საქართველოს ეროვნული ბანკი
National Bank of Georgia

Bond Indices as Strategic Asset Allocation Benchmarks

From Strategic Asset Allocation to Active Reserve Management

Risk Management and Control Division

THE PROCESS

Strategic Asset Allocation

SAA translates high-level objectives into a long-term, policy-neutral benchmark allocation - the anchor for everything that follows.

01
Reserve Objectives
Liquidity · safety · return

02
Risk Appetite
Tolerance for loss & volatility

03
Investment Horizon
Holding period of the reserves

04
Investment Universe
Permissible markets & currencies

05
Eligible Assets
Sectors, ratings, instruments

06
Benchmark Selection
Policy-neutral reference portfolio

07
Portfolio Construction
Implement the benchmark

08
Active Management
Controlled deviations for alpha

Reserve Structure & Benchmark Framework

TOTAL FX RESERVES

IMF / SDR | **Managed Reserves** | Gold

	Operational Tranche (NO BENCHMARK)	Liquidity Tranche (BENCHMARKED)	Investment Tranche (BENCHMARKED)	Investment Tranche – External
In USD	Working Capital USD No Benchmark	LIQ USD US Gov 0 - 3 Y	INV USD GOVT 0 - 3 Y INV USD SUPRA 1 - 3 Y	WB USD GOVT (WB) US Gov 1 - 3 Y
In EUR	Working Capital EUR No Benchmark	—	INV EUR GOVT 0 - 3 Y	—
In GBP	—	—	INV GBP GOVT 0 - 3 Y	—
In CNY	—	—	INV CNY GOVT 0 - 3 Y	BIS CNY (BIS) CNY Gov 0 - 5 Y

SAA Principles & Benchmark Universe

PRIORITY →

Liquidity
Reserves must be deployable at short notice to intervene in FX markets and meet external obligations - no exception.

Safety
Capital preservation constrains credit and market risk; instruments must be high-quality and resilient under stress.

Return
Yield is optimized only within the space that remains once liquidity and safety are fully satisfied.

1-3Y	3-5Y	5-7Y	7-10Y	10Y+
Maturity Index	Maturity Index	Maturity Index	Maturity Index	Maturity Index

Increasing maturity →

Portfolio Decisions
The neutral position all active bets start from

Duration, tracking error & VaR set relative to it

Performance Measurement
Returns judged as excess over the benchmark

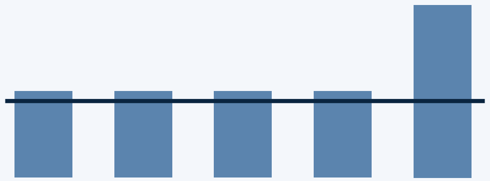
Over/underweights defined against benchmark weights

IMPLEMENTATION

Single Bond - Bond Index - ETF

SINGLE BOND
Single cash-flow stream

One issuer · one maturity



Coupons → principal at maturity

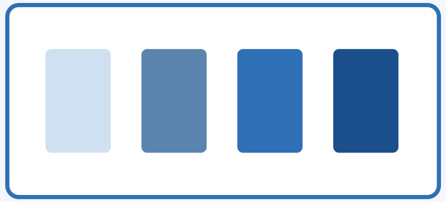
BOND INDEX
Diversified exposure

A basket of many bonds

Weighted, self-rebalancing

ETF
Tradable wrapper tracking the index

Index inside one wrapper



Trades intraday like a share

Market-value weighting
Larger issues carry proportionally larger weight

Diversification
Idiosyncratic single-issuer risk is diluted away

Automatic rebalancing
Bonds enter and leave by maturity & eligibility rules

Representative exposure
Tracks the broad market segment, not one name

THE KEY INSIGHT

How Return Distributions Evolve With Horizon

HOLDING PERIOD →

INDEX MATURITY

USD Treasury	1 mo	6 mo	1 yr	3 yr	5 yr	10 yr
1-3Y	High	Moderate	Low	Low	Low	Low
3-5Y	High	Moderate	Moderate	Low	Low	Low
5-7Y	High	High	Moderate	Low	Low	Low
7-10Y	High	High	High	Moderate	Low	Low
10Y+	High	High	High	Moderate	Moderate	Low

Risk of loss over the holding period: Low Moderate High

Historical Market Data 1
Yields, prices, curve history

▼

Return Forecasting 2
Expected paths & scenarios

Simulation / Historical Distribution 3
Monte-Carlo or bootstrap

▼

Investment-Horizon Adjustment 4
Scale to the holding period

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How Return Distributions Evolve With Horizon

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Risk / Return Profile of Benchmarks

Scenario: Forward Looking

USD	USD GOV 0.25Y	USD GOV 0.5Y	USD GOV 1Y	USD GOV 1.5Y	USD GOV 2Y	USD GOV 2.5Y	USD GOV 3Y	USD GOV 3.5Y	USD GOV 4Y	USD GOV 4.5y	USD GOV 5Y
Expected Return	**3.53%**	**3.54%**	**3.54%**	**3.54%**	**3.55%**	**3.55%**	**3.56%**	**3.57%**	**3.59%**	**3.60%**	**3.61%**
Volatility	0.29%	0.19%	0.42%	0.83%	1.29%	1.67%	2.08%	2.39%	2.75%	2.99%	3.33%
CVaR Return (95%)	**2.97%**	**3.16%**	**2.67%**	**1.85%**	**0.95%**	**0.20%**	**-0.62%**	**-1.18%**	**-1.90%**	**-2.33%**	**-2.98%**
CVaR Return (99%)	**2.82%**	**3.08%**	**2.46%**	**1.46%**	**0.29%**	**-0.66%**	**-1.73%**	**-2.47%**	**-3.42%**	**-3.97%**	**-4.82%**

USD SUPRA	USD SUPR 0.25Y	USD SUPR 0.5Y	USD SUPR 1Y	USD SUPR 1.5Y	USD SUPR 2Y	USD SUPR 2.5Y	USD SUPR 3Y	USD SUPR 3.5Y	USD SUPR 4Y	USD SUPR 4.5Y	USD SUPR 5Y
Expected Return	**3.56%**	**3.57%**	**3.57%**	**3.57%**	**3.58%**	**3.58%**	**3.59%**	**3.60%**	**3.62%**	**3.63%**	**3.64%**
Volatility	0.28%	0.18%	0.42%	0.84%	1.30%	1.69%	2.11%	2.42%	2.79%	3.03%	3.37%
CVaR Return (95%)	**3.00%**	**3.20%**	**2.70%**	**1.87%**	**0.95%**	**0.20%**	**-0.63%**	**-1.21%**	**-1.93%**	**-2.36%**	**-3.02%**

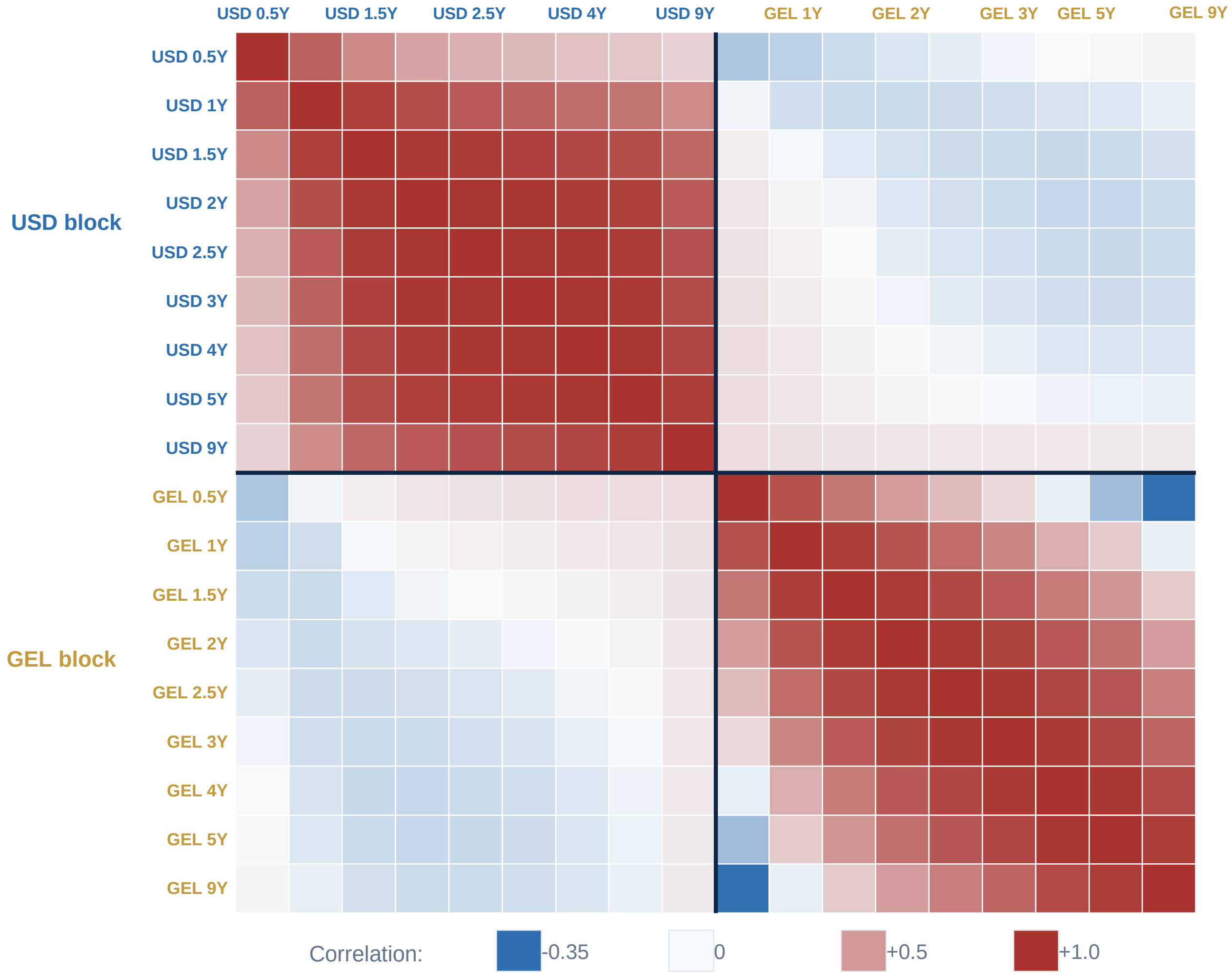
EUR GE	EUR GE GOV 0.25Y	EUR GE GOV 0.5Y	EUR GE GOV 1Y	EUR GE GOV 1.5Y	EUR GE GOV 2Y	EUR GE GOV 2.5Y	EUR GE GOV 3Y	EUR GE GOV 3.5Y	EUR GE GOV 4Y	EUR GE GOV 4.5Y	EUR GE GOV 5Y
Expected Return	**1.92%**	**1.92%**	**1.93%**	**1.93%**	**1.94%**	**1.95%**	**1.96%**	**1.97%**	**1.99%**	**2.01%**	**2.02%**
Volatility	0.23%	0.15%	0.37%	0.74%	1.15%	1.53%	1.92%	2.25%	2.62%	2.91%	3.26%
CVaR Return (95%)	**1.46%**	**1.62%**	**1.17%**	**0.42%**	**-0.40%**	**-1.13%**	**-1.91%**	**-2.52%**	**-3.23%**	**-3.73%**	**-4.41%**

CNY	CNY GOV 0.25Y	CNY GOV 0.5Y	CNY GOV 1Y	CNY GOV 1.5Y	CNY GOV 2Y	CNY GOV 2.5Y	CNY GOV 3Y	CNY GOV 3.5Y	CNY GOV 4Y	CNY GOV 4.5Y	CNY GOV 5Y
Expected Return	**1.38%**	**1.38%**	**1.38%**	**1.38%**	**1.38%**	**1.38%**	**1.39%**	**1.39%**	**1.39%**	**1.40%**	**1.40%**
Volatility	0.22%	0.18%	0.29%	0.48%	0.68%	0.87%	1.06%	1.24%	1.43%	1.59%	1.78%
CVaR Return (95%)	**0.92%**	**1.00%**	**0.79%**	**0.42%**	**0.01%**	**-0.36%**	**-0.76%**	**-1.10%**	**-1.48%**	**-1.80%**	**-2.18%**

GBP	GBP GOV 0.25Y	GBP GOV 0.5Y	GBP GOV 1Y	GBP GOV 1.5Y	GBP GOV 2Y	GBP GOV 2.5Y	GBP GOV 3Y	GBP GOV 3.5Y	GBP GOV 4Y	GBP GOV 4.5Y	GBP GOV 5Y
Expected Return	**3.68%**	**3.68%**	**3.68%**	**3.68%**	**3.69%**	**3.69%**	**3.70%**	**3.71%**	**3.72%**	**3.74%**	**3.75%**
Volatility	0.29%	0.20%	0.37%	0.71%	1.10%	1.43%	1.80%	2.08%	2.42%	2.65%	2.98%
CVaR Return (95%)	**3.10%**	**3.27%**	**2.93%**	**2.26%**	**1.49%**	**0.86%**	**0.15%**	**-0.36%**	**-1.00%**	**-1.41%**	**-2.04%**

Diversification Runs Across Currencies, Not Maturities

Correlation matrix - Forward scenario – No FX factor applied on yields



STRONGEST +
+0.9
USD 2.5Y ↔ 3Y

NEAR ZERO
≈ 0.00
cross-currency avg

MOST NEGATIVE
−0.35
GEL 0.5Y ↔ 9Y

Two currencies, two blocks

Within each currency, bonds move almost as one - adjacent USD maturities correlate 0.94-0.99; the long USD block (3-9Y) averages 0.95. Stacking same-currency maturities adds little diversification.

Duration concentrates risk

Extending maturity multiplies volatility ~3× per currency and tightens intra-block correlation. Long-duration bonds carry more risk without diversifying it away.

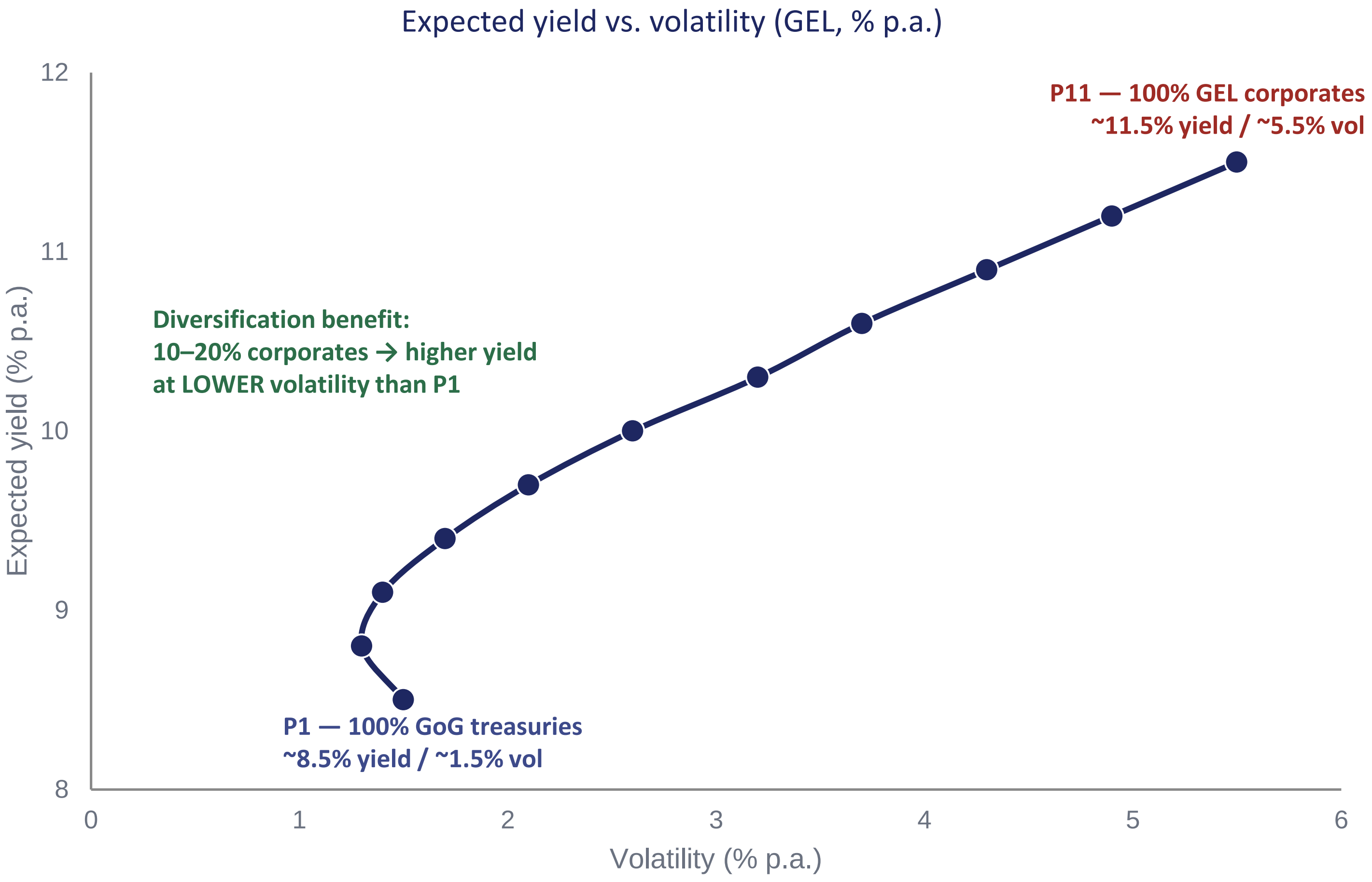
Currency is the real diversifier

USD-GEL correlations cluster around zero (−0.13 to +0.15, avg ≈ 0). Pairing the two markets - not lengthening duration - is what lowers portfolio risk.

Risk-Return Enhancement

ILLUSTRATIVE

Blending GEL government treasuries with GEL corporate bonds - negative rate/spread correlation creates a diversification benefit



Mix (Gov / Corp)	Yield	Vol
P1 100% / 0%	8.5%	1.5%
P2 90% / 10%	**8.8%**	**1.3%**
P3 80% / 20%	**9.1%**	**1.4%**
P4 70% / 30%	9.4%	1.7%
P5 60% / 40%	9.7%	2.1%
P6 50% / 50%	10.0%	2.6%
P7 40% / 60%	10.3%	3.2%
P8 30% / 70%	10.6%	3.7%
P9 20% / 80%	10.9%	4.3%
P10 10% / 90%	11.2%	4.9%
P11 0% / 100%	11.5%	5.5%

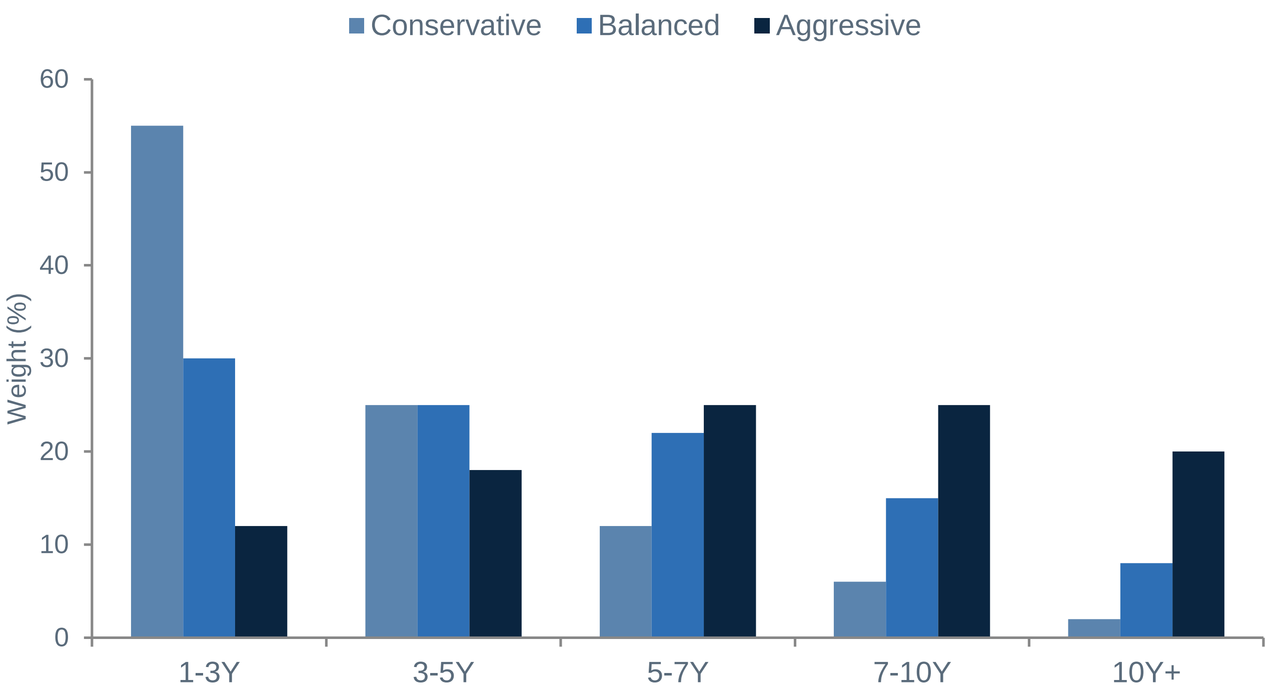
Green rows: higher yield AND lower volatility vs. 100% treasuries

For illustration only. Indicative levels: GoG GEL treasuries ~8.5% yield / ~1.5% vol; GEL corporates ~11.5% yield (~300 bps spread), total vol ~5.5% decomposed into rate risk (1.5%) + spread risk (~6.1%) with rate/spread correlation of −0.5 (US high-yield experience as proxy) → implied treasury/corporate return correlation ≈ −0.3; minimum-volatility mix ≈ 12% corporates. Not investment advice.

CONSTRUCTION

Portfolio Optimization & Allocation

Optimized weights across maturity indices deliver target return at minimum risk - and shifting weights traces the whole risk-return trade-off.



Conservative

E[R] 3.8% · Vol 1.9%

Short-end tilt for Liquidity & Stability

Balanced

E[R] 4.6% · Vol 3.4%

Diversified across the curve

Aggressive

E[R] 5.3% · Vol 6.2%

Long-end tilt to harvest term premium

Sources of Active Return

Alpha in fixed income comes from several distinct, repeatable levers - each a controlled deviation from the benchmark.

Duration Positioning

Over/under the benchmark's rate sensitivity

Yield-curve positioning

Steepeners, flatteners & butterfly trades

Security Selection

Choosing cheap issues within a segment

Carry

Earning yield differentials over time

Roll-down

Capturing price gains as bonds age down the curve

Relative Value

Exploiting mispricing between comparable bonds

Sector Allocation

Tilting across issuer or instrument sectors

Currency Positioning

Where the mandate permits FX active risk

RISK CONTROL

Active Risk Management Dashboard

Every active position is bounded by explicit limits - the guardrails that keep the portfolio consistent with the investment policy.

Tracking Error
68 bps
Limit 100 bps

Relative Duration
+0.4 yrs
Band ±0.75

DV01 (rel.)
+2.1k
Limit ±4k

aR (95%)
1.9%
Limit 3.0%

- **Issuer limits**
- **Country limits**
- **Sector limits**
- **Liquidity limits**
- **Rating limits**
- **Concentration caps**

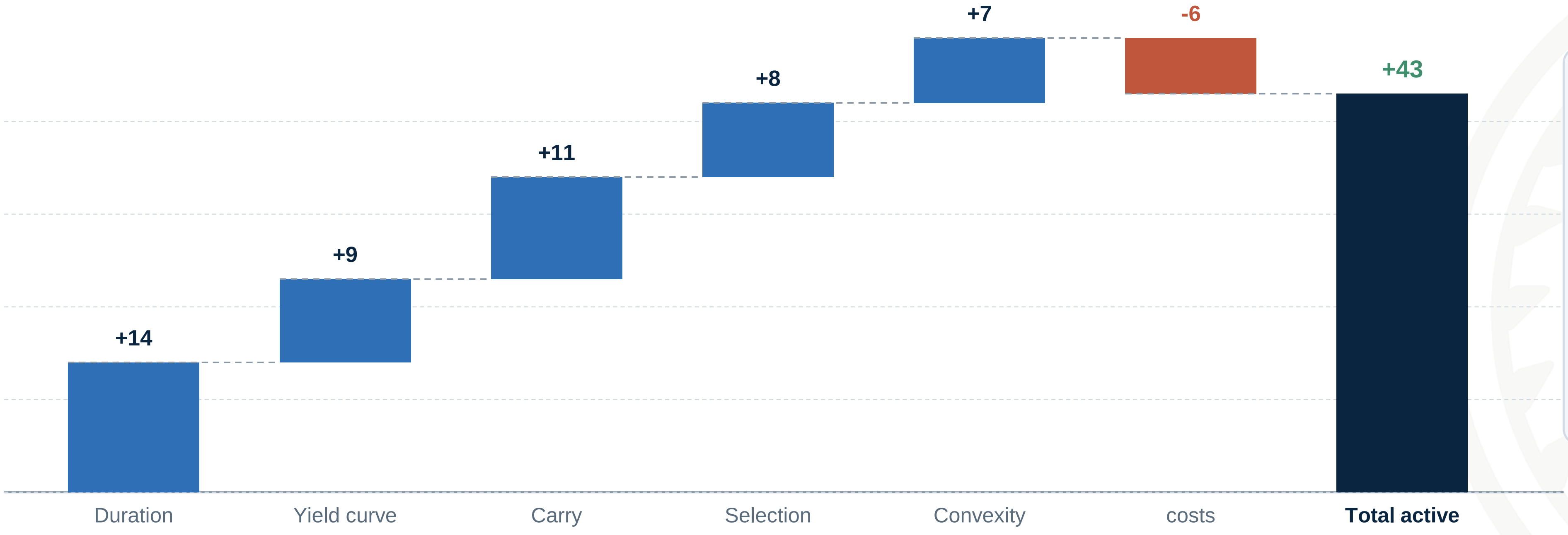
Stress testing

+ 200 bps parallel shift
Curve twist & flattening
Liquidity-stress scenario

Performance Attribution

Portfolio return = benchmark return + active return - and active return decomposes cleanly into its sources.

Portfolio return = Benchmark return (4.60%) + Active return (+0.48%)



Active return

+48

basis points

HANDS-ON EXERCISE

Comparing Bond Returns in a Common Currency

A GEL-based reserve manager holds a 1-3 year US Treasury Index. Rebuild each index from weekly returns and translate the dollar return into GEL – to reveal what currency really did to performance.

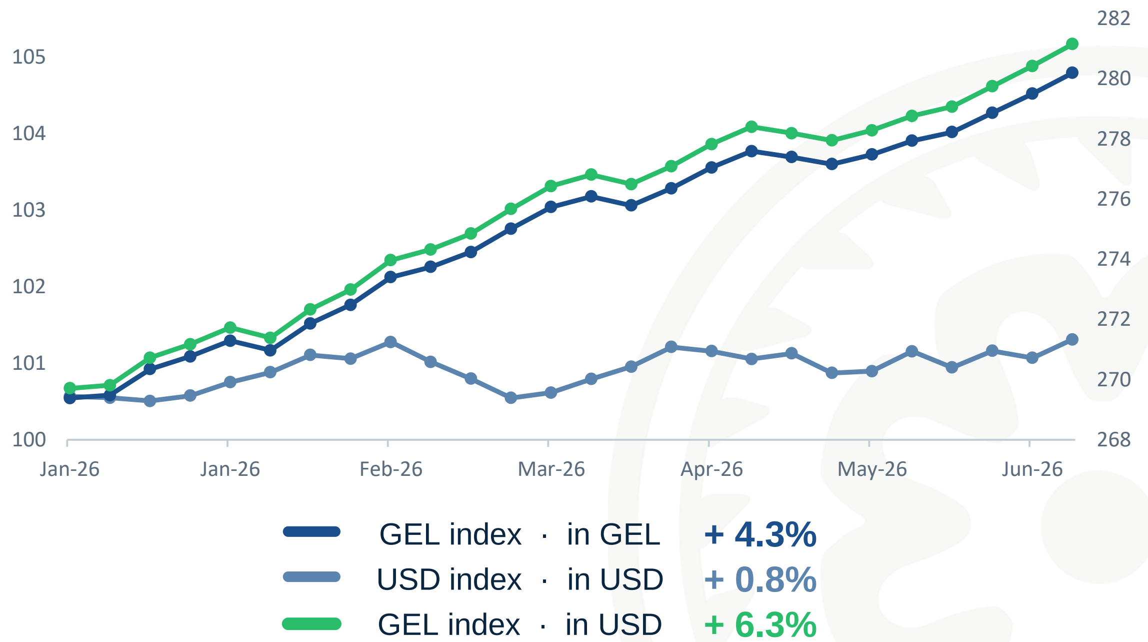
1. **Rebuild each index to 100**
   Chain the weekly returns from a base of 100.

2. **Track the exchange rate**
   Log the weekly USD / GEL rate beside the rebuilt USD index.

3. **Convert USD into GEL**
   Multiply the USD index by the FX rate to state it in local currency.

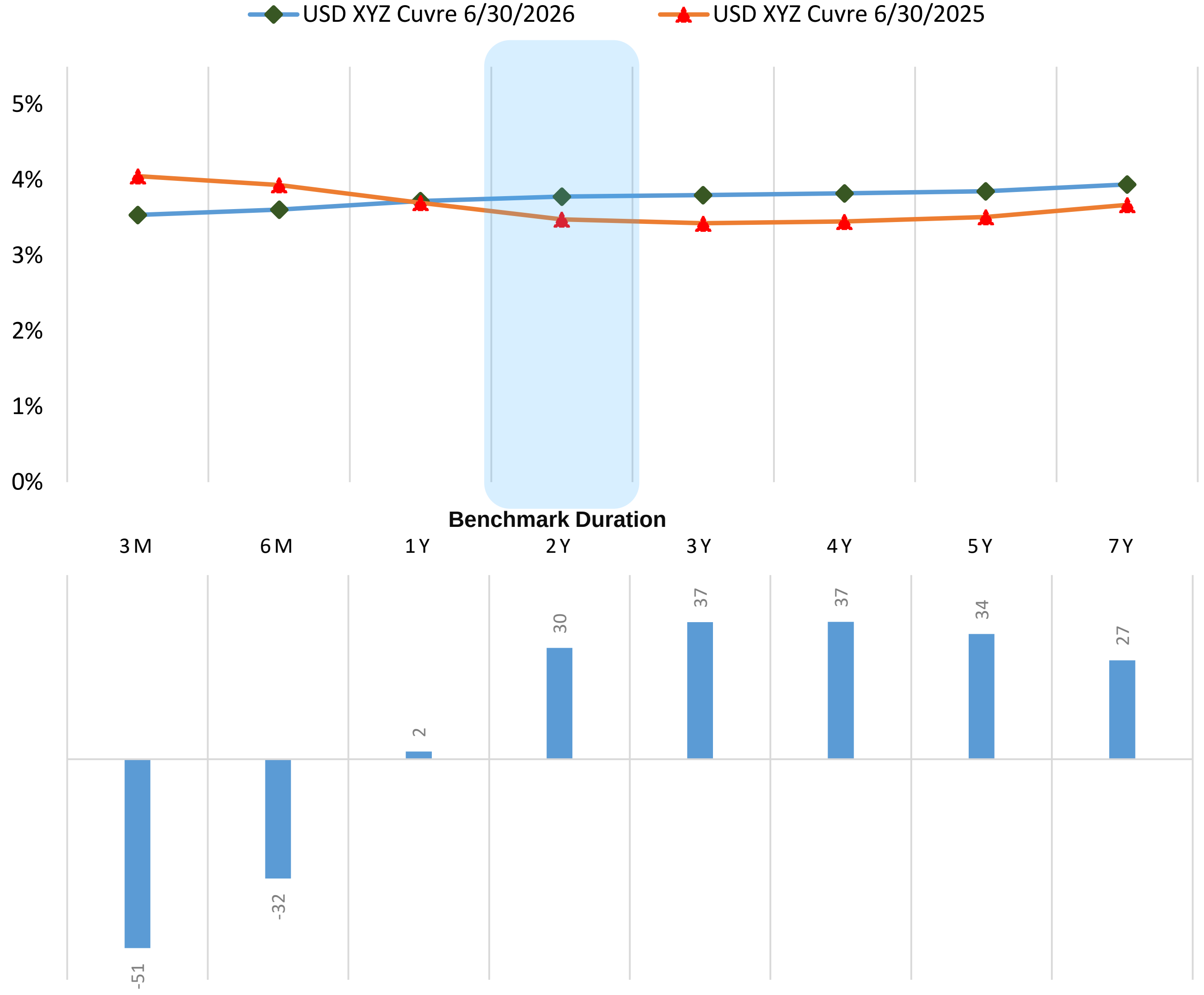
4. **Compare & Attribute**
   Split the GEL-vs-USD gap into bond return and currency effect.

GROWTH OF 100 · USD vs GEL



The GEL Index earned +4.3% locally, a 2% stronger GEL lifted it to +6.3% in USD. Currency added 2 pp - for a dollar investor, unhedged FX worked in their favor.

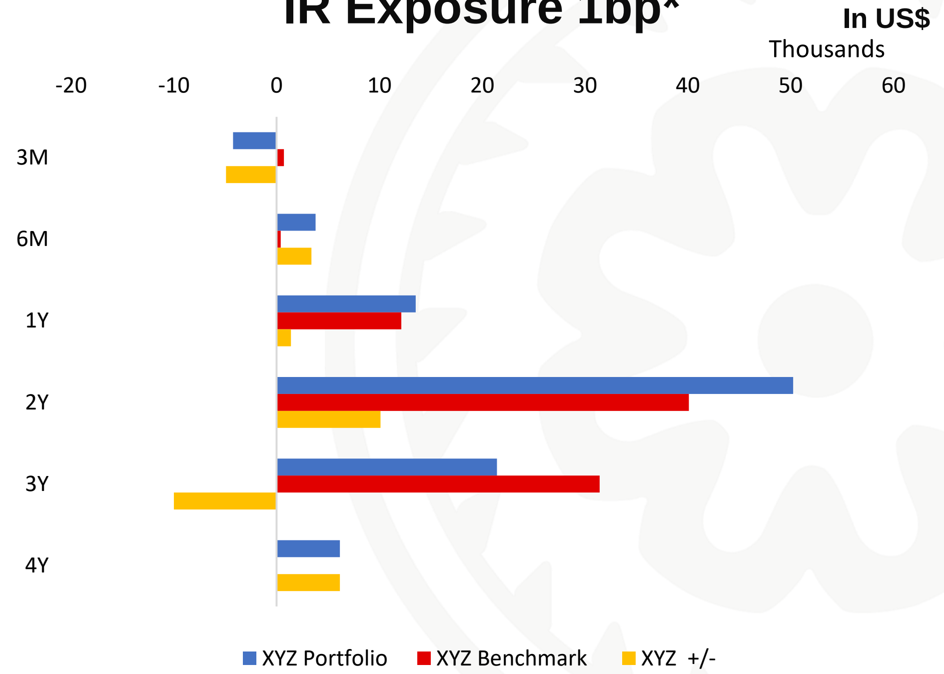
XYZ Investment Portfolio



Expected Benchmark Return/CVaR

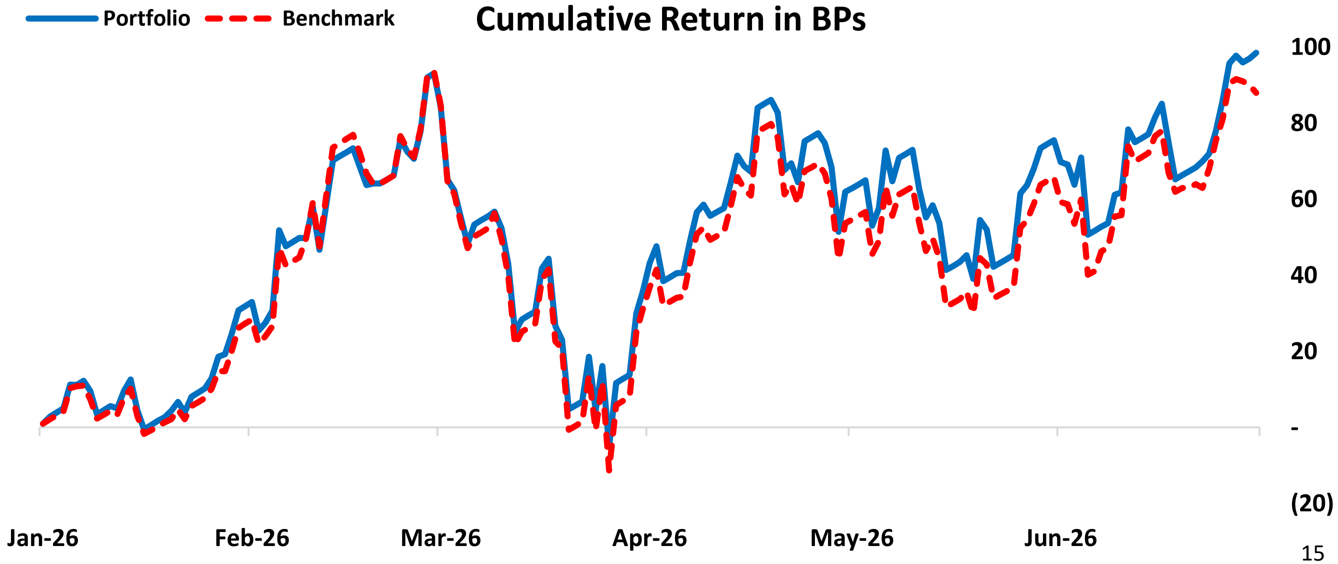
	INVESTMENT USD XYZ		
	6/30/2026	MtM Change	YTD Change
1Yr Exptected Return	4.4%	0.2%	0.6%
CVaR Return (95%)	1.5%	-0.1%	0.64%

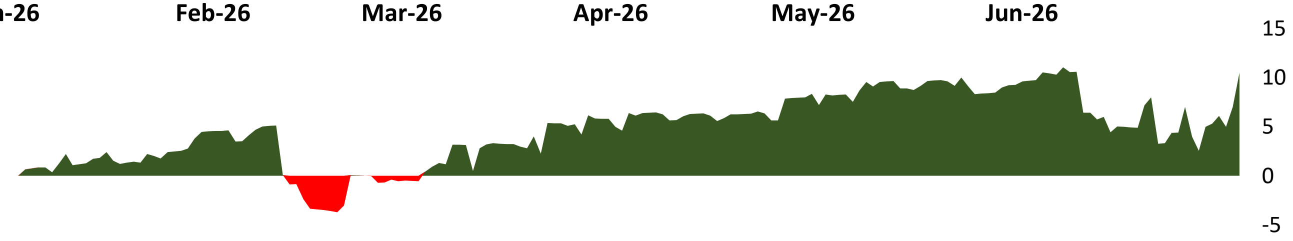
IR Exposure 1bp*



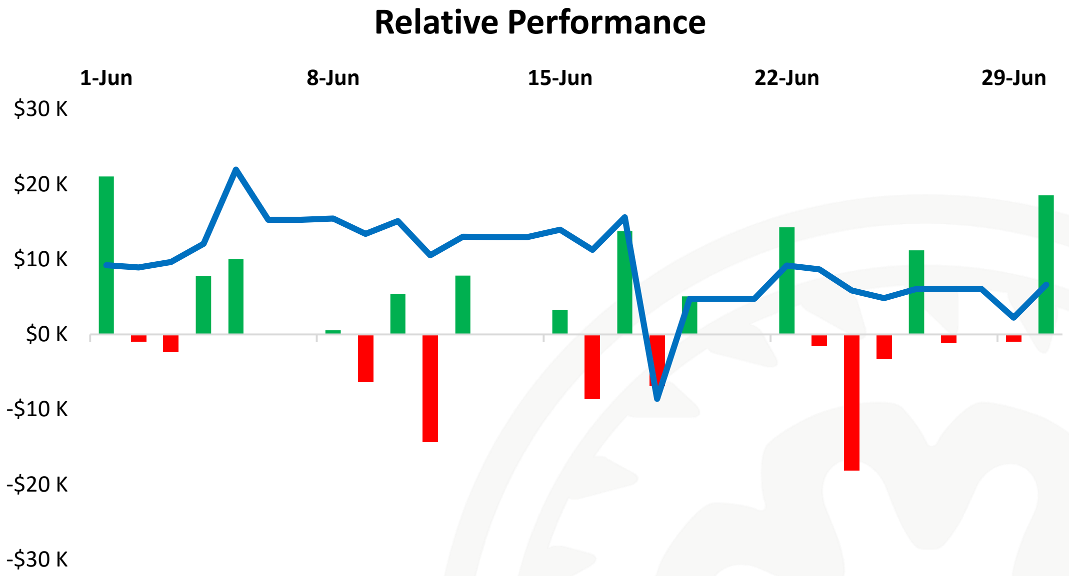
*dollar value sensitivity to a 1 basis point (0.01%) change in interest rates

USD XYZ Investment Portfolio Performance





In US$



Performance						
	2026			June		
	Portfolio	Benchmark	Excess	Portfolio	Benchmark	Excess
US$	4,322,334	3,906,145	416,189	436,908	430,765	6,143
BPs	124	113	11	13	12	1

Portfolio Brief Description

At the end of June 2026, XYZ spreads remained stable as markets focused on the monetary policy outlook. During the rebalancing, the portfolio manager closed the September 2026 SOFR futures position, reduced short-dated out-of-benchmark holdings, and increased exposure to securities with maturities above 2.5 years. As a result, the portfolio remained slightly short in duration relative to the benchmark while maintaining benchmark-aligned positioning.

Thank you !