GOBIERNO DE
CHILE
MINISTRY OF FINANCE

PENSION RESERVE FUND

First Quarter, 2010

CONTENTS

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

In the first 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 funds rate remained in the range of 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 January and February, the Central Bank of China introduced two consecutive half-point increases in the reserve requirement for commercial banks. These increases sought to continue stabilizing the growth of lending in China and to reduce the inflationary pressures generated by the expansionary cycle of its monetary policy. In March, in the context of 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. In addition, Fitch Ratings reduced its rating for Portugal's long-term

sovereign debt from AA to AA- in response to this country's high fiscal deficit.

Figure 1
Exchange Rates: Euro and Yen against the Dollar
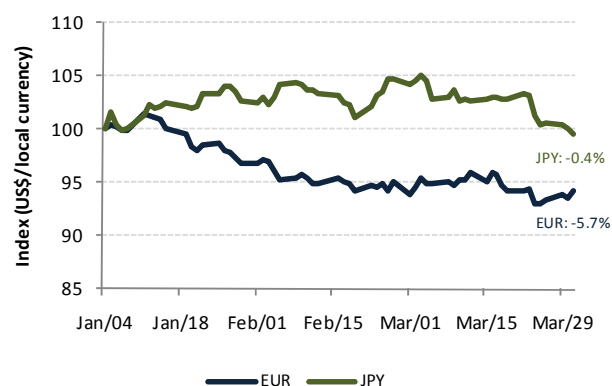
Source: JPMorgan

Figure 2
Interest Rates on 2-Year Sovereign Bonds
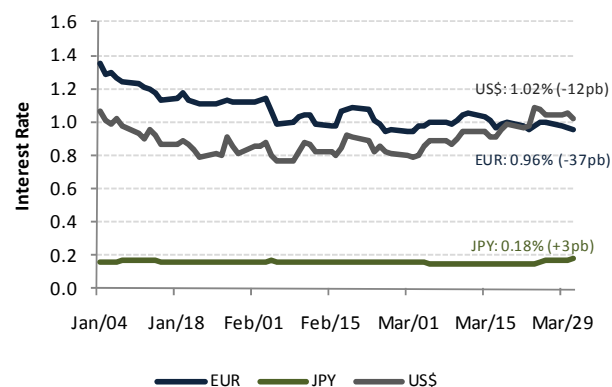
Source: Bloomberg

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[1] Acceptation Agreement adopted by the Central Bank Board in Ordinary Meeting N° 1.321, held on February 22, 2007. Since the PRF's inception, its assets have been managed by the CBC.

[2] Under the Finance Ministry's Supreme Decree N° 1.383.

[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 first quarter of 2010, the PRF held assets that, at market prices, were worth US$3,373.68 million, down by US$47.15 million on the close of 2009. This drop was explained by accrued interest earnings of US$16.93 million, a drop of US$64.01 million in the market value of the fund's assets and management and custody fees for US$0.07 million.

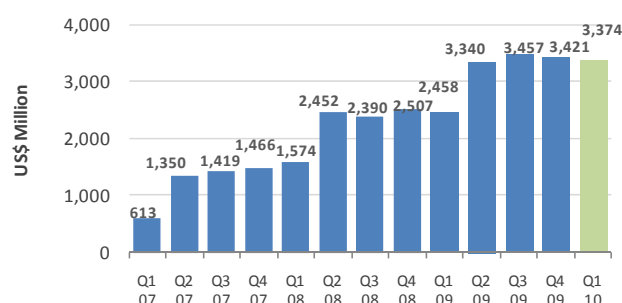In March, the drop in the value of the PRF reached US$32.57 million. Accrued interest earnings amounted to US$5.72 million while the negative impact of the depreciation of the yen and the euro against the dollar and of an increase in interest rates on relevant financial instruments accounted for losses of US$27.14 million and US$11.11 million, respectively. Management and custody costs totaled US$0.04 million.[5]

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

Source: Dipres

Figure 4
Variation in the Market Value of the PRF's Portfolio (1st quarter, 2010)
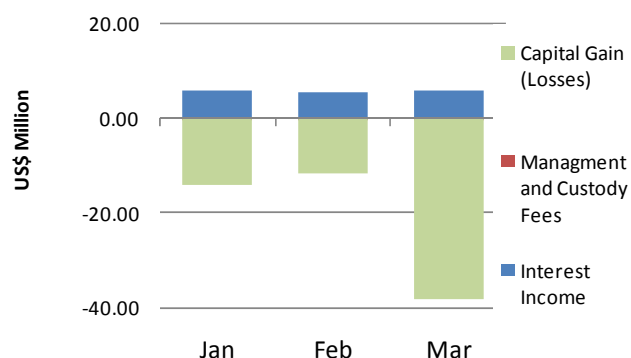

Source: Dipres based on information provided by JP Morgan and CBC.

In January, the PRF showed a drop of US$8.25 million. This was explained by accrued interest of US$5.89 million, a loss of approximately US$33.84 million due principally to the depreciation of the euro against the dollar and a gain of US$19.72 million due to movements in the interest rates on relevant financial instruments. In addition, management and custody fees totaled US$0.02 million.[4]

In February, the PRF showed a loss of US$6.33 million. This reflected accrued interest for US$5.32 million, a loss of approximately US$17.74 million due principally to the depreciation of the euro against the dollar and a gain of US$6.11 million due to movements in the interest rates on relevant financial instruments. Management and custody fees totaled US$0.02 million.

[4] For further details, see Table 6.

[5] For further details, see Table 6.

IV. INVESTMENT PORTFOLIO

At the close of the first quarter, 77.79% of the PRF's assets were invested in sovereign bonds and 22.21% in bank deposits. As compared to end-2009, this represented a reduction of 0.84% in the fund's exposure to sovereign bonds (Table 4) and a corresponding increase in its exposure to bank-risk instruments which have a short-term investment horizon.

In the case of sovereign-risk investments, Austria was incorporated into the PRF's portfolio during the first quarter while Greece and Portugal were eliminated. As compared to the previous quarter, its exposure to Italy, France and the United States increased and showed a drop for Ireland, Belgium and Japan.

Figure 5
Sovereign-Risk Investments by Country
(Q1 2010 vs. Q4 2009)[6]
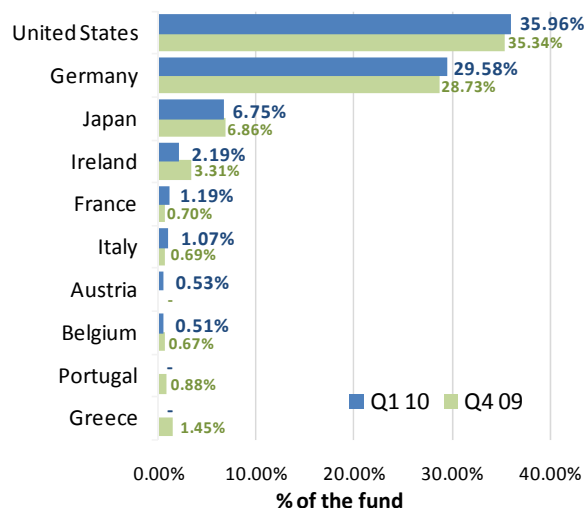
Source: Dipres based on information provided by JP Morgan.

As of the close of the first quarter, 86.47% of the fund's investments in sovereign instruments had an AAA risk rating. This represented an increase of 4.10% on the previous quarter. During the quarter, the fund also reduced its holdings of assets with a BBB+[7] rating.

Figure 6
Investments by Sovereign Risk Rating
(Q1 2010 vs. Q4 2009)[8]
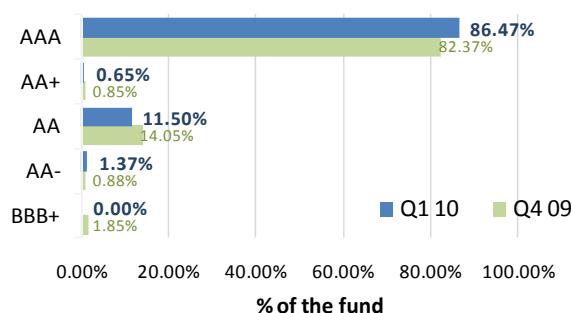
Source: Dipres based on information provided by JP Morgan.

In the case of bank-risk assets, the PRF's exposure to Germany and Netherlands increased during the quarter but decreased for the United Kingdom, Belgium, Japan and Spain. In addition, Switzerland, Denmark and Sweden were incorporated into this segment of the portfolio.

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[6] Based on settlement date information.

[7] Greece's risk rating was downgraded to BBB+ at the close of the previous quarter. As a result, investments in Greece's instruments fell below the lowest limit established in the ESSF's investment policy. In order to resolve this situation, the Fiscal Agent and the Finance Ministry took the necessary measures to eliminate this exposure.

[8] Based on settlement date information.

Figure 7
Bank-Risk Investments by Country
(Q1 2010 vs. Q4 2009)[9]

Source: Dipres based on information provided by JP Morgan.

Figure 8
Total Portfolio by Country
(Q1 2010 vs. Q4 2009)[10]

Source: Dipres based on information provided by JP Morgan.

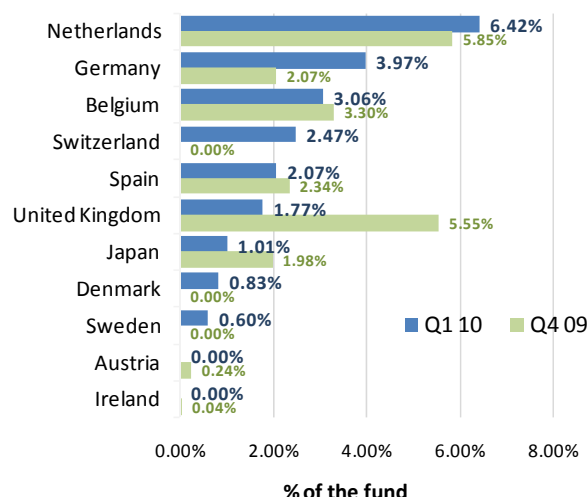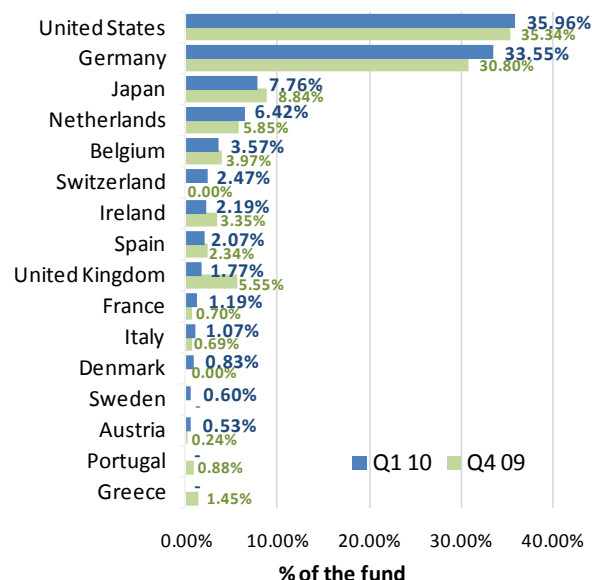In terms of the PRF's total portfolio, it can, therefore, be seen that Switzerland, Denmark and Sweden were incorporated during the first quarter while positions in Greece and Portugal were eliminated. In addition, the fund's exposure to Germany, Austria, Netherlands, Italy, France and United States increased while dropping for United Kingdom, Japan, Ireland, Belgium and Spain.

At the close of the first quarter of 2010, the PRF held assets in dollars for US$1,682.63 million (49.88% of its portfolio) while assets in euros and yens amounted to US$1,359.33 million (40.29%) and US$331.72 million (9.83%), respectively. This currency allocation represented only a very small change on the previous quarter.

Figure 9
Currency Allocation
(Q1 2010 vs. Q4 2009)
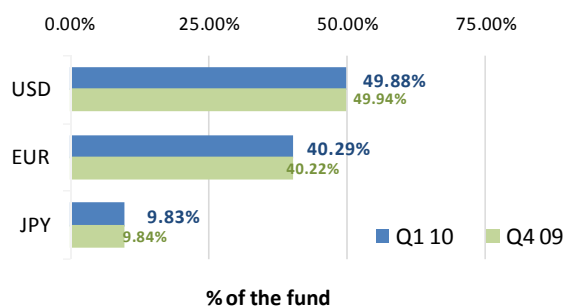
Source: Dipres based on information provided by CBC.

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[9] Based on settlement date information.

[10] Based on settlement date information.

The average duration of the fund's financial investments at the close of the first quarter was 2.43 years, equivalent to an average duration of 889 days. This represented a decrease of 14 days on the previous quarter.

Table 1
Historical Summary of PRF (since inception)

US$ Million	2006	2007	2008	2009	2010				Summary Total
					Jan	Feb	Mar	Summary Q1	
Starting Value	0.00	604.63	1,466.35	2,506.76	3,420.83	3,412.58	3,406.25	3,420.83	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	71.86	5.89	5.32	5.72	16.93	205.66
Managment and Custody Fees	0.00	-0.04	-0.32	-0.35	-0.02	-0.02	-0.04	-0.07	-0.78
Capital Gain (Losses)[11]	0.09	79.79	60.41	5.85	-14.12	-11.63	-38.25	-64.01	82.13
Final Value	604.63	1,466.35	2,506.76	3,420.83	3,412.58	3,406.25	3,373.68	3,373.68	3,373.68

* Includes interest from securities lending program.

Source: Dipres based on data provided by JP Morgan.

Table 2
Allocation by Type of Risk and Currency
(Q1 2010 vs. Q4 2009)

US$ Million	Local Currency	Q4 09	Q1 10	dif.
Sovereign	USD	1,371.89	1,324.13	-47.76
	EUR	1,083.32	1,072.41	-10.91
	YEN	234.58	227.81	-6.77
Bank	USD	336.47	358.50	22.03
	EUR	292.56	286.93	-5.64
	YEN	102.01	103.91	1.90
Total		**3,420.83**	**3,373.68**	**-47.15**
Duration (years)		**2.47**	**2.43**	**-0.04**
Duration (days)		**903**	**889**	**-14**

Source: Dipres based on information provided by CBC.

Table 3
Currency Allocation
(Q1 2010 vs. Q4 2009)

Currency Allocatior	Q4 09	Q1 10	dif.
USD	49.94%	49.88%	-0.06%
EUR	40.22%	40.29%	0.07%
JPY	9.84%	9.83%	-0.01%
Total	**100.00%**	**100.00%**	**0.00%**

Source: Dipres based on information provided by CBC.

Table 4
Allocation by Type of Risk and Country[12]
(Q1 2010 vs. Q4 2009)

Sovereign Risk	Q4 09	Q1 10	dif.
United States	35.34%	35.96%	0.62%
Germany	28.73%	29.58%	0.85%
Japan	6.86%	6.75%	-0.10%
Ireland	3.31%	2.19%	-1.12%
France	0.70%	1.19%	0.49%
Italy	0.69%	1.07%	0.38%
Austria	0.00%	0.53%	0.53%
Belgium	0.67%	0.51%	-0.16%
Greece	1.45%	0.00%	-1.45%
Portugal	0.88%	0.00%	-0.88%
Total	**78.63%**	**77.79%**	**-0.84%**

Bank Risk	Q4 09	Q1 10	dif.
Netherlands	5.85%	6.42%	0.57%
Germany	2.07%	3.97%	1.90%
Belgium	3.30%	3.06%	-0.24%
Switzerland	0.00%	2.47%	2.47%
Spain	2.34%	2.07%	-0.28%
United Kingdom	5.55%	1.77%	-3.78%
Japan	1.98%	1.01%	-0.97%
Denmark	0.00%	0.83%	0.83%
Sweden	0.00%	0.60%	0.60%
Austria	0.24%	0.00%	-0.24%
Ireland	0.04%	0.00%	-0.04%
Total	**21.37%**	**22.21%**	**0.84%**

Source: Dipres based on information provided by JP Morgan.

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[11] Capital gains (losses) on the PRF are the result of movements in exchange rates and market interest rates on its investments in a given period.

[12] Based on settlement date information.

V. RETURN ON INVESTMENT PORTFOLIO

V.1. Returns

The indicator used to measure the yield on the PRF's portfolio is the Internal Rate of Return (IRR).[13] This represents the effective return received by investors and takes account of all flows during the period.

In the first quarter of 2010, the IRR on the PRF, measured in dollars, was -1.38%. This was explained mainly by a weakening of the euro and the yen against the dollar, which represented a loss of 2.34% and was partly offset by a 0.96% gain due to a drop in interest rates.

Figure 10
Quarterly IRR in Dollars
(Since inception)
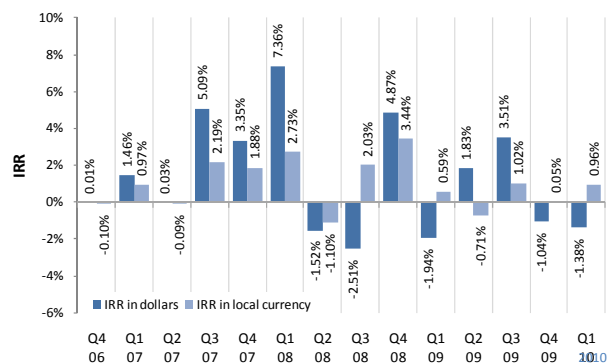
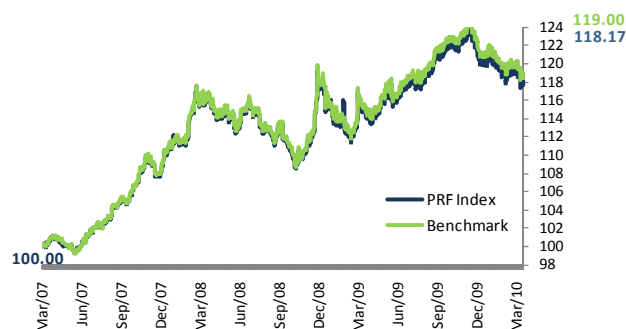Source: Dipres based on information provided by JP Morgan and CBC.

V.2. Performance

The Time-Weighted Rate of Return (TWR)[14] is used to measure the PRF's performance relative to its benchmark (BMK). For this purpose, an index is calculated based on daily variations in the portfolio's market value in dollars.

Development of this indicator for the PRF began at the end of the first quarter of 2007 and March 31, 2007 is used as the base value. For the purpose of comparison with the benchmark,[15] the fund is,

therefore, considered to have started operations at this date.

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

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

In the first quarter of 2010, this index showed a return of -1.38% as compared to -1.40% for the benchmark. In relative terms, this means that the PRF's performance was 2 basis points (bps) above the benchmark.

Measured since the PRF's inception, its TWR was 5.72% or 25 bps short of its benchmark.

However, when the risk associated with the fund's investments is taken into account, returns on the PRF since its inception show less variability than those on the benchmark, indicating that the Fiscal Agent's management was slightly more conservative than that implicit in the benchmark. If the return is adjusted by unit of risk, we find that the return on the PRF was 4 bps below the benchmark.

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[13] See Glossary.

[14] See Glossary.

[15] See Appendix VIII.4.

Table 5
Return and Risk Indicators

Return Indicators	Q1 10	Since Inception[1]
IRR[2]	-1.38%	4.33%
TWR	-1.38%	5.72%
Benchmark	-1.40%	5.96%
Differential	0.02%	-0.25%
PRF local currency (TWR)	0.94%	4.47%
BMK local currency (TWR)	0.92%	4.72%
Return Adjusted by Unit of Risk	**Q1 10**	**Since Inception[1]**
TWR PRF	-0.51	0.88
Benchmark	-0.51	0.92

1 March 31, 2007

2 December 28, 2006

Risk Indicators	Q1 10[2]	Since Inception[1]
Standard Deviation PRF	2.70%	6.47%
Standard Deviation BMK	2.72%	6.49%
Tracking Error ex-post	-	0.19%
Information Ratio	-	-1.31

1 March 31, 2007

2 Considers last 12 months expressed in quarterly terms.

VI. OTHER FLOWS

VI.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 first quarter, operations of this type generated additional income of US$94,960 for the PRF.

VI.2. Costs

In the first quarter, management and custody costs totaled US$74,266 of which US$38,400 corresponded to the management services provided by the CBC and US$35,866 to custody fees paid to JP Morgan.

Table 6
Summary of Other Quarterly Flows

Other Flows (US$)	Q1 10
Managment (CBC)	-38,400
Custody (JPMorgan)	-35,866
Others Costs	0
Total Costs	-74,266
Securities Lending	94,960
Total Other Flows	20,694

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

VII. BEHAVIOR OF RELEVANT MARKETS

VII.1. General Situation

In the first 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.

Important international economic news attracted the attention of financial markets. In January and February, the Central Bank of China made two increases of 50 bps in the amount of the deposits that commercial banks must maintain as a reserve requirement. These increases sought to continue the stabilization of lending growth in China and to reduce the inflationary pressures generated by the expansionary cycle of its monetary policy.[16]

In February, in response to the improvement in economic conditions seen in previous months, the US Federal Reserve (Fed) increased the discount rate on its emergency lending facility for financial institutions by 50 bps. This marked the end of one of the extraordinary measures taken by the US government to support lending in the face of the international financial crisis.

In March, in line with ongoing 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. This included resources to be made available, if requested by Greece, to allow this country to cover its financial needs. In this context, Greece placed bonds for €5 billion, raising part of the €24 billion required to comply with very short-term liabilities falling due in April and May 2010. In addition, Fitch Ratings downgraded Portugal's long-term sovereign debt from AA to AA- in response to the country's

large fiscal deficit, which reached 9.3% of GDP in 2009.

In the first quarter of 2010, the main world currencies weakened against the US dollar and the yield curves of the different economic zones steepened.

VII.2. Main Macroeconomic Trends

- **United States**

The main indicators of confidence in the United States[17] showed mixed results as compared to the last quarter of 2009, but remained at historically low levels.

In the first quarter, the Leading Index[18] showed positive results, anticipating an improvement in the US economy. Similarly, industrial production increased at an average monthly rate of 0.5%, confirming the recovery of this sector that began in the third quarter of 2009. Unemployment dropped from 10% to 9.7%, reflecting the creation of an average of 54,000 jobs per month during the quarter. Annual inflation dropped from 2.7% to 2.3% while annual core inflation fell to 1.1%, down from 1.8%.

The yield curve steepened 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 12 bps and 1 bp, respectively. In general, interest rates showed a drop and, on average, the yield on Treasury bills fell by 7 bps.

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[16] These were the first increases in the bank reserve ratio since the onset of the international financial crisis.

[17] University of Michigan Survey of Consumer Confidence Sentiment and Conference Board Consumer Confidence.

[18] The Leading Index is an indicator that seeks to anticipate changes in economic conditions.

- **Euro Zone**

In Europe, indicators of economic confidence,[19] services and industrial activity strengthened while the indicator of consumer confidence showed a small drop as compared to the close of the last quarter of 2009.

Indicators of activity in the services and manufacturing sectors[20] continued to show positive results in the first quarter, reinforcing the trend seen since the second quarter of 2009. Industrial output[21] showed a recovery, with the annual reading of this indicator rising from -3.9% to 4.1%. However, unemployment increased from 9.9% to 10%, its highest level since 1998. Annual inflation also rose, reaching 1.4% up from 0.9%, while annual core inflation declined slightly, dropping from 1.1% to 1.0%.

In the Euro Zone, the yield curve[22] steepened. The yield on 2-year and 10-year German bonds dropped by 37 bps and 30 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 33 bps.

- **Japan**

Japan's main indicators of confidence[23] showed an increase on the close of the last quarter of 2009. However, they remained at historically low levels, reflecting consumers' lack of confidence in the recovery of the Japanese economy.

Industrial output[24] showed a recovery, with its annual rate of expansion rising from 5.1% to 31.3%. Unemployment dropped from 5.2% to 4.9% in line with market expectations. Annual inflation rose from

-1.7% to -1.1% while annual core inflation increased from -1.2% to -1.1%.

In the first quarter of 2010, Japan's yield curve steepened. This was reflected in the yield on 2-year Japanese sovereign bonds, which increased by 3 bps, while that on 10-year bonds rose by 11 bps. In general, interest rates for all maturities shifted upwards and, on average, the yield on Japanese bonds increased by 8 bps.

VII.3. Fixed-Income Market

In the fixed-income market, the behavior of interest rates on 5-year government bonds was mixed. In both the United States and Europe, reference interest rates dropped while, in Japan, they rose for this maturity (Figure 12).
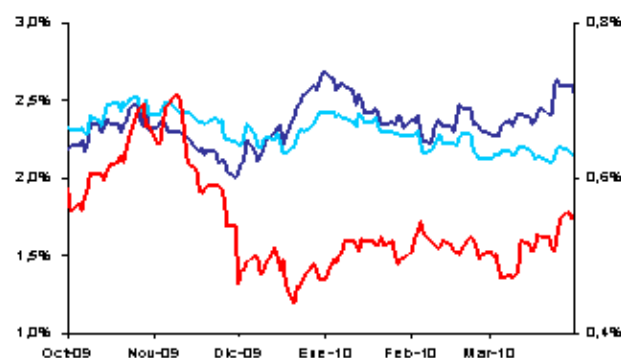
Figure 12
Interest Rates on 5-year Sovereign Bonds
Blue: United States
Light blue: Europe
Red: Japan (secondary axis)

Source: Bloomberg

In line with these trends, total returns were positive in both the United States and Europe but negative in Japan (Figure 13).

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[19] Euro Zone indicators of confidence published by the European Commission.

[20] Eurozone Services PMI Markit Survey, EC Composite PMI Output and Eurozone Manufacturing PMI Markit Survey Ticker.

[21] Figures for industrial output and unemployment in the Euro Zone are for February 2010 and were the latest available at the close of this report.

[22] The yield curve referred to by Bloomberg as EUR German Sovereign.

[23] Japan Consumer Confidence Overall Nationwide NSA and Japan Consumer Confidence Households NSA.

[24] Figures for industrial output, retail sales, unemployment and inflation in Japan are for February 2010 and were the latest available at the close of this report.

Figure 13
Total Returns (JP Morgan Index 1-10 years)
September 30, 2009 = 100
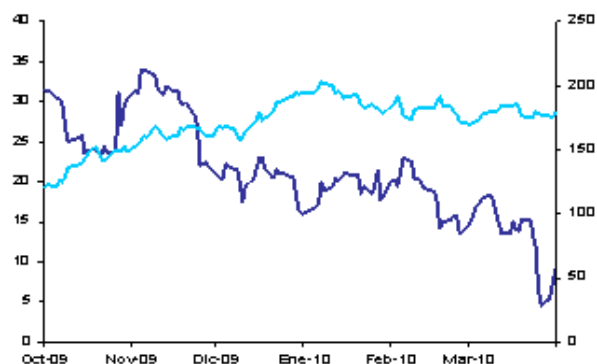Blue: United States
Light blue: Europe
Red: Japan
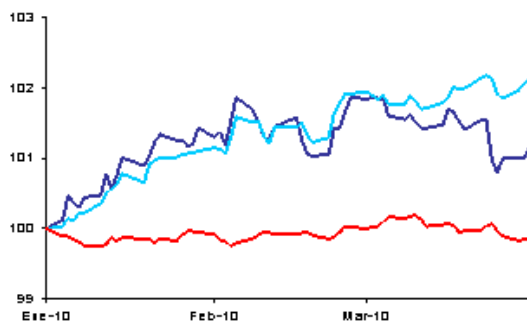
Source: JP Morgan

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.4.   Main Spreads on Portfolio Securities

The spread on 5-year agency bonds dropped by 7 bps in the first quarter of 2010 (Figure 14). As a result, their return[25] was below that on 5-year US Treasury bills despite a narrowing of the spread between the two instruments.

US inflation-linked bonds (TIPS) also showed a lower return than (nominal) US Treasury bills of an equivalent maturity[26]. This was reflected in the spread on TIPS[27] which dropped by 16 bps (Figure 14).

VII.5.   Exchange Rates

In the first quarter of 2010, the euro and the yen depreciated against the dollar by 5.69% and 0.37%, respectively (Figure 15). As a result, the yen/euro exchange rate showed a depreciation of 5.34% over the same period.

Figure 15
Exchange Rates
(Against the dollar)
Blue: Euro (secondary axis)
Light blue: Yen
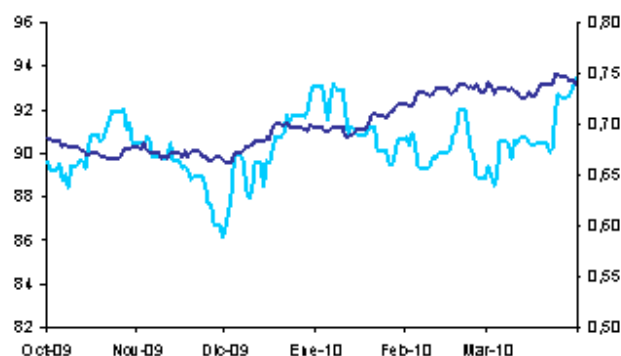
Source: JP Morgan

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[25] In the first quarter of 2010, the return on 5-year US agency bonds (6.4%) was below that on US Treasury bills of the same maturity (7.0%).
[26] In the first quarter of 2010, the return on 5-year inflation-indexed bonds (1.2%) was below that on US Treasury bills of the same maturity (7.0%).
[27] 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:

Financial institutions with deposits, 1Q 2010

1	ABN AMRO Bank NV
2	Banco Santander Central Hispano SpA
3	Bank of Scotland PLC
4	Bayerische Hypo- und Vereinsbank AG
5	Bayerische Landesbank
6	Caja de Ahorros y Monte de Piedad de Madrid
7	Danske Bank Aktieselskab
8	Dexia Bank Belgium SA
9	HSH Nordbank AG
10	ING Bank NV
11	KBC Bank NV
12	Mizuho Corp Bank
13	Norddeutsche Landesbank Girozentrale
14	Svenska Handelsbanken AB (publ)
15	The Royal Bank Of Scotland PLC
16	Zurcher Kantonalbank

Source: JP Morgan

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+ AA AA-	90%
A+ A A-	30%

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 TWR

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.[28]

- **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 TWR[29] 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

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[28] Alternatively, the IRR can be calculated using the Modified Dietz Method (MDM):

$$MDM \; \mathrm{Re}\,turn = \frac{EMV - BMV - CF}{BMV + Net \; Adjusted \; Cash \; Flow}$$

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.

[29] Fabozzi and Frank, *Investment Management*, © 1995, pgs. 611-618.

daily net returns of contributions and withdrawals are calculated as well as costs[30] and income from securities lending.

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

where:

$$r_i = \frac{value\_assets_i - \text{contributions} + \text{withdrawals} + \text{costs} - \text{securities\_lending}}{value\_assets_{i-1}}$$

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.

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[30] 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 rates[31] and 6-month Treasury bills for the three currencies included in the PRF's portfolio. Daily returns are calculated as the variation in the <u>dollar-denominated</u> index in period t as compared to its value in t_{-1}:

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

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

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

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[31] 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:

$$\text{Ret\_BNom} \ or \ \text{R}et\_Bcls_t = \frac{Idx\_Bcls_t}{Idx\_Bcls_{t-1}} - 1$$

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:

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

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

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:

$$\text{Ret\_BNom}_t \ or \ \text{R}et\_Bcls_t = \text{R}et\_BNom\_USD_t + \text{R}et\_BNom\_EUR_t + \text{R}et\_BNom\_JPY_t$$

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

The benchmark for inflation-linked bonds is simply:

$$\mathrm{Re}t\_TIPS_t = 3.5\% \cdot \left(\frac{Idx\_TIPS_t}{Idx\_TIPS_{t-1}} - 1 \right)$$

- **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:

$$asset\_return_t^{EUR}[EUR] = \frac{asset\_price_t^{EUR}}{asset\_price_{t-1}^{EUR}} - 1$$

(1)

(2)

$$EUR\_return_t = \frac{EUR_t}{EUR_{t-1}} - 1$$

(3)

$$asset\_return_t^{EUR}[USD] = \frac{asset\_price_t^{EUR} \cdot EUR_t}{asset\_price_{t-1}^{EUR} \cdot EUR_{t-1}} - 1 = \frac{asset\_price_t^{EUR}}{asset\_price_{t-1}^{EUR}} \cdot \frac{EUR_t}{EUR_{t-1}} - 1$$

Replacing (1) in (3):

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

(4)

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

(5)

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

IX.   GLOSSARY[32]

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%.

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[32] 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.