



PENSION RESERVE FUND

Second Quarter, 2010

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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 PRF'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 from 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 VIII.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 VII).

II. SUMMARY OF RELEVANT MARKETS

The second quarter of 2010 was marked by the sharp depreciation of the euro against the US dollar (9.5%) while, by contrast, the yen gained 6.2% against the dollar (Figure 1). During the quarter, there was a general drop in interest rates (Figure 2), reflecting principally a growing aversion to risk in response to the fiscal situation of some European countries and concern about international growth. It is important to note that, in the second quarter, the world's main

central banks opted to maintain their respective monetary-policy interest rates in the face of market uncertainty about the growth of their economies.

Figure 1

Exchange Rates: Euro and Yen against the Dollar

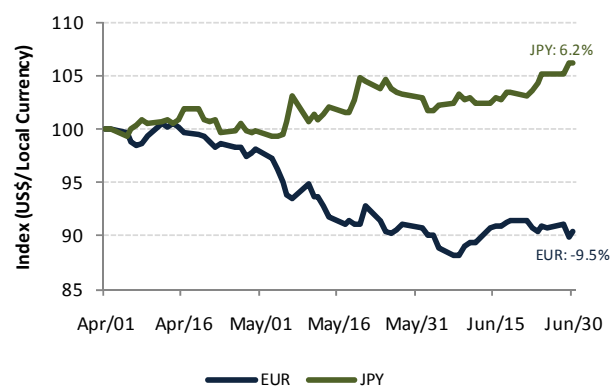
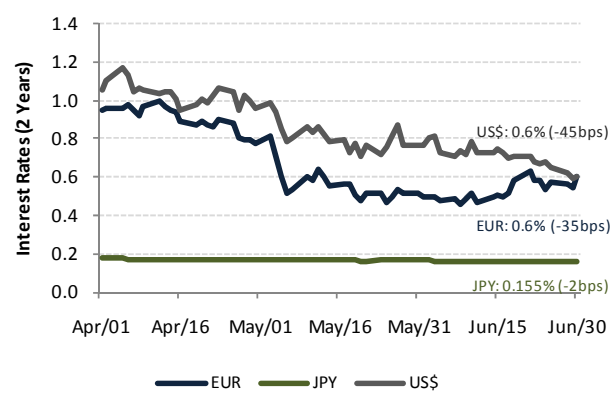


Figure 2

Interest Rates on 2-year Sovereign Bonds



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

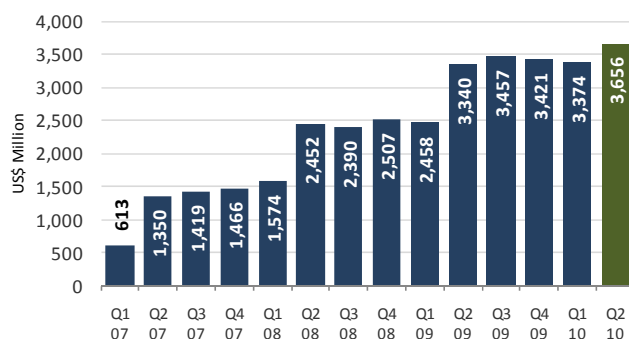
² Acceptation Agreement adopted by the CBC Board in Ordinary Meeting N° 1.321, held on February 22, 2007. Since the ESSF's inception, its assets have been managed by the CBC.

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

III. MARKET VALUE OF THE FUND

At the close of the second quarter of 2010, the PRF held assets that, at market prices, were worth US\$3,656.2 million. Compared to the end of the first quarter, the value recorded an increase of US\$ 282.5 million. This higher value is due to contributions of US\$337.3 million in June and accrued interest of US\$14.8 million, offset by capital losses of US\$69.4 million and management and custody fees of US\$0.2 million.

Figure 3
Market Value of the PRF (2007-2010)



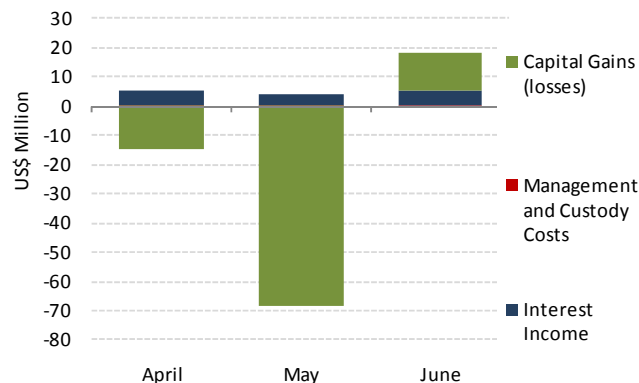
Source: Ministry of Finance

In April, the PRF's value showed a drop of US\$8.8 million. This was explained mainly by a capital loss of US\$14.3 million which was partly offset by accrued interest earnings of US\$5.5 million.

In May, it showed a drop of US\$64.4 million due to a capital loss of US\$68.4 million while accrued interest earnings reached US\$4.0 million.

In June, the PRF's value increased by US\$355.7 million. This was explained mainly by the contribution of US\$337.3 million as well as by capital gains of US\$13.4 million and accrued interest of US\$5.2 million. The management and custody fees⁴ were US\$0.2 million.

Figure 4
Variation in the Market Value of the PRF
(2nd quarter, 2010)



Source: Ministry of Finance based on information provided by JPMorgan

⁴ For further details, see Table 6.

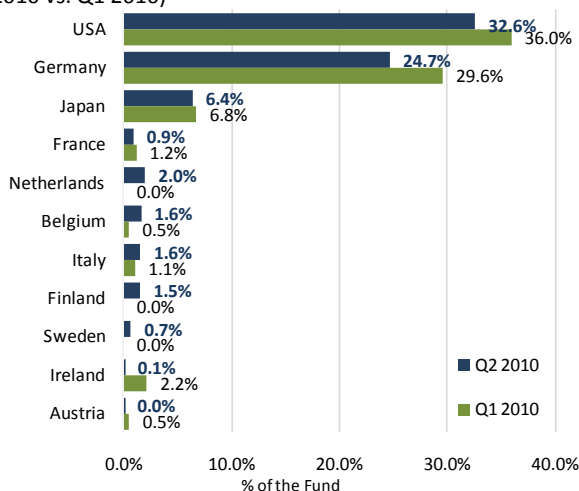
IV. INVESTMENT PORTFOLIO

At the close of the second quarter, 72.3% of the PRF's assets were invested in sovereign-risk instruments, 25.4% in bank-risk instruments and 2.2% in multilateral instruments. As compared to the end of the previous quarter, this represented a drop of 5.4% in the fund's exposure to sovereign risk and an increase of 3.2% in its exposure to bank risk and of 2.2% in its exposure to supranational risk (Table 4).

In the case of sovereign-risk investments, Netherlands, Finland and Sweden were incorporated into the PRF's portfolio during the second quarter. Figure 5 shows its exposure by country in the first and second quarters.

Figure 5

Sovereign-Risk Investments by Country
(Q2 2010 vs. Q1 2010)⁵

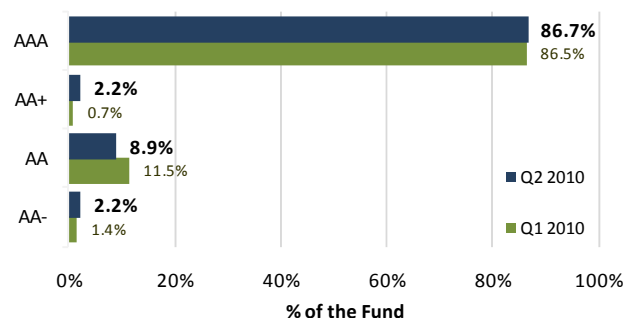


Source: Ministry of Finance based on information provided by JPMorgan

At the close of the second quarter, 86.7% of the fund's investments in sovereign instruments had an AAA risk rating. This represented no significant change on the end of the first quarter. Figure 6 shows the fund's exposure to sovereign risk by rating in the first and second quarters.

Figure 6

Investments by Sovereign Risk Rating
(Q2 2010 vs. Q1 2010)⁵



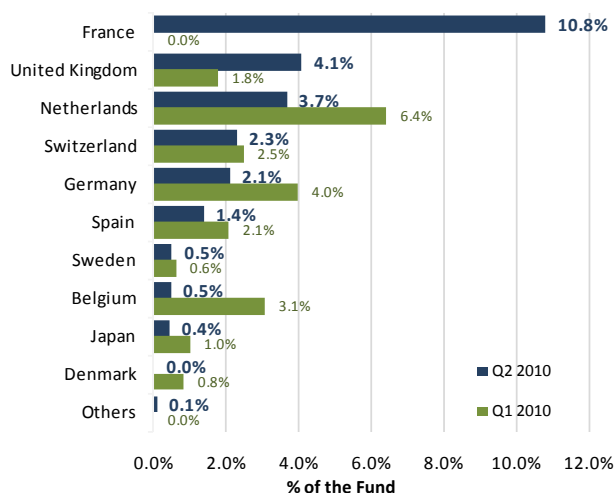
Source: Ministry of Finance based on information provided by JPMorgan

In the case of bank-risk instruments, the PRF eliminated its exposure to Denmark in the second quarter and incorporated instruments from France. Figure 7 shows its bank-risk exposure by country in the first and second quarters.

⁵ Based on settlement date information.

Figure 7

Bank-Risk Investments by Country
(Q2 2010 vs. Q1 2010)⁶



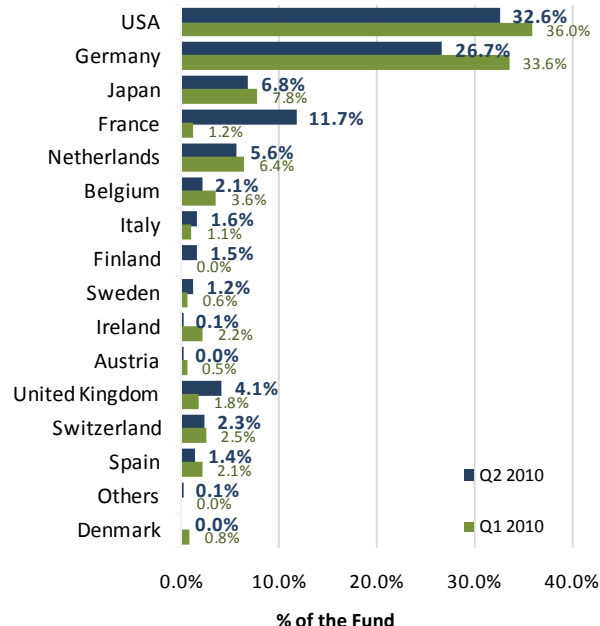
Source: Ministry of Finance based on information provided by JPMorgan

Figure 8 shows that, in terms of the PRF's total portfolio, around 60% of its exposure is to the United States and Germany, principally in the form of sovereign bonds, and that, in the second quarter, it incorporated investments in Finland, eliminating investments in Austria and Denmark.

At the close of the second quarter of 2010, the PRF held assets in dollars for US\$1,995.6 million (54.6% of its portfolio) while assets in euros and yens amounted to US\$1,322.3 million (36.2%) and US\$338.3 million (9.3%), respectively. This allocation was influenced by the contribution of US\$337.3 million on June, 30, the close day of the report, so it is not the average currency allocation of the quarter (Figure 9).

Figure 8

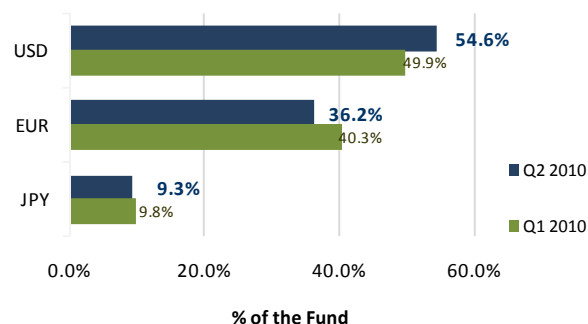
Total Portfolio by Country
(Q2 2010 vs. Q1 2010)⁶



Source: Ministry of Finance based on information provided by JPMorgan

Figure 9

Currency Allocation
(Q2 2010 vs. Q1 2010)



Source: Ministry of Finance based on information provided by the Central Bank of Chile

The average duration of the fund's financial investments at the end of the second quarter was 2.05 years, equivalent to 748 days. This represented a drop of around 4.5 months on the previous quarter.⁷

⁶ Based on settlement date information.

⁷ This decrease in duration is influenced by the contribution of U.S. \$ 337.3 million made the closing day of the quarter. Usually, when these resources are received, they are invested in short-term instruments until the desired composition is achieved.

Table 1

Historical Summary of PRF

US\$ Million	2007	2008	2009	2010					Summary Total
				Q1	April	May	June	Summary Q2	
Starting Value ⁽¹⁾	604.6	1,466.4	2,506.8	3,420.8	3,373.7	3,364.9	3,300.5	3,373.7	0.0
Aportes	736.4	909.1	836.7	0.0	0.0	0.0	337.3	337.3	3,424.0
Retiros	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Interest Income	45.6	71.2	71.9	16.9	5.5	4.0	5.2	14.8	220.5
Capital Gains (losses)	79.8	60.4	5.9	-64.0	-14.3	-68.4	13.4	-69.4	12.7
Management and Custody Costs	0.0	-0.3	-0.3	-0.1	0.0	0.0	-0.2	-0.2	-1.0
Final Value	1,466.4	2,506.8	3,420.8	3,373.7	3,364.9	3,300.5	3,656.2	3,656.2	3,656.2

(1) The creation of the FRP was held December 28, 2006, with an initial contribution of U.S. \$ 604.5 million

Source: Ministry of Finance based on information provided by JPMorgan

Table 2

Allocation by Type of Risk and Currency
(Q2 2010 vs. Q1 2010)

US\$ Million	Local Currency	Q1 2010	Q2 2010	Dif.
Sovereign	USD	1,324.1	1,341.6	17.5
	EUR	1,072.4	1,057.8	-14.6
	YEN	227.8	232.7	4.9
Bank	USD	358.5	571.8	213.3
	EUR	286.9	264.5	-22.4
	YEN	103.9	105.5	1.6
Supranational	USD	0.0	82.2	82.2
	EUR	0.0	0.0	0.0
	YEN	0.0	0.0	0.0
Total by Currency	USD	1,682.6	1,995.6	313.0
	EUR	1,359.3	1,322.3	-37.0
	YEN	331.7	338.3	6.5
Total		3,373.7	3,656.2	282.5
Duration (years)		2.43	2.05	-0.38
Duration (days)		889	748	-140

Source: Ministry of Finance based on information provided by CBC

Table 3

Currency Allocation
(Q2 2010 vs. Q1 2010)

Currency Allocation	T1 2010	T2 2010	Diferencia
USD	49.9%	54.6%	4.7%
EUR	40.3%	36.2%	-4.1%
JPY	9.8%	9.3%	-0.6%
Total	100.0%	100.0%	0.0%

Source: Ministry of Finance based on information provided by CBC

Table 4

Allocation by Type of Risk and Country ⁹
(Q2 2010 vs. Q1 2010)

Sovereign Risk	Q1 2010	Q2 2010	Dif.
USA	36.0%	32.6%	-3.4%
Germany	29.6%	24.7%	-4.9%
Japan	6.8%	6.4%	-0.4%
France	1.2%	0.9%	-0.3%
Netherlands	0.0%	2.0%	2.0%
Belgium	0.5%	1.6%	1.1%
Italy	1.1%	1.6%	0.5%
Finland	0.0%	1.5%	1.5%
Sweden	0.0%	0.7%	0.7%
Ireland	2.2%	0.1%	-2.1%
Austria	0.5%	0.0%	-0.5%
Total	77.8%	72.0%	-5.8%

Riesgo Bancario	Q1 2010	Q2 2010	Dif.
France	0.0%	10.8%	10.8%
United Kingdom	1.8%	4.1%	2.3%
Netherlands	6.4%	3.7%	-2.8%
Switzerland	2.5%	2.3%	-0.2%
Germany	4.0%	2.1%	-1.9%
Spain	2.1%	1.4%	-0.7%
Sweden	0.6%	0.5%	-0.1%
Belgium	3.1%	0.5%	-2.6%
Japan	1.0%	0.4%	-0.6%
Denmark	0.8%	0.0%	-0.8%
Others	0.0%	0.1%	0.1%
Total	22.2%	25.8%	3.6%

Supranational Risk	Q1 2010	Q2 2010	Dif.
Supranational	0.0%	2.2%	2.2%
Total	0.0%	2.2%	2.2%

Source: Ministry of Finance based on information provided by JPMorgan

⁹ Based on settlement date information.

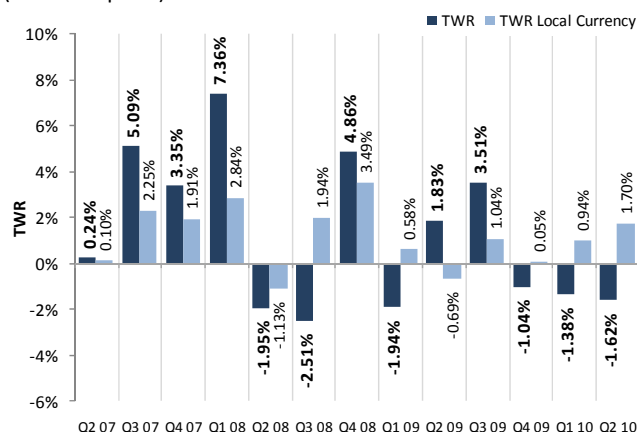
V. RETURN ON INVESTMENT PORTFOLIO

V.1. Returns and Performance

Returns on the PRF are shown as the time-weighted return (TWR), the indicator generally used to measure the yield on investments and the performance of the portfolio manager or, in other words, the manager's ability to generate returns in excess of a benchmark (BMK).¹⁰ The TWR's method of calculation neutralizes the distortions that can be caused by inflows and outflows outside the manager's control.

In the second quarter of 2010, the fund showed a return of -1.62% in dollars and 1.57% in pesos while, over the first six months, its return reached -2.98% in dollars and 4.26% in pesos (Table 5). Since its inception,¹¹ it showed an annualized return of 4.74% in dollars and 4.95% in pesos. Figure 10 sets out the fund's quarterly returns in dollars and local currency¹² since March 31, 2007.

Figure 10
Quarterly TWR in Dollars
(Since inception)

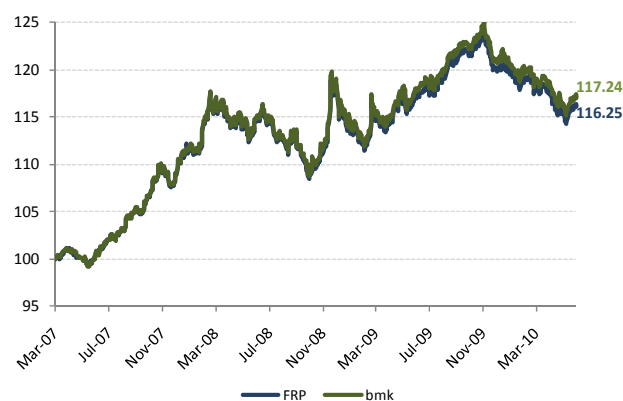


Source: Ministry of Finance based on information provided by JPMorgan and CBC

In the second quarter, the fund's performance, measured as the difference between its return and that of the benchmark, was -14 basis points (bps) while its annual return, measured since March 31, 2007, was 27 bps short of the benchmark.

In order to illustrate the yield on the PRF, an index that reflects daily variations in the return on its investments expressed in dollars is calculated with March 31, 2007 as its base value. Figure 11 shows the indexes for the PRF and the benchmark.

Figure 11
TWR on the PRF vs. Benchmark
(March 31, 2007 = 100)



Source: Ministry of Finance based on information provided by JPMorgan and CBC

Over the past three years, the portfolio's volatility expressed as the standard deviation of its annualized returns was 6.56%.

The ex-post tracking error in the second quarter was 0.18%, which is consistent with passive management of its assets.

¹⁰ See Appendix VIII.4.

¹¹ The TWR has been used to calculate returns since March 31, 2007 when the performance of the CBC began to be measured.

¹² Return in local currency excludes exchange-rate effect.

Table 5

Return and Risk Indicators

	2007 ^(a)	2008	2009	2010	Since inception
				Q2	(annualized) ^(a)
				Year to date	
Return in US\$	8.86%	7.59%	2.28%	-1.62%	4.74%
Benchmark in US\$	9.10%	7.76%	2.63%	-1.48%	5.01%
Differential (bps)	-24	-17	-35	-14	-27
Exchange Rate CLP	-8.07%	26.80%	-19.50%	3.19%	0.21%
Return in CLP ^(b)	0.79%	34.39%	-17.22%	1.57%	4.95%

^(a) Return since the fund's inception calculated as from March 31, 2007 when the performance of the CBC began to be measured.

^(b) Percentage variation in the peso/dollar exchange rate plus the return in dollars.

Q2 2010 ^(a)

Standard Deviation	6.56%
Tracking Error (expost)	0.18%

^(a) Calculated taking monthly returns for the last three years expressed in annual terms.

Returns for periods of more than one year are compound annualized rates while those for less than a year correspond to the change as seen in the stated period. With a view to meeting high standards of transparency and providing a better assessment of the gains or losses on investments, the Ministry of Finance discloses the fund's return in different time horizons and currencies. With respect to the horizon, it is important to note that, in keeping with the medium- and long-term investment policy, the return assessment should focus on that period, disregarding fluctuations that may occur monthly or quarterly. With regard to returns expressed in different currencies, the return in US dollars allows for an assessment which is more in line with the investment policy given that the fund's resources are wholly invested abroad and in foreign currency. The return in Chilean pesos is also disclosed. This return reflects changes in the peso-dollar exchange rate and, therefore, may experience greater fluctuations. Finally, as with any investment, returns obtained in the past do not guarantee future positive results.

VI. OTHER FLOWS

VI.1. Securities Lending

A 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. In the second quarter, operations of this type generated additional income of US\$83,378 for the PRF.

VI.2. Costs

In the second quarter, management and custody costs totaled US\$150,642 of which US\$38,400 corresponded to the management services provided by the CBC and US\$112,242 to custody fees paid to JP Morgan.

Table 6
Summary of Other Quarterly Flows

<i>Other Flows (US\$)</i>	Q2 2010
Management (CBC)	-38,400
Custody (JP Morgan)	-112,242
Others	0
Total Costs	-150,642
Securities Lending	83,378
Total Other Flows	-67,264

Source: Finance Ministry based on information provided by JP Morgan and CBC.

VII. BEHAVIOR OF RELEVANT MARKETS

VII.1. General Situation

In the second quarter of 2010, the world's main central banks made no changes in 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 monetary-policy rates at 1% and 0.1%, respectively.

In May, in line with persistent concern about the fiscal situation of some European countries, the Euro Zone countries and the International Monetary Fund (IMF) agreed on a financial rescue plan for Greece consisting in a joint loan for €110 billion. In addition, in a bid to provide a signal of stability, they also announced a plan of financial support for a total of €750 billion.

In this international context, the Central Bank of China announced its intention of adopting a more flexible exchange-rate policy, allowing the yuan to appreciate gradually against the US dollar.

In the US, Congress reached a preliminary agreement¹³ on the reform of financial regulation proposed by the government in June 2009. This includes principally measures that seek to reduce risk in the financial system and tighten supervision of the bank sector.

In the second quarter of 2010, the main international currencies showed a mixed performance against the US dollar while the yield curves of the different economic zones flattened. This situation was marked by a general drop in interest rates, reflecting principally an increased aversion to risk in response to the fiscal situation of some European countries.

VII.2. Main Macroeconomic Trends

• United States

The main indicators of confidence in the United States¹⁴ showed an increase as compared to the close of the first quarter of the year, but remained at historically low levels.

In the second quarter of 2010, the Leading Index¹⁵ showed positive results, anticipating an improvement in the US economy. Similarly, industrial output increased at an average monthly rate of 0.7%, confirming the recovery of this sector that began in the third quarter of 2009. Unemployment dropped from 9.7% to 9.5%, reflecting the creation of an average of 207,000 jobs a month during the quarter. Annual inflation fell from 2.3% to 1.1% while annual core inflation dropped from 1.1% to 0.9%.

The yield curve flattened in the United States. The evolution of the structure of interest rates implied that the yield on 2-year and 10-year Treasury bills dropped by 42 bps and 90 bps, respectively. In general, interest rates showed a drop and, on average, the yield on Treasury bills fell by 76 bps.

• Euro Zone

In Europe, indicators of economic confidence,¹⁶ services and industrial activity strengthened while the indicator of consumer confidence showed a small drop as compared to the close of the first quarter of 2010.

Indicators of activity in the services and manufacturing sectors¹⁷ showed negative readings in the second quarter. However, industrial output¹⁸ showed a recovery, with the annual reading of this

¹³ Requires approval by both the House of Representatives and the Senate.

¹⁴ University of Michigan Survey of Consumer Confidence Sentiment and Conference Board Consumer Confidence.

¹⁵ The Leading Index is an indicator that seeks to anticipate changes in GDP growth over the next one to two quarters.

¹⁶ Euro Zone indicators of confidence published by the European Commission.

¹⁷ Eurozone Services PMI Markit Survey, EC Composite PMI Output and Eurozone Manufacturing PMI Markit Survey Ticker.

¹⁸ Figures for industrial output and unemployment in the Euro Zone are for May 2010 and were the latest available at the close of this report.

indicator rising from 7.8% to 9.4%. Unemployment held steady at 10%, its highest level since 1998. Annual inflation also held steady at 1.4% while annual core inflation dropped slightly from 1.0% to 0.9%.

In the Euro Zone, the relevant yield curve flattened.¹⁹ Over the quarter, the yield on 2-year and 10-year German bonds dropped by 36 bps and 52 bps, respectively. In general, there was a downward shift in interest rates for maturities of between two and ten years and, on average, the yield on German bonds fell by 57 bps.

• Japan

Japan's main indicators of confidence²⁰ showed an increase on the close of the first quarter of 2010, maintaining an improvement that began at the end of 2009.

The annual growth of industrial output²¹ dropped from 25.9% to 20.4% and unemployment increased from 5.0% to 5.2%. Annual inflation rose from -1.1% at the end of the first quarter of 2010 to -0.9% while annual core inflation dropped from -1.1% to -1.6%.

In the second quarter of 2010, Japan's yield curve flattened. This was reflected in the yield on 2-year Japanese sovereign bonds, which dropped by 3 bps, while that on 10-year bonds fell by 31 bps. In general, interest rates shifted downwards for all maturities and, on average, the yield on Japanese bonds fell by 22 bps.

VII.3. Fixed-income Market

In the fixed-income market, there was a general drop in interest rates on government bonds (Figure 12).

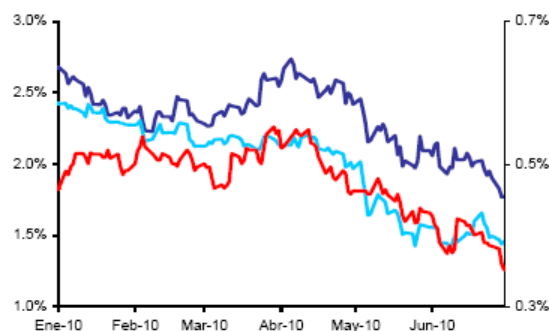
Figure 12

Interest Rates on 5-year Sovereign Bonds

Blue: United States

Light blue: Europe

Red: Japan (secondary axis)



Source: Bloomberg

In line with this trend, total returns on the government bonds of the United States, Europe and Japan were positive in the second quarter of 2010 (Figure 13).

Figure 13

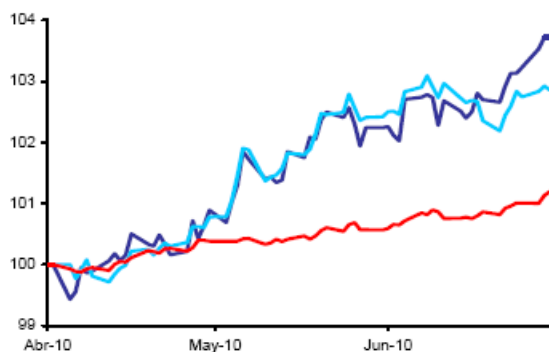
Total Returns (JP Morgan Index 1-10 years)

September 30, 2009 = 100

Blue: United States

Light blue: Europe

Red: Japan



Source: JPMorgan

¹⁹ The yield curve referred to by Bloomberg as EUR German Sovereign.

²⁰ Japan Consumer Confidence Overall Nationwide NSA and Japan Consumer Confidence Households NSA.

²¹ Figures for industrial output, unemployment and inflation in Japan are for May 2010 and were the latest available at the close of this report.

VII.4. Main Spreads on Portfolio Securities

The spread on 5-year agency bonds increased by 24 bps in the second quarter of 2010 (Figure 14).²² However, their return²³ was below that on 5-year US Treasury bills.

US inflation-linked bonds (TIPS) also showed a lower return than (nominal) US Treasury bills of an equivalent maturity.²⁴ This was reflected in the spread on TIPS²⁵ which dropped by 27 bps (Figure 14).

Figure 14

Agency and TIPS Spread vs. Treasuries
(Spreads in bps compared to 5-year Treasuries)
Blue: Agencies
Light blue: TIPS (secondary axis)



Source: Bloomberg

VII.5. Exchange Rates

In the second quarter of 2010, the euro depreciated by 9.47% against the US dollar while the yen gained 5.30% against the dollar. As a result, the yen/euro exchange rate showed a depreciation of 14.27% over the same period (Figure 15).

Figure 15

Exchange Rates
(Against the dollar)
Blue: Euro (secondary axis)
Light blue: Yen



Source: JPMorgan

²² The increase in the agency spread seen in June 2010 was the result of a change in the benchmark instrument due to the change in the maturity of the original issue.

²³ In the second quarter of 2010, the return on 5-year US agency bonds (17.0%) was below that on US Treasury bills of the same maturity (18.9%).

²⁴ In the second quarter of 2010, the return on 5-year inflation-indexed bonds (5.4%) was below that on US Treasury bills of the same maturity (18.9%).

²⁵ TIPS spread: Return on a US Treasury bill minus the return on TIPS of an equivalent maturity.

VIII. APPENDIX**VIII.1. Positions with Financial Institutions**

The PRF holds deposits with **bank risk** in the following institutions:

- 1 ABN AMRO Bank
- 2 Banco Santander
- 3 Bank of Scotland PLC
- 4 Bayerische Landesbank
- 5 Credit Industriel et Commercial
- 6 Dexia Bank Belgium
- 7 Erste Group Bank AG
- 8 HSBC France
- 9 ING Bank NV
- 10 Lloyds TSB Bank PLC
- 11 Mizuho Corp Bank
- 12 Norddeutsche Landesbank
- 13 Royal Bank of Scotland (The)
- 14 Svenska Handelsbanken
- 15 Zuercher Kantonalbank

Source: JPMorgan

VIII.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
Sovereign	100%
Multilateral	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 from at least two of 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 Multilateral Risk

The eligible international organizations are those with a long-term risk classification equivalent to **AA-** or higher from at least two of 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	
AA	Aa2	600
AA-	Aa3	

A.3 Bank Risk

The methodology for selecting 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 from at least two of Fitch, Moody's and Standard & Poor's, and a minimum net worth 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	
AA	Aa2	400
AA-	Aa3	
A+	A1	
A	A2	300
A-	A3	

A.4 Agency Risk

The eligible US agencies are those with a long-term risk classification equivalent to **AAA** from at least two of Fitch, Moody's and Standard & Poor's, and a minimum net worth equivalent to **US\$1,000 million**. Investment in any one agency may not exceed **US\$800 million**.

VIII.3. Methods for Calculating Estimated Returns

The method used to calculate the return on a portfolio depends on the nature of the fund and on whether the yield 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 asset-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 return to the State of Chile.

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.

• Internal Rate of Return

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 rate calculated on the basis of a series of cash flows and is the 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 to the T degree:

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

Rates of return calculated using the iterative IRR method are affected by the timing and size of net cash flows during the period.²⁶

• Time-Weighted Rate of Return (TWR)

This method is used by the market 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 flow because they are constantly buying and selling.

The TWR²⁷ 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

²⁶ 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.

Adjusted Net 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.

²⁷ Fabozzi and Frank, *Investment Management*, © 1995, pgs. 611-618.

daily net returns of contributions and withdrawals are calculated as well as costs²⁸ and income from securities lending.

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

where:

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

The 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 being 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.

• TWR vs. IRR

The TWR is used 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 devise a benchmark and verify the 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 can easily be constructed by an external party.

The IRR, on the other hand, serves to measure the fund's performance from the point of view of the State of Chile as an investor.

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

VIII.4. Calculation of the Benchmark

A new reference portfolio (benchmark) was introduced on September 1, 2009. However, it maintains the structure of the previous benchmark:

- ✓ **Short-term money market instruments:** The Merrill Lynch LIBID Index and 6-month T-bill rates in dollars, euros and yens are used to simulate a portfolio of 3-month deposits.

²⁸ Only includes custody and advisory costs.

- ✓ **Nominal bonds:** Barclays indexes 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 Government Inflation-Linked Bond Index (US TIPS) is used. This index monitors sovereign bonds with a duration of between 1 and 10 years.

The weight of each of these components is as follows:

Structure	USD	EUR	JPY	Total
Money market (*)	15.00%	12.00%	3.00%	30.00%
Merrill Lynch LIBID 6-Month Average	7.50%	6.00%	1.50%	15.00%
Merrill Lynch Treasury Bill Index	7.50%	6.00%	1.50%	15.00%
Nominal sovereign bonds	31.50%	28.00%	7.00%	66.50%
Barclays Capital Global Treasury Bond Index 1-3 years	14.18%	12.60%	3.15%	29.93%
Barclays Capital Global Treasury Bond Index 3-5 years	9.45%	8.40%	2.10%	19.95%
Barclays Capital Global Treasury Bond Index 5-7 years	3.94%	3.50%	0.88%	8.31%
Barclays Capital Global Treasury Bond Index 7-10 years	3.94%	3.50%	0.88%	8.31%
Inflation-linked sovereign bonds	3.50%			3.50%
Barclays Capital Global Inflation-Linked US TIPS Index 1-10 years	3.50%			
Total	50.00%	40.00%	10.00%	100.00%

• Calculation of LIBID and T-Bill Benchmark

The benchmark for money market investments is calculated using the Merrill Lynch indexes for LIBID rates²⁹ and 6-month Treasury bills for the three currencies included in the PRF's portfolio. Daily returns are calculated as the variation in the dollar-denominated index in period t as compared to its value in t_{-1} :

$$Ret_Libid_t = 7,5\% \cdot \left(\frac{ML_Libid_t^{USD}}{ML_Libid_{t-1}^{USD}} - 1 \right) + 6,0\% \cdot \left(\frac{ML_Libid_t^{EUR}}{ML_Libid_{t-1}^{EUR}} - 1 \right) + 1,5\% \cdot \left(\frac{ML_Libid_t^{JPY}}{ML_Libid_{t-1}^{JPY}} - 1 \right)$$

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

$$Ret_TBill_t = 7,5\% \cdot \left(\frac{ML_TBill_t^{USD}}{ML_TBill_{t-1}^{USD}} - 1 \right) + 6,0\% \cdot \left(\frac{ML_TBill_t^{EUR}}{ML_TBill_{t-1}^{EUR}} - 1 \right) + 1,5\% \cdot \left(\frac{ML_TBill_t^{JPY}}{ML_TBill_{t-1}^{JPY}} - 1 \right)$$

²⁹ According to convention, the LIBID rate is equal to LIBOR less 1/8 o 0.125.

- **Calculation of the Nominal Bond Benchmark**

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

$$Ret_BNom \text{ or } Ret_Bcls_t = \frac{Idx_Bcls_t}{Idx_Bcls_{t-1}} - 1$$

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

$$Ret_BNom_USD_t = \sum_{duration} Ret_Idx_USD_t^{duration} \cdot \omega_{JPY}^{duration}$$

$$Ret_BNom_EUR_t = \sum_{duration} \left[\left(Ret_Idx_EUR_t^{duration} + 1 \right) \cdot \frac{EUR_t}{EUR_{t-1}} - 1 \right] \cdot \omega_{EUR}^{duration}$$

$$Ret_BNom_JPY_t = \sum_{duration} \left[\left(Ret_Idx_JPY_t^{duration} + 1 \right) \cdot \frac{JPY_t}{JPY_{t-1}} - 1 \right] \cdot \omega_{JPY}^{duration}$$

where:

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

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

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:

$$Ret_BNom_t \text{ or } Ret_Bcls_t = Ret_BNom_USD_t + Ret_BNom_EUR_t + Ret_BNom_JPY_t$$

- **Calculation of Inflation-Linked Bond Benchmark**

The benchmark for inflation-linked bonds is simply:

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

- **Calculation of Fund Benchmark**

The daily return on the benchmark for the funds is:

$$Ret_Libid_t + Ret_TBill_t + Ret_BNom_t + Ret_TIPS_t$$

- **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):

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

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

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

IX. GLOSSARY³⁰

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 assets, 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 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.

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.

Currency basket: A measure of the value of a group of currencies in which each individual currency has a defined weight.

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.

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%.

³⁰ Sources: Central Bank of Chile (CBC) and Bloomberg.

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

Liquidity risk: The risk arising from the possibility that a counterpart (or participant in a clearing system) does not clear a liability for its total value when it falls due. This does not imply that a counterpart or participant is insolvent, given the possibility of clearing the liability at an unspecified subsequent date.

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

Money market instruments: Tradable 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: An index of 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 assets.

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

Time-Weighted Rate of Return (TWR): Rate of growth measured as a percentage of the change in an asset'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.

Trade bill: 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.

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.