidity, exchange-rate and interest-rate risk.

Basis point: One hundredth of a percentage point; the smallest unit for measuring the return on a bond or a change in interest rates.

Benchmark: A portfolio used for the purposes of comparison; permits evaluation of a fund manager's performance. For an investor in fixed-income instruments, benchmarks are, in general, optimum portfolios with clearly defined investment parameters such as the relative weight of the portfolio's components, currency allocation and credit risk.

Carry trade: A financial strategy that consists in borrowing in one currency in order to invest the resources in instruments denominated in another currency with an expected rate of return that is relatively higher than the cost of borrowing in the first currency. Under this strategy, there is no coverage against exchange-rate risk.

Commercial paper: A debt security in local or foreign currency, with a maturity of between 90 days and 1 year, issued by governments, financial institutions and large companies to cover short-term financing needs. A trade bill's yield depends on the issuer's risk rating; maturities, interest rates, repayment terms, currency and expiry vary.

Counterpart risk: The risk arising from the possibility of default on the financial obligations of the counterpart in a financial operation.

Credit risk: The risk that an issuer may not fully comply with a financial liability either at the time it falls due or at some subsequent time. In systems for the exchange of securities, this definition in general includes replacement and principal risks.

Duration: A measure of exposure to interest-rate risk that measures the sensitivity of the price of a fixed-income instrument (bond) to changes in interest rates or, in other words, how much the instrument's price changes in response to a change in interest rates.

Financial agencies in the US: Mortgage lenders in the United States with explicit or implicit government backing.

Flight to quality: Investors' movement of funds to assets of better credit quality and, therefore, lower risk during periods of uncertainty or great volatility.

Inflation-linked bonds: Bonds whose value is adjusted in accordance with an inflation index; in the US, these bonds are known as TIPS.

Information ratio: A measure of the risk-adjusted return on financial securities or a portfolio; defined as the difference between the return on the security or portfolio and the benchmark divided by the TE. It can be interpreted as the ability of the manager to generate returns in excess of the benchmark for each unit of relative risk.

Internal Rate of Return (IRR): The rate of return actually perceived by an investor; corresponds to the internal rate of return on net flows during a given period.

Investment guidelines: Criteria under which investments are managed.

³⁴ Sources: Central Bank of Chile (CBC) and Bloomberg.

LIBID: London Interbank Bid Rate, the interest rate paid on interbank deposits; by definition, it is equal to LIBOR (offered rate) minus 0.00125 or 0.125%.

LIBOR: London Interbank Offered Rate, the interest rate charged on interbank borrowing.

Local Currency: Denomination currency of financial instruments.

Market risk: The risk that the value of an investment may be reduced by changes in market factors.

Money market instruments: Financial instruments with a maturity of up to a year.

Multilateral risk: The risk of default by an official multilateral issuer.

Operational risk: The risk that deficiencies in internal information systems or controls may result in unexpected losses.

Overnight deposits: Deposits with a maturity of one day.

Portfolio: A combination of investment instruments held by an individual or institutional investor.

Reference duration: Benchmark duration devised to guide and evaluate the duration of investments.

Reference structure: A reference portfolio used to guide and evaluate portfolio management.

Return differential: A measure of the performance of a portfolio compared to its benchmark.

Risk: The possibility of suffering damage or losses; the variability of the return on an investment.

Risk classification: The level of credit risk associated with a financial instrument, institution or country as defined by a risk rating agency.

Secondary market: The market in which financial assets that have already been issued are traded. Each transaction involves a sale/purchase between investors.

Sovereign risk: The risk arising from investment in sovereign instruments; generally used to refer to the risk classification of a sovereign state. This classification corresponds to the opinion issued by bodies specialized in risk evaluation as to the possibility that a state will properly comply with its financial obligations, taking into account factors that include its payment record, political stability, economic situation and willingness to repay borrowing.

Spread: The difference between yield-to-maturity on fixed-income securities; used to evaluate the relative performance of different instruments.

Subprime mortgages: Loans for house purchase granted to persons whose credit profile excludes them from access to standard financing. These mortgages are relatively more risky.

Time-Weighted Rate of Return (TWRR): Rate of growth measured as a percentage of the change in a financial instrument's value over a period of time without taking account of the effect of cash flows.

Total return: Annualized rate of growth of the economic value of an instrument or portfolio considering all the potential sources of income such as capital gains or losses, coupons and their reinvestment.

Tracking Error (TE): An indicator of the risk arising from active positions taken by a portfolio manager as compared to its benchmark.

Value at risk (VaR): An indicator of the risk of a portfolio that provides an estimate of the amount that could be lost over a given period of time with a given level of probability.

Volatility: A measure of an asset's risk, representing the variation in its price over a period of time. Values can fluctuate with market swings due to events such as variations in interest rates, unemployment and economic changes in general.

Waiver: Explicit and voluntary authorization for non-compliance during a certain period of time with certain rules, parameters and/or procedures established in specific investment guidelines.

Weekend deposits: Deposits with a maturity of a weekend.