

Investments from EI Revenues, analyses and evaluation

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Outline of Session I

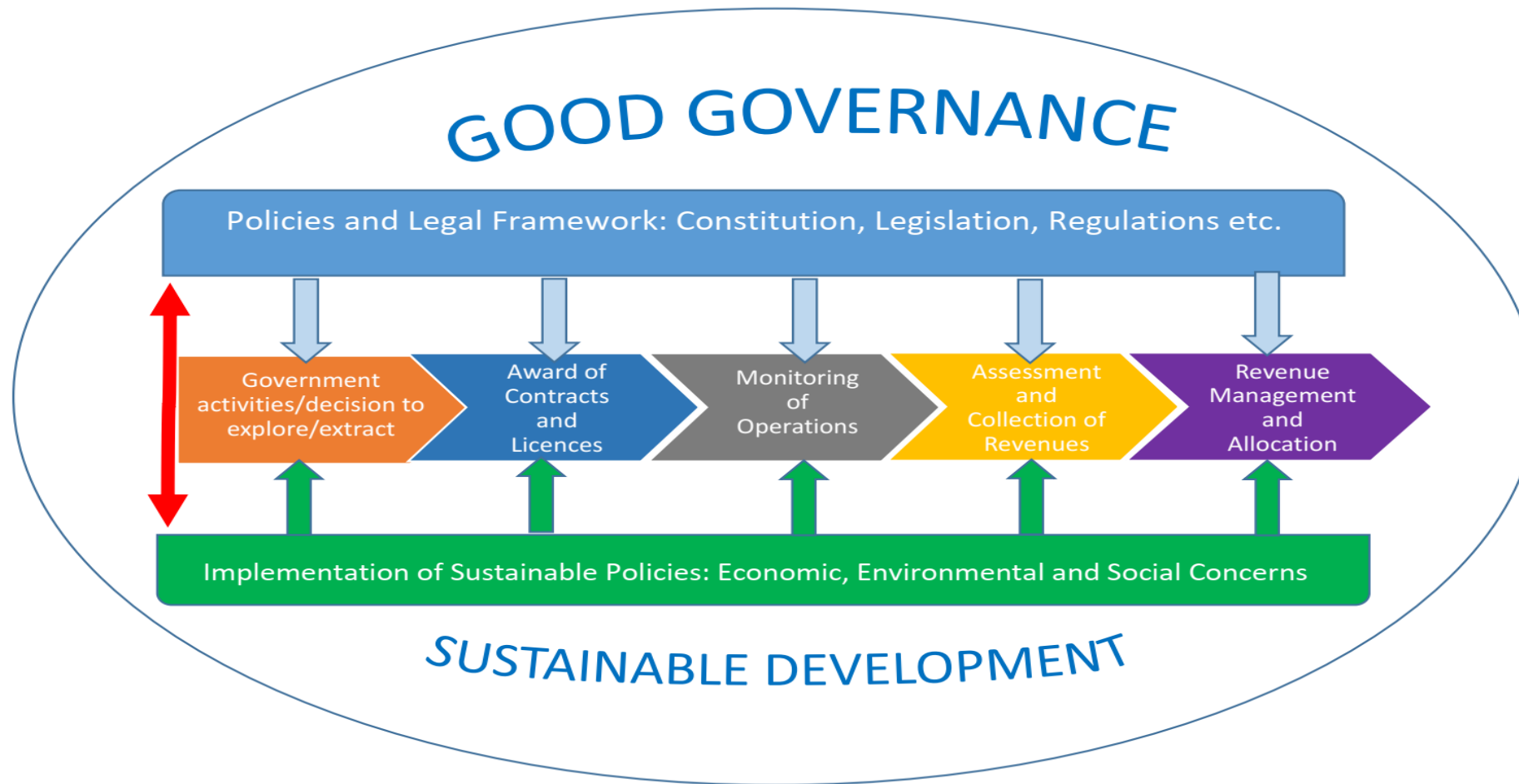
El value chain

Overview of investment types

Valuation, analyses and evaluation

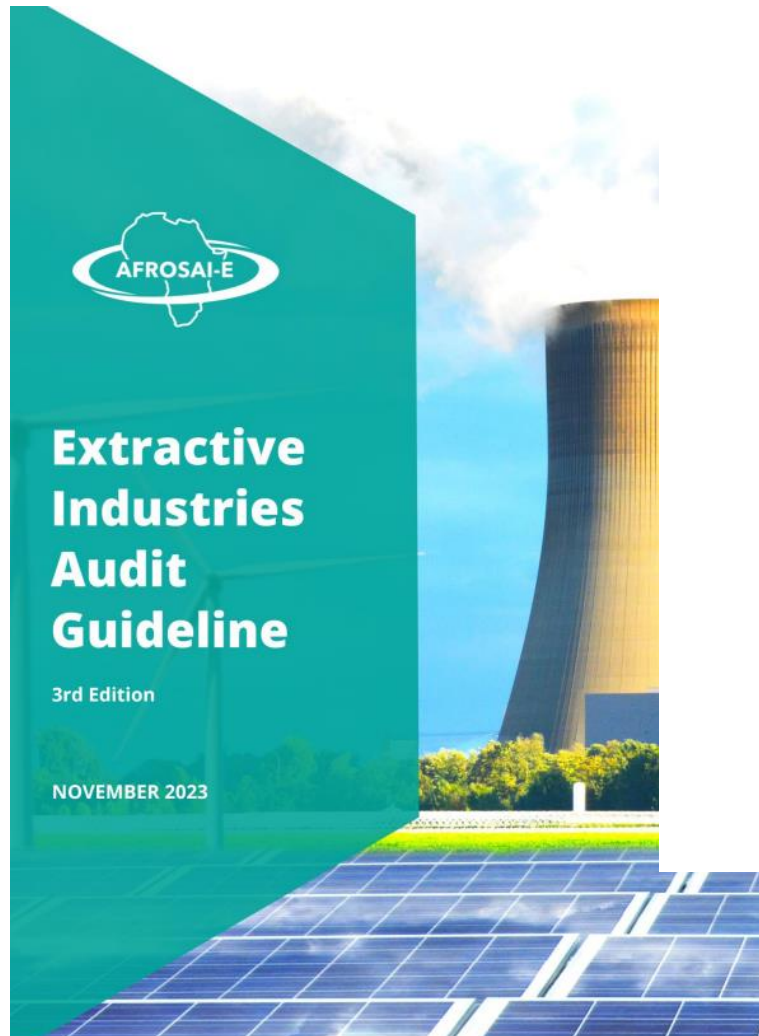
Audit considerations

The EI Value Chain



AFROSAI-E EI Guideline

3rd Edition November 2023 – [EI Guideline link](#)



The essence of ensuring prudent management and allocation of minerals and petroleum revenue by countries is to promote smooth spending flows, long-term fiscal sustainability, and intergenerational equity to mitigate Dutch disease.

Box 5 - Case example: The Dutch disease is a reminder that revenue collected from petroleum resources is both a blessing and a curse if not handled correctly. The Netherlands discovered large gas fields in 1959, and after extracting the resources, large quantities of foreign currency were flowing in, with the result that the Netherlands had a much stronger currency than other nations. The Dutch government also increased its spending, which increased inflationary pressure on the domestic economy. The manufacturing industry suffered greatly from this by being less competitive.

Policies should be set to ensure long-term fiscal sustainability and prevent the so-called 'Dutch disease'. Annual budgeting should be based on accurate estimates of petroleum and mineral prices and assumptions of volumes.

3.6.3. High-level audit considerations

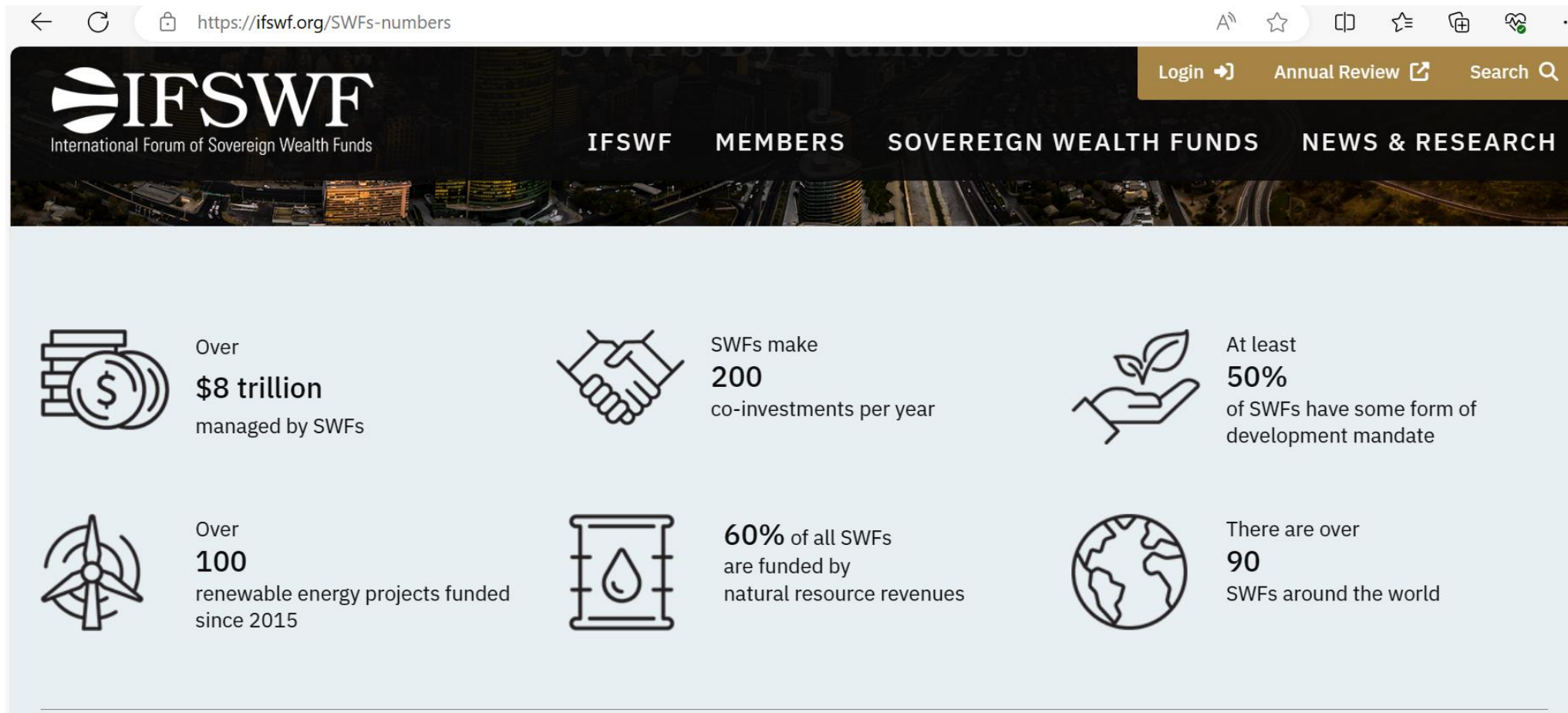
Investment considerations

Asset mix and diversification

Considerations

- ❖ Investment mandate
- ❖ How much should be invested in equity, bonds, and real estate?
- ❖ Investment timeframe – long-term vs short-term.
- ❖ How much risk can (is) be assumed to pursue a high return?
- ❖ What is the acceptable level of risk for the investor?
- ❖ Who is responsible for setting limits, the fund/asset manager or the investor?
- ❖ Should it be managed passively (replicate index/reference benchmark) or should there be a mix of passive and active management?
- ❖ Essential to invest in such a manner that considers risk and return.
- ❖ Diversification “Don’t put all the eggs in one basket”

Natural resource revenues invested by many SWF



[Our Members | IFSWF](#)

[Sovereign Wealth Fund Institute - SWFI \(swfinstitute.org\)](https://swfinstitute.org)

Investment mandate

Investor vs Fund manager

- Well-defined investment mandate
- Ideally long-term perspective
- Clear risk-taking limits
- Clearly defined roles and responsibilities of the investor and the asset manager
- Defined geographies, asset classes, deal types and capital structure
- Diversified and adaptable to the changing environment

Asset Classes

A graphic element for the Equity asset class, consisting of a dark blue rounded rectangle with a light blue rounded rectangle inside it, which contains the text "Equity".

Equity

A graphic element for the Fixed Income asset class, consisting of a dark blue rounded rectangle with a light blue rounded rectangle inside it, which contains the text "Fixed Income".

Fixed
Income

A graphic element for the Real Estate asset class, consisting of a dark blue rounded rectangle with a light blue rounded rectangle inside it, which contains the text "Real Estate".

Real
Estate

Asset Mix – Pula Fund Botswana

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (Continued) For the year ended December 31, 2022

	2022 P'000	2021 P'000
12. CATEGORIES OF FINANCIAL INSTRUMENTS		
12.1 Financial Assets		
Measured at FVTPL		
Equities	21 696 865	25 284 820
Bonds	18 934 626	22 271 493
Derivative assets	1 588 289	48 334
	<u>42 219 780</u>	<u>47 604 647</u>

Asset Mix – GLC Singapore

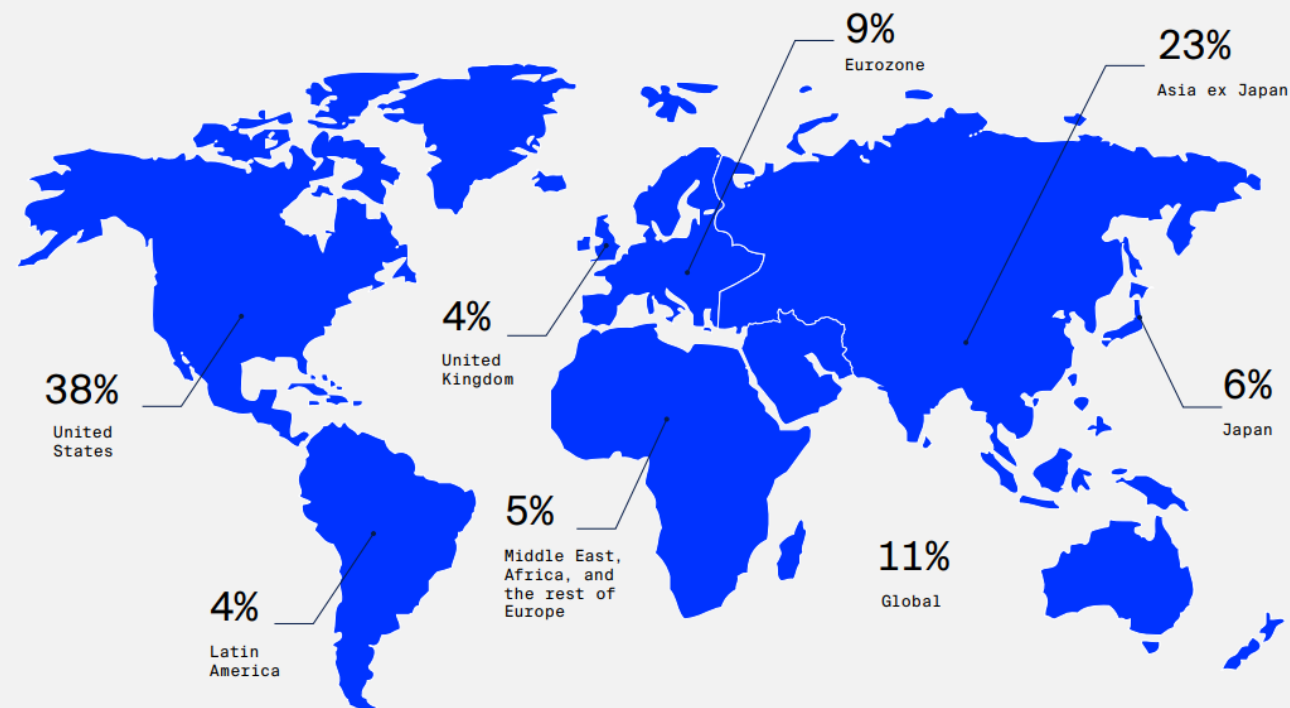
Table 1. Asset Mix of the GLC Portfolio

Asset Mix	31 March 2023 (%)	31 March 2022 (%)
Developed Market Equities	13	14
Emerging Market Equities	17	16
Nominal Bonds and Cash	34	37
Inflation-linked Bonds	6	6
Real Estate	13	10
Private Equity	17	17
Total	100	100

Geographic Mix of the GIC's Portfolio as of March 2023

Figure 5. Geographic Mix of the GIC Portfolio as at 31 March 2023

Geographic mix as at 31 March 2023: United States (38%); Latin America (4%); United Kingdom (4%); Eurozone (9%); Middle East, Africa, and the rest of Europe (5%); Japan (6%); Asia ex Japan (23%); Global (11%).



GIC's Infrastructure Investments

What is Infrastructure?

GIC defines infrastructure as investments with a combination of stable and predictable cash flows, ability to pass through inflation, and low risk of obsolescence. These investments offer a unique proposition to the GIC portfolio. Their returns tend to be resilient across macroeconomic cycles due to the defensive nature of the underlying assets.

Infrastructure assets undergird economies and are essential for safe modern living. Quality infrastructure provides us with access to clean water and reliable electricity supply, as well as digital and physical connectivity.

GIC's infrastructure portfolio includes companies that develop and operate **airports, seaports, electricity utilities, renewable energy generation, fiber networks, and telecommunication towers.**

Airports



Seaports



Electricity Utilities



Renewable Energy Generation



Fiber Networks



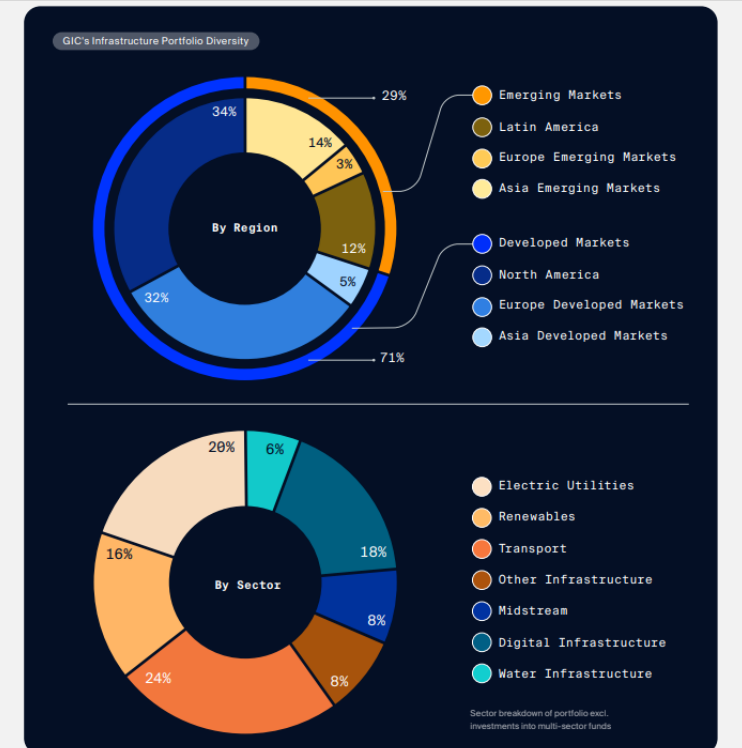
Telecommunication Towers



GIC diversified infrastructure portfolio across regions and sectors

The resilience of GIC's infrastructure portfolio is further enhanced by diversifying across regions and sectors.

Our developed market portfolio mainly comprises assets with mature, low-to-moderate risk, while our emerging markets portfolio includes investments with higher growth potential. GIC's institutional familiarity with emerging markets has enabled us to be an early investor in its infrastructure sector. Relative to our peers, we have a sizeable infrastructure portfolio in emerging markets.



Asset mix - Nigeria

Nigeria's FGF and SF managed by Nigeria Sovereign Investment Authority

Table 2.1: Target Asset Allocation for the Future Generations Fund

	Policy Target	Benchmark
Growth Assets	85%	MSCI All Country World Index
Developed Equities	20%	MSCI World Index
Emerging & Frontier Equities	10%	MSCI Emerging Markets Index
Private Equity, VC and value-added Real Estate	25%	Cambridge Associates US Private Equity Index
Absolute Return	20%	HFR Event-Driven (Total) Index
Other Diversifiers	10%	Cambridge Associates US Private Equity Index
Hedging Assets: Inflation	5%	Weighted Composite
Hard Assets	5%	50% FTSE® EPRA/NAREIT Developed Real Estate Index/ 50% CA Private Natural Resources Benchmark
Hedging Assets: Deflation	10%	Citigroup World Government (Hedged) – US\$ Bond Index
Cash	10%	US T-Bill

The Stabilisation Fund (SF)

Table 2.2: Target Asset Allocation for the Stabilisation Fund

	Policy Target	Benchmark
Growth Assets	75%	Barclays 1-3 Year Corporate Bond
Investment Grade Corporate Bond		Barclays 1-3 Year Corporate Bond
Hedge Assets	25%	Barclays 1-3 Year Treasury Bond
US T-Bill		91-Day Treasury Bill Index
US Treasuries 1-3 years		Barclays 1-3 Year Treasury Bond

Nigeria's infrastructure investment

Nigeria Infrastructure Fund



Ghana Stabilisation Fund and Heritage Fund

Ghana Petroleum Management Fund Audit Report 2022



REPUBLIC OF GHANA



OUR VISION

Our Vision is to become a world-class Supreme Audit Institution delivering professional, excellent and cost-effective auditing services.



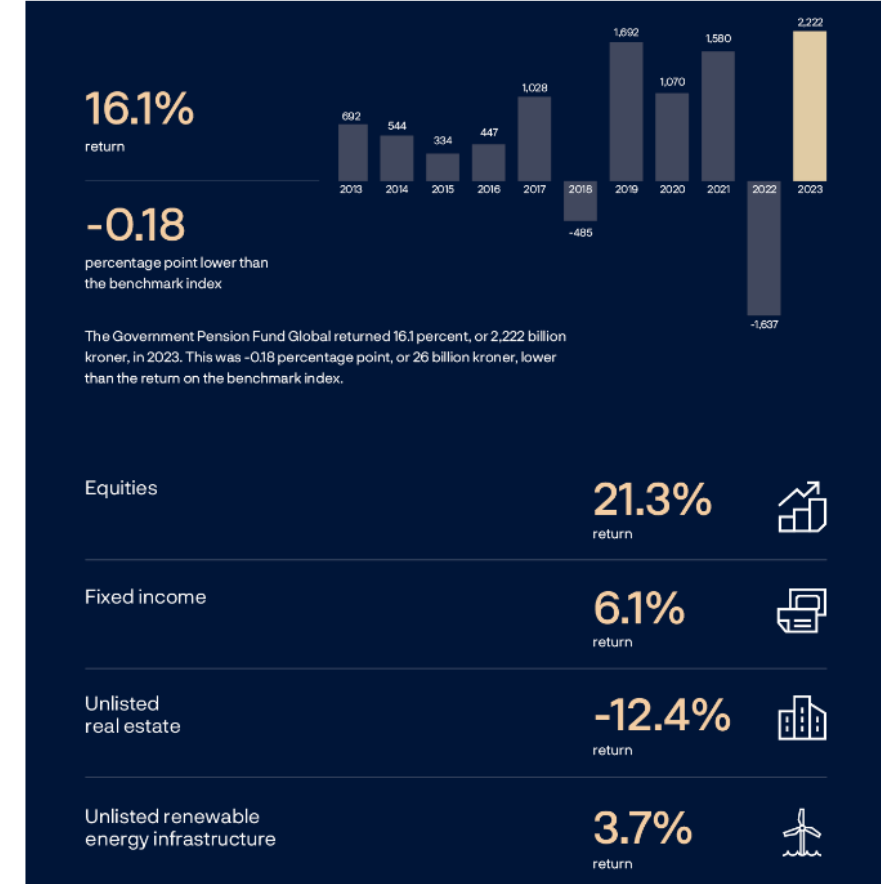
REPORT OF THE AUDITOR-GENERAL ON THE
MANAGEMENT OF PETROLEUM FUNDS FOR THE
PERIOD 1 JANUARY 2022 TO 31 DECEMBER 2022

Investment income received is classified in the following categories

	2022 US\$	2021 US\$	2020 US\$
<i>Ghana Stabilisation Fund</i>			
Bond	30,534	272,895	1,052,203
US treasury bill	(79,647)	366,799	516,195
Over-night income	425,441	6,828	751,428
	<u>376,328</u>	<u>646,522</u>	<u>2,319,826</u>
<i>Ghana Heritage Fund</i>			
Bond	5,649,224	13,006,049	14,577,617
US treasury bill	9,423,175	533,439	144,557
Over-night income	2,207,864	6,305	506,839
	<u>17,280,263</u>	<u>13,545,793</u>	<u>15,229,013</u>

GPFG of Norway's Asset mix and key figures 2023

Market value



The fund's investments in real estate returned -0.2 percent in 2023 and made up 3.9 percent of the fund at the end of the year. Unlisted real estate investments returned -12.4 percent, and listed real estate investments 16.6 percent.



The fund's real estate strategy covers both unlisted and listed real estate investments. Altogether, these investments amounted to 611 billion kroner at the end of the year.

Despite weaker valuations, GPFG's rental income was stable from 2022 to 2023 and contributed 3.4 percentage points to the return for the year.

TABLE 10 Value of real estate investments in millions of kroner as at 31 December 2023.

Risk management and volatility

The risk in the Norwegian fund is driven largely by the share invested in equities and how much equity prices fluctuate.

Movements in interest rates, credit risk premiums, and exchange rates will also affect risk, as will changes in the value of investments in unlisted real estate and renewable energy infrastructure.

As an investor, NBIM/the fund manager needs to have good systems for analysing and managing the risk in the fund. Measuring the risk to which the fund is exposed is a challenge. To obtain the broadest possible picture, NBIM uses a variety of analyses and calculations.

Risk management and volatility

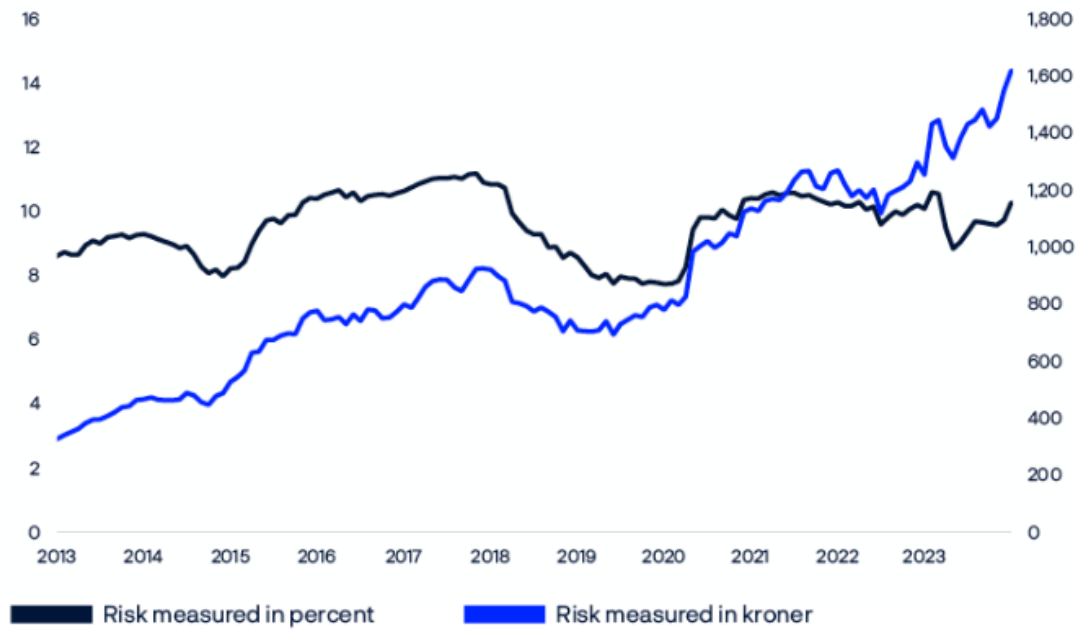
NBIM monitor the fund's concentration risk, expected fluctuations in markets and fund value, factor exposures and liquidity risk. They also perform stress tests and hypothetical scenario analyses on the portfolio. Some investment strategies expose the fund to an increased risk of rare but large and to some extent unpredictable losses. NBIM closely monitor exposure to strategies of this type.

Expected absolute volatility is a measure of how much the annual return on the fund's investments can normally be expected to fluctuate. This is calculated using standard deviation based on a three-year price history. The fund's expected absolute volatility was 10.3 percent at the end of 2023, or about 1,620 billion kroner. In other words, the value of the fund can be expected to fluctuate by more than 1,620 billion kroner in one out of three years.

EXPECTED ABSOLUTE VOLATILITY FOR GPFG

CHART 18

Expected absolute volatility for the fund. Percent (left-hand axis) and billions of kroner (right-hand axis).



GPFG's Benchmarks

Listed equity and bonds

Benchmark	Total listed	Invested by GPFG
FTSE Global All Cap	9,191 listed companies	8,859 listed companies
Bloomberg	17,565 bonds from 2 398 issuers	6378 bonds from 1,290 issuers

Limits and risk exposure

TABLE 22 Key figures for the fund's risk and exposure.

	Limits set by the Ministry of Finance	31.12.2023
Allocation	Equity portfolio 60–80 percent of fund's market value ¹	70.8
	Unlisted real estate no more than 7 percent of the fund's market value	1.9
	Fixed-income portfolio 20–40 percent of fund's market value ¹	28.6
	Unlisted renewable energy infrastructure no more than 2 percent of the fund's market value	0.1
Market risk	1.25 percentage points expected relative volatility for the fund's investments	0.3
Credit risk	Maximum 5 percent of fixed-income investments may be rated below BBB-	1.1
Emerging markets	Maximum 5 percent of fixed-income investments may be in emerging markets	2.7
Ownership	Maximum 10 percent of voting shares in a listed company in the equity portfolio ²	9.6

¹ Derivatives are represented with their underlying economic exposure.

² Investments in listed and unlisted real estate companies are exempt from this restriction.

Risk analyses

Sensitivity analyses

- Scenarios on hypothetical situations – GPFG's analyses below shows three scenarios that could have a significant adverse impact on the fund's value over time.

Debt crisis

High real interest rates and high public and private debt trigger a deep and long recession in both developed and emerging markets. This could hit the real estate sector particularly hard. High levels of debt limit governments' ability to combat the recession.

Divided world

Tensions between countries increase, resulting in a protracted geoeconomic conflict. A splintering into two economic blocs leads to a persistent decrease in growth and higher inflation. Trade and capital flows between the two blocs decline permanently. Competition between the blocs means that investment in strategic sectors grows.

Repricing of risk

Equity risk premiums – or the compensation that investors receive for taking risk in the stock market – appears to be at historically low levels. Inflation does not come down, and central banks have to manage a difficult trade-off between stimulating economic growth and fighting inflation.

Derivatives

Financial derivatives

Interest rate derivatives

This consists of agreements between two parties to exchange interest payment streams based on different interest rate calculation methods. Interest rate derivatives recognised in the balance sheet are mainly interest rate swaps, where one party pays a floating rate of interest and the other pays a fixed rate.

Credit derivatives

This comprises credit default swaps indices (CDS indices) for corporate bonds, where one party (the seller) assumes the credit risk and the other party (the buyer) reduces the credit risk on the underlying index of corporate bonds. Under a CDS index contract, the seller receives a periodic coupon from the buyer as compensation for assuming the credit risk. The buyer only receives payment if the credit protection is triggered by for instance default on the underlying credit in the index (credit event).

Equity derivatives

Equity derivatives are derivatives with exposure to an underlying equity. Equity derivatives recognised in the balance sheet include instruments with an option component, such as rights and warrants. These instruments grant the owner the right to purchase an equity at an agreed price within a certain time frame.

Futures contracts

Futures contracts are listed contracts to buy or sell a specified asset (security, index, interest rate, power or similar assets) at an agreed price at a future point in time.

Derivatives

Table 5.3 Financial derivatives

Amounts in NOK million	31.12.2023			31.12.2022		
	Notional amount	Fair value		Notional amount	Fair value	
		Asset	Liability		Asset	Liability
Foreign exchange derivatives	976 868	6 388	18 148	1 028 213	6 955	28 135
Interest rate derivatives	464 466	11 920	12 323	390 528	13 049	11 615
Credit derivatives	52 311	706	2 556	53 290	-	375
Equity derivatives ¹	-	69	-	-	274	-
Exchange-traded futures contracts ²	95 742	110	29	91 638	221	34
Total financial derivatives	1 589 387	19 192	33 055	1 563 669	20 498	40 159

¹ Notional amounts are not considered relevant for equity derivatives and are therefore not included in the table.

² Exchange-traded futures contracts have daily margin payments and the net amount recognised in the balance sheet is normally zero at the balance sheet date, with the exception of futures contracts in certain markets where there is different timing for setting the market value for recognition in the balance sheet and daily margining.

Return methodology

Time-weighted rate of return methodology is applied

Fair value of holdings is determined at the time of cash flows into and out of the asset classes and the fund as a whole.

Geometric linking of periodic returns is used for longer return periods. Returns are calculated net of transaction costs, non-reclaimable withholding taxes on dividends and interest, and taxes on realised capital gains.

Fair Value

Definition IFRS 13 Fair value measurement



Fair value, is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.



Fair value for majority of the assets and liabilities is based on quoted market prices or observable market inputs. If the market is not active, fair value is established using standard valuation techniques.



Estimating fair value can be complex and requires the use of judgement, particularly when observable inputs are not available.

Fair value hierarchy

Assets and liabilities in the investment portfolio are classified in the three categories in the fair value hierarchy.

Classification is determined by the observability of the market inputs used in the fair value measurement.

The fair value hierarchy

The three categories

Level 1 comprises assets that are valued based on unadjusted quoted prices in active markets. An active market is defined as a market in which transactions take place with sufficient frequency and volume to provide pricing information on an ongoing basis.

E.g. New York Stock Exchange (NYSE), Johannesburg Stock Exchange (JSE), BSE (Bombay Stock Exchange)

The fair value hierarchy

The three categories

Level 2 Assets and liabilities are valued using models with market inputs that are either directly or indirectly observable, Inputs are considered observable when they are developed based on market data reflecting actual events and transactions.

The fair value hierarchy

The three categories

Level 3 Assets classified as Level 3 are valued using models with significant use of unobservable inputs. Inputs are considered to be unobservable when market data is not available, and the input is developed using the best available information on the assumptions that market participants would use when pricing the asset.

Valuation Assessment (analyses)



DCF: Discounted Cash Flow (Net present value)



Price/Earnings ratio (P/E)



Price/Book ratio (P/B)



Modified Duration for bonds

Discounted Cash Flow

DCF Valuation Model



Time is money

Net present value

$$V_0 = \frac{\overline{CF_1}}{(1+r)^1} + \frac{\overline{CF_2}}{(1+r)^2} + \frac{\overline{CF_3}}{(1+r)^3} + \dots + \frac{\overline{CF_n}}{(1+r)^n}$$

Expected future cash flows

Cost of capital/
discount rate

In the context of evaluating corporate securities, the net present value calculation is often called discounted cash flow (DCF) analysis. It's the method used by investors to compare the NPV of a company's future DCFs with its current price.

This concept is the basis for the net present value rule, which says that only investments with a positive NPV should be considered (applies to the initial stage when investing).

DCF – NPV

A simple example in excel

	A	B	C	D
1				
2				
3		Discount Rate	5%	
4				
5		Initial Investment	\$ (500)	
6		Year 1	\$ 50	
7		Year 2	\$ 75	
8		Year 3	\$ 100	
9		Year 4	\$ 150	
10		Year 5	\$ 250	
11				
12		NPV	\$ 21.32	
13				

NPV Example, Excel.

DCF Model - Net Present Value

A negative NPV shows that the expected rate of return will fall short of it, meaning that the project will not create value.

The discount rate is central to the formula. It accounts for the fact that, as long as interest rates are positive, a dollar today is worth more than a dollar in the future. Inflation erodes the value of money over time.

Meanwhile, today's dollar can be invested in a safe asset like government bonds; investments riskier than Treasuries must offer a higher rate of return. However, it's determined, that the discount rate is simply the baseline rate of return that a project must exceed to be worthwhile.

For example, an investor could receive \$100 today or a year from now. Most investors would not be willing to postpone receiving \$100 today. However, what if an investor could choose to receive \$100 today or \$105 in one year? The 5% rate of return might be worthwhile if comparable investments of equal risk offered less over the same period.

If, on the other hand, an investor could earn 7% with no risk over the next year, then the offer of \$105 in a year would not suffice. In this case, 7% would be the discount rate.

Price Earnings Ratio

The P/E ratio is one of many fundamental financial metrics for evaluating a company

P/E Ratio Formula and Calculation

The formula and calculation are as follows:

$$\text{P/E Ratio} = \frac{\text{Market value per share}}{\text{Earnings per share}}$$

- ✓ It indicates investor expectations, helping to determine if a stock is overvalued or undervalued relative to its earnings. The P/E ratio helps compare companies within the same industry.
- ✓ To get a general idea of whether a particular P/E ratio is high or low, compare it to the average P/E of others in its sector, then other sectors and the market.

Price Book Ratio

- Many investors use the price-to-book ratio (P/B ratio) to compare a firm's market capitalization to its book value and locate undervalued companies. This ratio is calculated by dividing the company's current stock price per share by its book value per share (BVPS).
- The market value of equity is typically higher than the book value of a company's stock.
- The price-to-book ratio is used by value investors to identify potential investments.
- P/B ratios under 1.0 are typically considered solid investments by value investors.

A good P/B ratio is relative to a business and its industry.

Price Book ratio

Example of how to use P/B ratio

$$P/B \text{ Ratio} = \frac{\text{Market Price per Share}}{\text{Book Value per Share}}$$

Modified Duration

Fixed Income (bonds)

Modified duration is a formula that expresses the measurable change in the value of a security in response to a change in interest rates. Modified duration follows the concept that interest rates and bond prices move in opposite directions. This formula is used to determine the effect that a 100-basis-point (1%) change in interest rates will have on the price of a bond.

Duration measures a bond's or fixed-income portfolio's price sensitivity to interest rate changes.

- As a bond's maturity increases, duration increases, and as a bond's coupon and interest rate increases, its duration decreases.
- Most often, when interest rates rise, the higher a bond's duration, the more its price will fall.
- Time to maturity and a bond's coupon rate are two factors that can affect a bond's duration.
- Modified duration is an extension of the Macaulay duration, and in order to calculate modified duration, the Macaulay duration must first be calculated.
- Macaulay duration calculates the weighted average time before a bondholder receives the bond's cash flows.

Modified Duration

Time to Maturity and Coupon rate

Time to maturity: The longer the maturity, the higher the duration, and the greater the interest rate risk. Consider two bonds that each yield 5% and cost \$1,000 but have different maturities. A bond that matures faster—e.g., in one year—would repay its true cost faster than a bond that matures in 10 years. Consequently, the shorter-maturity bond would have a lower duration and less risk.

Coupon rate: A coupon rate is the nominal yield paid by a fixed-income security.

A bond's coupon rate is a key factor in calculation duration. If we have two bonds that are identical with the exception of their coupon rates, the bond with the higher coupon rate will pay back its original costs faster than the bond with a lower yield. The higher the coupon rate, the lower the duration, and the lower the interest rate risk.

INVESTMENT RISK

Type	Market risk	Credit risk	Counterparty risk
Definition	Risk of loss or a change in the market value of the portfolio, or parts of the portfolio, due to changes in financial market variables, real estate and infrastructure values	Risk of loss due to a bond issuer not meeting its payment obligations	Risk of loss due to counterparty bankruptcy or other events leading to counterparties defaulting
Main dimensions	<p>Measured both absolute and relative to the benchmark</p> <ul style="list-style-type: none"> - Concentration risk - Volatility and correlation risk - Systematic factor risk - Liquidity risk 	<p>Measured at single issuer and portfolio levels</p> <ul style="list-style-type: none"> - Probability of default - Loss given default - Correlation between instruments and issuers at portfolio level 	<p>Measured risk exposure by type of position</p> <ul style="list-style-type: none"> - Securities lending - Unsecured bank deposits and securities - Derivatives including FX contracts - Repurchase and reverse repurchase agreements - Settlement risk towards brokers and long settlement transactions

GPFG's credit risk

Credit risk

Credit risk is the risk of losses resulting from issuers of bonds defaulting on their payment obligations. Fixed-income instruments in the portfolio's benchmark index are all rated investment grade by one of the major credit rating agencies. Investments in bonds are made based on internal assessments with regards to expected return and risk profile.

Table 9.9 Bond portfolio specified by credit rating

Amounts in NOK million, 31.12.2023	AAA	AA	A	BBB	Lower rating	Total
Government bonds	612 472	1 456 325	406 747	80 433	36 233	2 592 210
Government-related bonds	198 601	149 019	34 615	22 373	2 369	406 977
Inflation-linked bonds	48 794	193 647	24 943	15 752	-	283 137
Corporate bonds	8 977	66 905	460 349	455 568	10 487	1 002 288
Securitised bonds	239 362	41 931	1 812	-	-	283 106
Total bonds¹	1 108 207	1 907 827	928 467	574 127	49 090	4 567 718

Counterparty risk

Counterparty risk

Counterparties are necessary to trade in the markets and to ensure effective management of liquidity, market and credit risk. Exposure to counterparty risk is related to trading in derivatives and foreign exchange contracts, securities lending, and repurchase and reverse repurchase agreements. Counterparty risk also arises from unsecured bank deposits and in connection with the daily liquidity management of the fund, as well as purchases and sales of unlisted real estate and unlisted infrastructure. Furthermore, there is exposure to counterparty risk related to counterparties in the international settlement and custody systems where transactions settle. This can occur both for currency trades and for the purchase and sale of securities. Settlement risk and exposure from trades with a long settlement period are also defined as counterparty risk.

Various counterparties are used to reduce concentration and there are strict requirements for counterparty credit rating. Credit rating requirements are generally higher for counterparties to unsecured deposits in banks than in cases where collateral is received. Changes in counterparty credit ratings are monitored continuously.

Pula Fund's credit risk

Credit Exposure on Bonds

Moody's/S&P Rating	Government (P'000)	Corporate (P'000)	2022 Total (P'000)	2021 Total (P'000)
AAA	7 544 643	384 048	7 928 691	8 795 957
AA+	696 557	59 024	755 581	912 523
AA	1 506 153	138 504	1 644 657	2 224 957
AA-	429 949	162 093	592 042	966 654
A+	2 074 508	636 999	2 711 507	2 397 119
A	244 378	542 735	787 113	1 448 215
Other ¹⁰	1 198 803	3 316 232	4 515 035	5 526 068
	<u>13 694 991</u>	<u>5 239 635</u>	<u>18 934 626</u>	<u>22 271 493</u>

Credit Exposure to Banks (Short-term deposits)

Pula Fund's credit risk criteria

Rating agencies

The Table below shows the Bank's risk criteria mapped to external ratings for short-term deposits.

Risk Criteria	Fitch	Moody's	S&P
Normal	AAA AA+ AA AA- A+ A A- BBB+ BBB	Aaa Aa1 Aa2 Aa3 A1 A2 A3 Baa1 Baa2	AAA AA+ AA AA- A+ A A- BBB+ BBB
Concerned	BBB-	Baa3	BBB-
Default		Bbb	BB

Risk and Return on investments

TABLE 18 Relative return in 2023.

	Percentage points
Fund	-0.18
Equity investments	0.50
Fixed-income investments	0.48

GPFG 2023 Total return 16 %



Key points 2023

Total return

16%

Relative return (basis points)

-18

Return in kroner

2,222 billion kroner

Market value

15,765 billion kroner

Performance measurement

Rate of return

Calculates rates of return based on investment-related changes in an account's value over a specified time period. In that situation, the account's rate of return during evaluation period t equals the market value at the end of the period (MV_1) less the market value at the beginning of the period (MV_0), divided by the beginning market value. That is,

$$r_t = \frac{MV_1 - MV_0}{MV_0}$$

$$r_t = \frac{\$1,080,000 - \$1,000,000}{\$1,000,000} = 8.0\%$$

Performance measurement

Total Rate of return

The total rate of return measures the increase in the investor's wealth due to both investment income (for example, dividends and interest) and capital gains (both realized and unrealized). The total rate of return implies that a dollar of wealth is equally meaningful to the investor whether that wealth is generated by the secure income from a 90-day Treasury bill or by the unrealized appreciation in the price of a share of common stock.

Performance measurement

Time-weighted rate of return (TWR)

A measure of return that reflects the compound rate of growth over a stated evaluation period of one unit of money initially invested in the account.

The formula for TWR is:

$$r_{TWR} = (1 + r_{t,1}) \times (1 + r_{t,2}) \times \dots \times (1 + r_{t,n}) - 1$$

Performance measurement

Money-weighted rate of return (MWR)

The money-weighted rate of return (MWR) measures the compound growth rate in the value of all funds invested in the account over the evaluation period. In the corporate finance literature, the MWR goes by the name internal rate of return, or IRR. Of importance for performance measurement, the MWR is the growth rate that will link the ending value of the account to its beginning value plus all intermediate cash flows. With MV_1 and MV_0 representing the values of the account at the end and beginning of the evaluation period, respectively, the MWR is the growth rate R that solves the equation

Where m is the number of time units in the evaluation period (for example, the number of days in the month) CF_i is the i th cash flow $L(i)$ is the number of time units by which the i th cash flow is separated from the beginning of the evaluation period

Note that R is expressed as the return per unit of time composing the measurement period.

$$MV_1 = MV_0(1 + R)^m + CF_1(1 + R)^{m-L(1)} + \dots + CF_n(1 + R)^{m-L(n)}$$

TWR vs MWR

comparison

The MWR represents the average growth rate of all money invested in an account, while the TWR represents the growth of a single unit of money invested in the account.

Consequently, the **MWR is sensitive to the size and timing of external cash flows to and from the account, while the TWR is unaffected by these flows.**

Under "normal" conditions, these two return measures will produce similar results. However, when external cash flows occur that are large relative to the account's value and the account's performance fluctuates significantly during the measurement period, then the MWR and the TWR can differ materially.

Annualised rate of return

Geometric mean return – chain-linking method

Rates of return are typically reported on an annualized basis, which allows for easy comparisons between different funds.

The annualized return represents the compound average annual return earned by the account over the evaluation period. The calculation is also known as the compound growth rate or **geometric mean return**. An annualized return is computed by employing the chain-linking method and raising the product of the linking to the reciprocal of the number of years covering the evaluation period (or equivalently, taking the appropriate root of the linked product, where the root is the number of years in the measurement period).

If in years 1, 2, and 3 of a three-year measurement period, an account earned –4.7%, 9.5%, and –2.0%, respectively, then the annualized return for the evaluation period would be

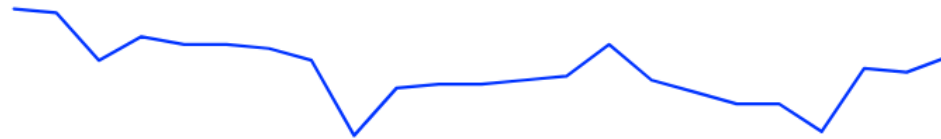
$$\begin{aligned}
 ra &= [(1 - 0.047) \times (1 + 0.095) \times (1 - 0.02)]^{1/3} - 1 \\
 &= 0.0075 \text{ or } 0.75\%
 \end{aligned}$$

If twelve quarterly returns had been available for the account instead of three yearly returns, then those quarterly returns would have been similarly linked and the cube root of the product would have been calculated to produce the account's annualized return over the three-year period.

GIC'S ANNUALISED REAL RATE OF RETURN

Investment Report

Annualised rolling 20-year real rate of return of the GIC Portfolio since 2001



4.6%

Over 20 years up to 31 March 2023, the GIC Portfolio's annualised US\$ nominal and real (above global inflation) returns were 6.9% and 4.6% respectively per year.

GIC's Comparison on real rate of return

2.2 Investment Backdrop

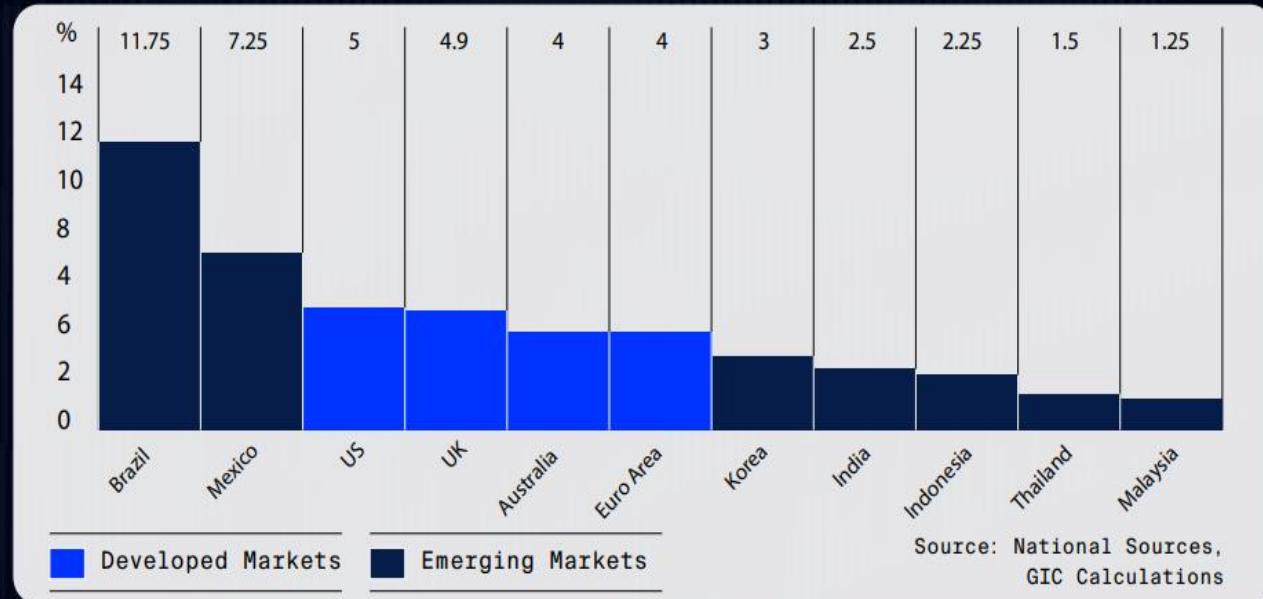
GIC's diversified portfolio and cautious investment stance have helped to cushion the GIC Portfolio's performance from the market correction over 2022.

2.0 Investment Report

2.5 Investment Outlook

Hike in Policy Rates

While real yields have backed up and look more attractive, the likely ensuing impact of policy tightening has yet to fully play out.



Audit considerations

- ❖ Understand the mandate and asset mix (stated in the law, regulation, policies, and instructions).
- ❖ Is the fund manager investing within the risk and other limits set by the investor? (Should not invest beyond the mandate).
- ❖ Are there many derivatives in the portfolio that rather increase the risk than hedge the risk?
- ❖ Is there any benchmark in the mandate to measure against the portfolio's performance (risk and return)?
- ❖ Understand the governance structure. Are there any related party issues?
- ❖ Is the selection of the (external) fund manager (s) well documented and without any conflict of interest?
- ❖ Is the management fee acceptable compared to the size of the fund? Understand the valuation of the fund as it determines how capital gain/loss will be reflected in the financial statements. E.g. are the financial instruments recognized at market value or historical cost. (Understand the valuation policy)
- ❖ How is the value of real estate calculated? At cost or used specialist to evaluate?

Audit considerations

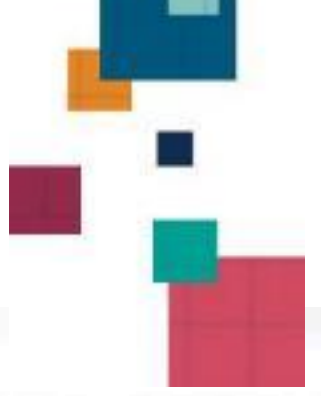
- ❖ Does the fund manager produce financial statements with disclosures and provide analyses with key figures?
- ❖ What kind of reporting framework is the fund manager applying in preparing the financial statements? (IFRS, National General Accounting Principles, IPSAS or **Cash**)
- ❖ Who is auditing the fund or the investments? If private audit firm is auditing, study the audit opinion and identify if there are any “key audit matters”.
- ❖ Does the SAI has mandate to audit the fund/investment portfolio’s all audit types?
- ❖ Identify the IT systems that the fund manager is using, e.g. the portfolio system and IFMIS (If the SAI is the external auditor). Assess that general IT controls are effective and then consider application controls, ref. ISSAI 2315.
- ❖ Does the fund manager have appropriate risk management IT systems?
- ❖ How are the transactions captured in the IT systems? Should be as much automated as possible.
- ❖ Understand the extent of manual transactions and assess whether there is a risk of overriding the controls, e.g. for payments and market values.

Thank You



African Organisation of English-speaking Supreme Audit Institutions

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