



**REPUBLIC OF CHILE**  
Ministry of Finance

# PENSION RESERVE FUND

Third 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<sup>1,2</sup> and invests its assets according to instructions given by the Finance Ministry.<sup>3</sup>

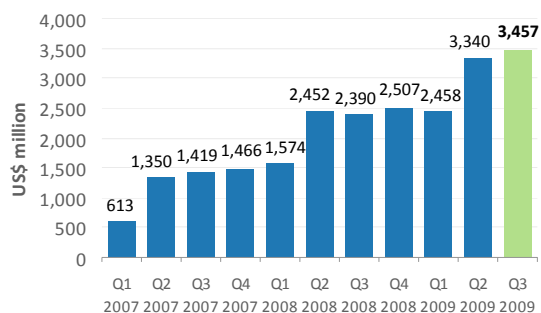
Under the PRF's current investment policy, its assets are held exclusively as international fixed-income instruments with credit ratings as set out in Appendix VII.2.

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 third quarter, the PRF held assets that, at market prices, were worth US\$3,456.98 million. The change in its value as compared to June 30 was explained by interest income of US\$20.28 million and a US\$96.90 million increase as the result of capital gains (net of management and custody fees).

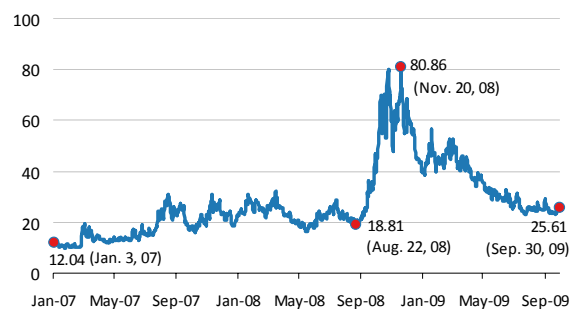
**Figure 1: Market Value (2007-2009)**



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 VIX<sup>4</sup> which, after peaking in November 2008, began to drop slowly to levels close to those of September 2008 (Figure 2).

**Figure 2: VIX (2007-2009)**



Source: Bloomberg

<sup>1</sup> Under the Finance Ministry's Supreme Decree N° 1.383.

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

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

<sup>4</sup> 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

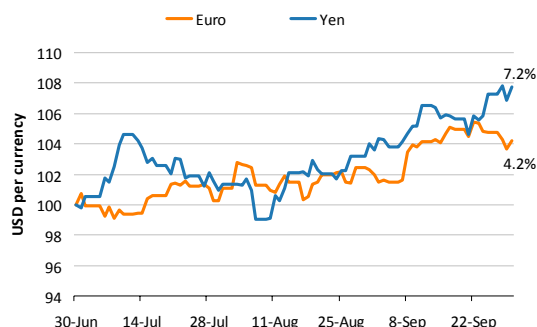
As of September 30, the PRF had a value of US\$3,456.98 million. As compared to the close of the second quarter, this represented an increase of US\$117.18 million.

The change in the PRF's value was explained by interest income of US\$20.28 million and capital gains of US\$96.90 million (after management and custody costs).

Capital gains were mainly the result of an appreciation of the euro and the yen against the dollar (Figure 3) as compared to the previous quarter, with a positive impact on the value of the PRF's investments denominated in these currencies. Additionally, downward movements in international interest rates positively affected its return (Figure 4).

In July, the PRF showed a capital gain of US\$20.64 million due to the positive impact of exchange-rate and interest-rate movements. The exchange rate effect meant a gain of US\$18.73 million while the gain on account of interest rates reached US\$1.94 million. Custody and administration costs, included in this amount, reached US\$0.03 million.

Figure 3: Exchange rates (third quarter)



Source: Bloomberg

In August, the fund showed a capital gain of US\$33.02 million. The gain was due mainly to a rise in the exchange rate which increased the fund's value in US\$24.94 million and, to a lesser extent, to the positive impact of interest rates, which caused a gain of US\$8.08 million. No custody or administration payments were made during this month.

In September, the fund experienced capital gains due to the positive impact of exchange rates (US\$37.15 million) and the interest rates (US\$6.15 million). Custody and administration costs (US\$0.06 million) are discounted from last figure.

Table 1: Historical Summary of PRF  
(Since inception)

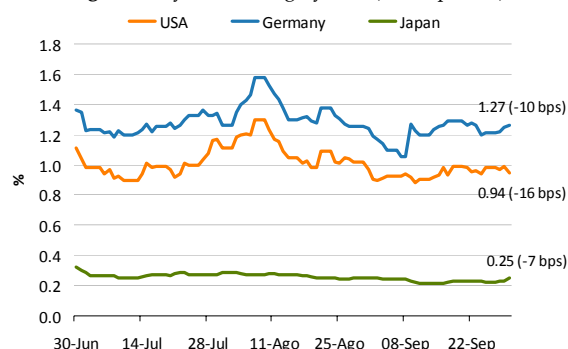
US\$ million	2006	2007	2008	2009					Summary Total
				1st Sem	Jul	Aug	Sep	Summary Q3	
Starting Value	0.00	604.63	1,466.35	2,506.76	3,339.80	3,367.24	3,407.09	3,339.80	0.00
Contributions	604.54	736.35	909.07	836.71	0.00	0.00	0.00	0.00	3,086.67
Withdrawals	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Interest Income*	0.00	45.62	71.25	32.63	6.80	6.83	6.65	20.28	169.77
Capital gains (losses)**	0.09	79.75	60.09	-36.29	20.64	33.02	43.24	96.90	200.54
Final Value	604.63	1,466.35	2,506.76	3,339.80	3,367.24	3,407.09	3,456.98	3,456.98	3,456.98

\* includes interest from the securities lending program

\*\* includes custody and administrative costs

Source: Dipres

Figure 4: 2-year sovereign yields (third quarter)



Source: Bloomberg

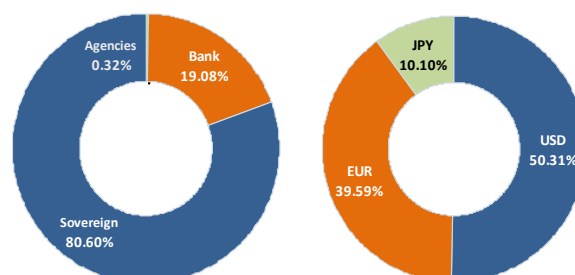
Since its inception, the value of the PRF at market prices has shown a net increase of US\$370.31 million in capital gains and interest income. Taking into account all net flows (contributions, withdrawals and others), this is equivalent to an IRR in dollars of 7.29%.

#### 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 allocation<sup>5</sup> of 50% in US dollars, 40% in euros and 10% in yens.

At the close of the third quarter, 80.60% of the PRF's portfolio was invested in sovereign bonds while 19.08% was held as bank deposits and 0.32% in agencies. In the case of its currency allocation, 50.31% corresponded to dollars, 39.59% to euros and 10.10% to yens.

Figure 5: Investment Portfolio by Asset Class and Currency September 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\$2,786.24 million, its bank instruments to US\$659.75 million and its agency instruments to US\$10.98 million. The currency distribution was US\$1,739.09 million in dollars, US\$1,368.64 million in euros and US\$349.25 million in yens.

As shown in Table 2, the duration of the fund's financial investments was 2.44 years, equivalent to an average duration of 891 days.

Table 2: Summary of PRF Investments

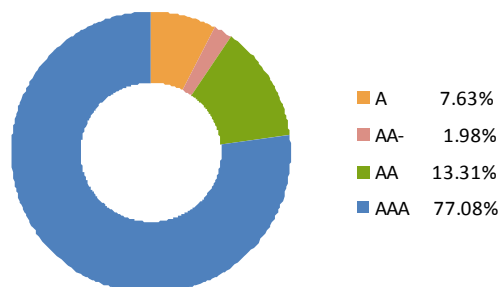
Assets	Original currency	3 <sup>rd</sup> Quarter 2009 US\$ million	Jul	Aug	Sep
Sovereign	USD	1,409.03	1,386.24	1,397.36	
	EUR	1,162.02	1,176.34	1,148.12	
	YEN	226.95	233.71	240.76	
Agencies	USD	10.98	10.98	10.98	
	EUR	0.00	0.00	0.00	
	YEN	0.00	0.00	0.00	
Banks	USD	249.30	291.42	330.75	
	EUR	208.60	205.37	220.52	
	YEN	100.36	103.04	108.48	
Total		3,367.24	3,407.09	3,456.98	
Duration (years)		2.44	2.43	2.44	

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 September 30, 77.08% of its assets were invested in this category while 7.63% corresponded to an A rating.

<sup>5</sup> A variation of +/- 5% is permitted in currency allocation.

**Figure 6:** Investment Portfolio by Risk Classification  
September 30, 2009

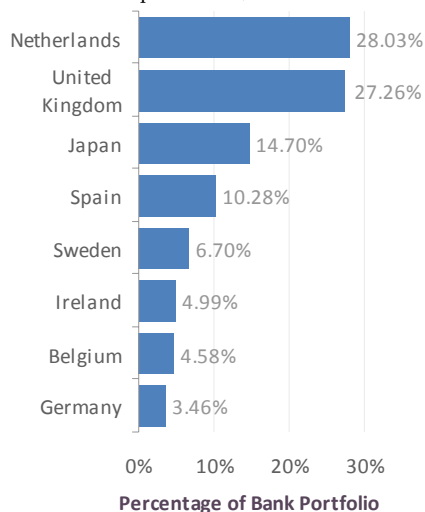


Total sovereigns investments: US\$2,786.24 million

Source: Dipres based on data provided by JP Morgan.

As of September 30, 69.99% of the PRF's bank-risk investments were held in the Netherlands, United Kingdom and Japan (Figure 7), while banks from other European countries accounted for the remainder (30.01%).

**Figure 7:** Investment Portfolio by Bank Risk  
September 30, 2009



Source: Dipres based on data provided by CBC.

#### IV.1. Investment Portfolio Returns

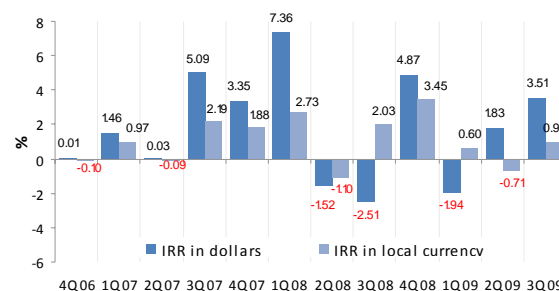
The indicator used to measure returns on the PRF's portfolio is the Internal Rate of Return

(IRR).<sup>6</sup> This represents the effective return received by investors and takes account of all flows during the period.

In the third quarter, the IRR on the PRF, measured in dollars, was 3.51%, reflecting the appreciation of the euro and the yen against the dollar and decreases in interest rates. The exchange-rate and interest-rate effects meant a return of 2.52% and 0.97%, respectively.

Since its inception, the PRF's IRR in dollars reached 7.29%, explained principally by the results of the third and fourth quarters of 2007, the first and fourth quarters of 2008 and the third quarter of 2009.

**Figure 6<sup>7</sup>:** Quarterly IRR in Dollars and Local Currency<sup>8</sup>



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

<sup>6</sup> See Glossary.

<sup>7</sup> Data on returns may differ from previous reports since, as from 2009, these were recalculated to include cost flows.

<sup>8</sup> 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.

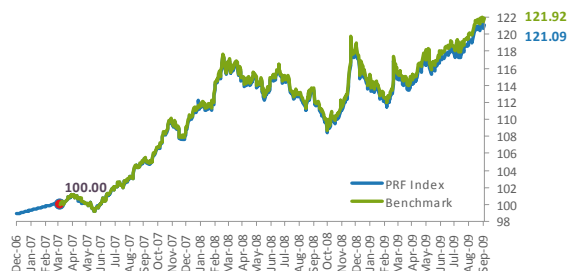
with an effect on the fund's portfolio that has so far been positive.

#### IV.2. Investment Portfolio Performance

The Time-Weighted Rate of Return (TWR)<sup>9</sup> 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.

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



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

In the third quarter of 2009, the index showed a return of 3.51% in comparison to 3.56% for the benchmark. In relative terms, this means that the PRF's performance was 5 basis points (bps) below its benchmark.

Since the PRF's inception, the TWR has been 7.94% or 30 bps short of its benchmark. This difference is explained mainly by the relatively lower contribution of the returns in local currency<sup>10</sup> (Table 3).

**Table 3: Returns**

Return indicators	3Q 09	Since inception <sup>1</sup>
IRR <sup>2</sup>	3.51%	7.29%
TWR	3.51%	7.94%
Benchmark	3.56%	8.24%
Differential	-0.06%	-0.30%
PRF Local currency (TWR)	0.97%	4.88%
BMK Local currency (TWR)	1.03%	5.17%
Risk-adjusted return	3Q 09	Since inception <sup>1</sup>
TWR PRF	0.83	1.22
Benchmark	0.85	1.27

<sup>1</sup> March 31, 2007

Source: Dipres

<sup>2</sup> December 28, 2006

The ex-post tracking error (TE<sub>ep</sub>)<sup>11</sup> 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<sub>ep</sub>, measured in annual terms since the fund's inception, reached 0.20% or 20 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	3Q 09 <sup>2</sup>	Since inception <sup>1</sup>
Standard deviation PRF	4.21%	6.50%
Standard deviation BMK	4.21%	6.50%
Ex-post tracking error	-	0.20%
Information ratio	-	-1.50

<sup>1</sup> March 31, 2007

Source: Dipres

<sup>2</sup> Last 12 months

<sup>9</sup> See Glossary.

<sup>10</sup> See Glossary.

<sup>11</sup> 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 third quarter, operations of this type generated additional income of US\$52,916 for the PRF.

### V.2. Costs

In the third quarter, management and custody costs totaled US\$91,606 of which US\$46,000 corresponded to the management services provided by the CBC and US\$45,606 to custody fees paid to JP Morgan.

Table 5: Summary of Other Quarterly Flows

<i>Other Flows (US\$)</i>	<i>Q3</i>
<b>Management (CBC)</b>	-46,000
<b>Custody (JP Morgan)</b>	-45,606
<b>Other costs</b>	0
<b>Total costs</b>	-91,606
<b>Securities Lending</b>	52,916
<b>Total other Flows</b>	<b>-38,690</b>

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



## VI. BEHAVIOR OF RELEVANT MARKETS

### VI.1. General Situation

During the third quarter of 2009, the world's main central banks maintained 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% while the European Central Bank (ECB) and the Bank of Japan (BoJ) maintained their rates at 1% and 0.1%, respectively.

In the context of the financial crisis, world economic attention focused on a number of important events. In August, the President of the United States confirmed Ben Bernanke as chairman of the Federal Reserve (FED) for a second four-year term. In a bid to increase the liquidity of the financial system, the International Monetary Fund (IMF) also announced an injection of US\$250 billion in Special Drawing Rights (SDRs)<sup>12</sup> into member countries' central banks. Emerging and developing economies were this measure's main beneficiaries, receiving 40% of the total amount, while the individual economies that most benefited were the United States, Japan and Germany.

At a Summit in September, G-20 leaders undertook to maintain the fiscal stimulus programs introduced to reactivate their respective economies. At this Summit, it was also agreed to adopt measures to increase transparency in the derivatives market, particularly in the case of mortgage-backed instruments, and to reinforce requirements relating to the minimum capital of financial institutions while also tying bank executives' compensation to their long-term management performance.

<sup>12</sup> The SDR is an international reserve asset created by the IMF to supplement the existing official reserves of member countries. SDRs are allocated to member countries in proportion to their IMF quotas and their value is based on a basket of international currencies.

In general, investors' appetite for risk showed an important increase in the third quarter of 2009 and this was reflected in the strong performance of stock markets around the world and a rise in commodity prices. This higher appetite for risk was mainly the result of good second-quarter company results in the United States<sup>13</sup> and the 7.9% second-quarter expansion of China's GDP.<sup>14</sup> Lower aversion to risk was also identified as a factor in the appreciation of major currencies against the US dollar during the third quarter. However, the yield curve flattened in the main economic zones, with a downward shift for all maturity periods, indicating a correction of expectations as to the speed of international economic recovery.

### VI.2. Main Economic Trends

#### • United States

The principal indicators of confidence in the United States<sup>15</sup> showed a modest increase on the last figures published for the second quarter of 2009. However, they remained at historically low levels, reflecting the uncertainty prevailing in the US economy.

Unlike previous quarters, the Leading Index<sup>16</sup> showed consistently positive monthly readings in the third quarter. This was interpreted as an early sign of a recovery of economic conditions in the United States. Similarly, the third quarter brought a change of trend in industrial production, which rose at an average rate of 1.0% as compared to averages of -1.6% and -0.7% in the

<sup>13</sup> Approximately 75% of the companies that make up the S&P 500 reported results that were better than market expectations.

<sup>14</sup> This strengthened expectations that China would achieve 8% annual growth in 2009 in line with the Chinese government's forecasts.

<sup>15</sup> University of Michigan Survey of Consumer Confidence Sentiment and Conference Board Consumer Confidence.

<sup>16</sup> The Leading Index provides an indication of GDP performance over a three to six-month horizon.

first and second quarters, respectively. In the labor market, the unemployment rate rose from 9.5% to 9.8% while job creation figures remained negative. However, average monthly job losses, at approximately 250,000, were significantly down on the average of 430,000 registered in the second quarter. In the case of prices, 12-monthly inflation increased slightly, rising from -1.4% to -1.3%, while 12-monthly core inflation dropped from 1.7% to 1.5%.

In the third quarter of 2009, the yield curve flattened in the United States. The evolution of the structure of interest rates indicates that the yield on 2-year Treasury bills dropped by 17 bps while that on 10-year Treasury bills fell by 23 bps. In general, the yield curve shifted downwards for all maturities, with an average drop of 22 bps drop on US bonds.

#### • Euro Zone

In Europe, the main indicators of confidence<sup>17</sup> also showed an important increase on the last figures published for the second quarter of 2009. However, they remained 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 third quarter with an important increase over the last survey of the previous quarter, reaching its highest level since April 2006. Indicators of activity in the services and manufacturing sectors<sup>18</sup> continued to show positive monthly readings in the third quarter of 2009, reinforcing a trend observed in the previous quarter. Industrial output also showed a recovery in the third quarter of 2009, reducing its 12-monthly contraction from -17% to -16.8%. In the labor market, there was a small increase in unemployment, which reached 9.6%, comparing

negatively with the rate of 9.5% seen at the end of the previous quarter.<sup>19</sup> In the case of prices, 12-monthly inflation dropped from -0.1% to -0.3% while 12-monthly core inflation showed a small decrease from 1.4% to 1.2%.

In the Euro Zone, the relevant yield curve flattened.<sup>20</sup> The yield on 2-year and 10-year German bonds dropped by 10 bps and 17 bps, respectively. In general, there was a downward shift in interest rates<sup>21</sup> with an average drop of 16 bps on German bonds.

#### • Japan

As in the United States and Europe, the main indicators of confidence in Japan<sup>22</sup> strengthened with respect to the second quarter of 2009. However, they remained at historically low levels, reflecting consumers' lack of confidence in the recovery of the Japanese economy.

In a quarter in which Yukio Hatoyama, the leader of the opposition Democratic Party (PDJ), was elected and took office as Japan's new prime minister, there were signs of a stabilization of the country's economy, principally in the industrial sector. Industrial output saw a recovery in the third quarter of 2009, with its 12-monthly contraction dropping from -29.5% to -18.7%. Similarly, the indicator of retail activity showed an improvement, with its 12-monthly contraction decreasing from -2.9% to -1.8%. In the labor market, unemployment rose from 5.2% to 5.5%,<sup>23</sup> maintaining its trend in previous quarters. In the case of prices, 12-monthly inflation decreased to -

<sup>17</sup> Euro Zone indicators of confidence published by the European Commission.

<sup>18</sup> Eurozone Services PMI Markit Survey, EC Composite PMI Output and Eurozone Manufacturing PMI Markit Survey Ticker.

<sup>19</sup> Figures for industrial output and unemployment in the Euro Zone are for August 2009 and were the latest available at the close of this report.

<sup>20</sup> The yield curve referred to by Bloomberg as EUR German Sovereign.

<sup>21</sup> The only exception was the yield on 3-year instruments which rose by 7 bps.

<sup>22</sup> Japan Consumer Confidence Overall Nationwide NSA and Japan Consumer Confidence Households NSA.

<sup>23</sup> Figures for industrial output, retail activity, unemployment and inflation in Japan are for August 2009 and were the latest available at the close of this report.

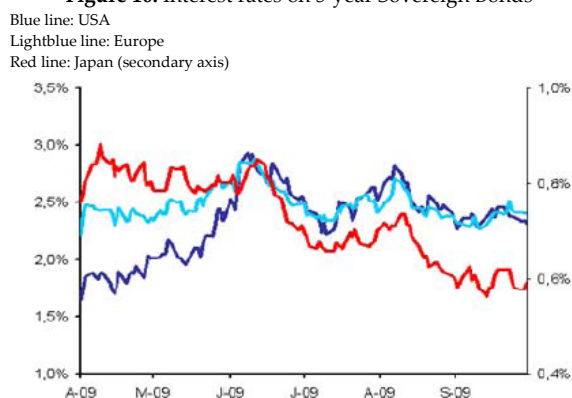
2.2%, down from -1.1% at the close of the previous quarter, while 12-monthly core inflation dropped to -0.9%, down from -0.5%.

In the third quarter of 2009, Japan's yield curve steepened marginally. This was reflected in the yield on 2-year and 10-year Japanese bonds, which dropped by 7 bps and 6bps, respectively. In general, there was a downward shift in interest rates for all maturities, with an average drop of 11 bps in the yield on Japanese bonds.

### VI.3. Fixed-Income Market

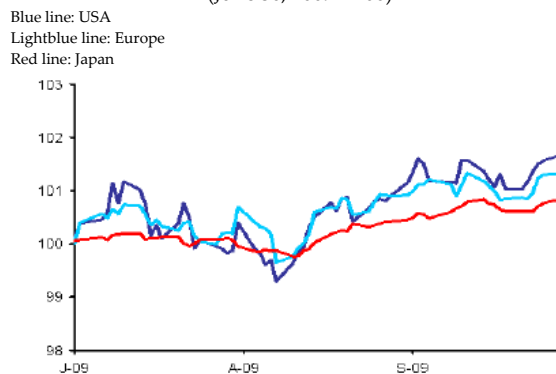
In the fixed-income market, interest rates on 5-year US, European and Japanese sovereign bonds showed a drop (Figure 10).

**Figure 10:** Interest rates on 5-year Sovereign Bonds



In this context, the different fixed-income markets showed a positive performance as regards total returns in the third quarter of 2009 (Figure 11).

**Figure 11:** Total returns (5-year fixed-income)  
(June 30, 2009 = 100)



### VI.4. Main Spreads on Portfolio Securities

The spread on 5-year agency bonds dropped by approximately 5 bps during the third quarter of 2009 (Figure 12). As a result, their return<sup>24</sup> was higher than that on 5-year Treasury bills.

US Inflation-Linked Bonds (TIPS) showed a lower return than (nominal) US Treasury bills of an equivalent maturity.<sup>25</sup> This was reflected in the spread on TIPS<sup>26</sup> which fell by 12 bps, due mainly to a correction of expectations as to the speed of international economic recovery, a factor that may affect the medium-term increase in inflation.

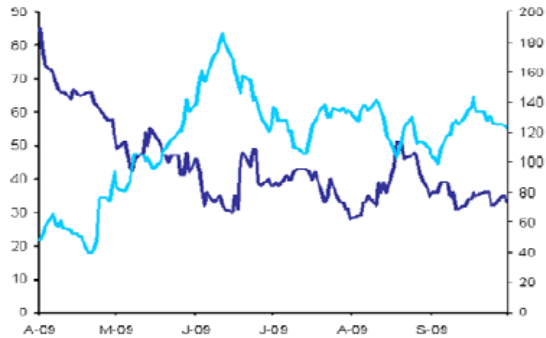
<sup>24</sup> In the third quarter of 2009, the return on 5-year US agency bonds (9.5%) was higher than on Treasury bills of the same maturity (7.4%). Reference values.

<sup>25</sup> In the third quarter of 2009, the return on 5-year inflation-linked bonds (6%) was lower than on Treasury bills of the same maturity (7.4%). Reference values.

<sup>26</sup> TIPS spread: Return on a US Treasury bill minus the return on TIPS of an equivalent maturity.

**Figure 12: Spread Agency and TIPS vs. Treasuries**  
(spread in bps compared to 5-year duration T-Bills)

Blue line: Agencies  
Lightblue line: TIPS (secondary axis)

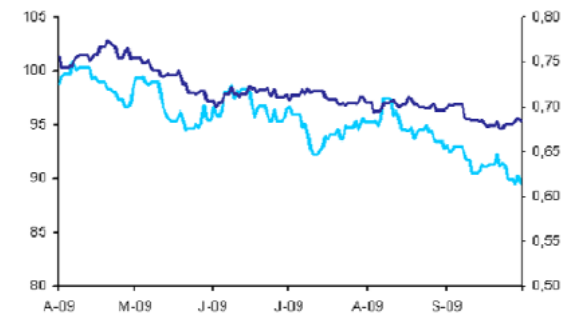


## VI.5. Exchange Rates

In the third quarter of 2009, the euro and the yen appreciated against the US dollar by 4.2% and 7.2%, respectively (Figure 13). As a result, the yen/euro exchange rate showed a depreciation of 3.3% during the same period.

**Figure 13: Exchange rates**  
(against the dollar)

Blue line: Euro (secondary axis)  
Lightblue line: Yen



## 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, Belgium and Ireland.

#### **ESSF and PRF Banks with Deposits, September 30, 2009**

1	ABN AMRO Bank NV
2	Allied Irish Banks
3	Banco Santander Central Hispano S.A.
4	Bank of Ireland
5	Bank of Scotland Plc
6	Barclays Bank Plc
7	Bayerische Hypo-und Vereinsbank AG
8	Caja de Ahorros y Monte de Piedad de Madrid
9	Danske Bank Aktieselskab
10	Dexia Bank Belgium SA
11	Erste Group Bank AG
12	Fortis Bank NV/SA
13	ING Bank NV
14	KBC Bank NV
15	Lloyds TSB Bank Plc
16	Mizuho Corporate Bank Ltd.
17	Norddeutsche Landesbank Girozentrale
18	Raiffeisen Zentralbank Österreich AG (RZB)
19	Skandinaviska Enskilda Banken AB (SEB)
20	Société Générale
21	The Royal Bank of Scotland Plc
22	Wells Fargo Bank NA

## 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
<b>Sovereigns</b>	<b>100%</b>
<b>Multilaterals</b>	<b>60%</b>
<b>Banks</b>	<b>50%</b>
<b>Agencies</b>	<b>30%</b>

#### 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
<b>AAA</b>	<b>100%</b>
<b>AA+</b>	<b>90%</b>
<b>AA</b>	
<b>AA-</b>	
<b>A+</b>	<b>30%</b>
<b>A</b>	
<b>A-</b>	

#### 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)
<b>AAA</b>	<b>Aaa</b>	800
<b>AA+</b>	<b>Aa1</b>	600
<b>AA</b>	<b>Aa2</b>	
<b>AA-</b>	<b>Aa3</b>	

### 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)
<b>AAA</b>	<b>Aaa</b>	600
<b>AA+</b>	<b>Aa1</b>	400
<b>AA</b>	<b>Aa2</b>	
<b>AA-</b>	<b>Aa3</b>	
<b>A+</b>	<b>A1</b>	300
<b>A</b>	<b>A2</b>	
<b>A-</b>	<b>A3</b>	

### 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 (TWR)** and the **Internal Rate of Return (IRR)**, with the latter serving as a measure of money-weighted return. While the

TWR 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.<sup>27</sup>

### VII.3.2 Time-Weighted Rate of Return (TWR)

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 TWR<sup>28</sup> 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 TWR for the period, the daily

<sup>27</sup> 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.

<sup>28</sup> Fabozzi and Frank, *Investment Management*, © 1995, pgs 611-618.



returns are net of contributions and withdrawals as well as costs<sup>29</sup> and income from the securities lending program.

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

where:

$$r_i = \frac{\text{value\_assets}_i - \text{contributions} + \text{withdrawals} + \text{costs} - \text{securities\_lending}}{\text{value\_assets}_{i-1}}$$

The TWR 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 TWR vs. IRR

The TWR 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 TWR 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:

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<sup>29</sup> Only includes custody and consultancy costs.

- ✓ **Short-term money market instruments:** Merrill Lynch Libid 6-Month Average index and Merrill Lynch Treasury Bills index in the three reference currencies are used.
- ✓ **Nominal bonds:** Barclays Global Treasuries sub indices 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
<b>Money Market (*)</b>	<b>15.0%</b>	<b>12.0%</b>	<b>3.0%</b>	<b>30.0%</b>
Merrill Lynch Libid 6-Month Average	7.5%	6.0%	1.5%	15.0%
Merrill Lynch Treasury Bills	7.5%	6.0%	1.5%	15.0%
<b>Nominal Sovereign Bonds</b>	<b>31.5%</b>	<b>28.0%</b>	<b>7.0%</b>	<b>66.5%</b>
Barclays Capital Global Treasury Index 1-3 years	14.2%	12.6%	3.2%	29.9%
Barclays Capital Global Treasury Index 3-4 years	9.5%	8.4%	2.1%	20.0%
Barclays Capital Global Treasury Index 5-7 years	3.9%	3.5%	0.9%	8.3%
Barclays Capital Global Treasury Index 7-10 years	3.9%	3.5%	0.9%	8.3%
<b>Inflation-Indexed Sovereign Bonds</b>	<b>3.5%</b>			<b>3.5%</b>
Barclays US Govt. Inflation-Linked Bond Index	3.5%			3.5%
<b>TOTAL</b>	<b>50.0%</b>	<b>40.0%</b>	<b>10.0%</b>	<b>100.0%</b>

#### VII.4.1 Calculation of LIBID and T-Bill Benchmark

The benchmark for the money market investments is calculated from the indexes Merrill Lynch Libid<sup>30</sup> 6-Month Average and Merrill Lynch Treasury Bills for the three currencies included in the portfolio. The daily returns are obtained from the change in value of said indexes denominated in USD:

$$Ret\_Libid_t = 7,5\% \cdot \left( \frac{ML\_Libid_t^{USD}}{ML\_Libid_{t-1}^{USD}} - 1 \right) + 6,0\% \cdot \left( \frac{ML\_Libid_t^{EUR}}{ML\_Libid_{t-1}^{EUR}} - 1 \right) + 1,5\% \cdot \left( \frac{ML\_Libid_t^{JPY}}{ML\_Libid_{t-1}^{JPY}} - 1 \right)$$

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

$$Ret\_TBill_t = 7,5\% \cdot \left( \frac{ML\_TBill_t^{USD}}{ML\_TBill_{t-1}^{USD}} - 1 \right) + 6,0\% \cdot \left( \frac{ML\_TBill_t^{EUR}}{ML\_TBill_{t-1}^{EUR}} - 1 \right) + 1,5\% \cdot \left( \frac{ML\_TBill_t^{JPY}}{ML\_TBill_{t-1}^{JPY}} - 1 \right)$$

<sup>30</sup> According to convention, the LIBID rate is equal to LIBOR less 1/8 o 0.125.

#### VII.4.2 Calculation of Nominal Bond Benchmark

The benchmark for sovereign bonds is calculated using the different Barclays Capital Global Treasury 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:

$$Ret\_BNom_t = \frac{Idx\_Bcls_t}{Idx\_Bcls_{t-1}} - 1$$

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

$$Ret\_BNom\_USD_t = \sum_{duration} Ret\_Idx\_USD_t^{duration} \cdot w_{USD}^{duration}$$

$$Ret\_BNom\_EUR_t = \sum_{duration} \left[ (1 + Ret\_Idx\_EUR_t^{duration}) \cdot \frac{EUR_t}{EUR_{t-1}} - 1 \right] \cdot w_{EUR}^{duration}$$

$$Ret\_BNom\_JPY_t = \sum_{duration} \left[ (1 + Ret\_Idx\_JPY_t^{duration}) \cdot \frac{JPY_t}{JPY_{t-1}} - 1 \right] \cdot w_{JPY}^{duration}$$

where:

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

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

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):

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

## VIII. GLOSSARY<sup>31</sup>

**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.

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<sup>31</sup> 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 (TWR):** 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.