

CoinShares Gold and Cryptoassets Index Lite (CGI)
Methodology

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Version History

Readers can access other versions of the methodology for the CoinShares Gold and Cryptoassets Index Lite online when they become available.

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1 Introduction

1.1 Overview

The CoinShares Gold and Cryptoassets Index Lite (CGI) is an adaptation of the CoinShares Gold and Cryptoassets Index (CGCI) that was launched by the Group in 2020. The CGI is designed to be launched on-chain, on the Ethereum network. The CGI only tracks ERC-20 tokens.

1.2 Motivation

The CoinShares Group has been a pioneer in the industry by launching first-of-its-kind products since 2014. In 2020, the CoinShares Group launched the CGCI, one of the first EU Benchmark Regulated indices in the cryptoasset industry. The CGCI is designed to provide risk managed exposure to cryptoassets by pairing them with gold, in a way that yields a superior risk-return profile when compared to holding such assets in isolation while being independent to traditional financial markets. Continuing its pioneering mission, CoinShares has now developed the CGI as an index that can be launched on-chain, on the Ethereum network.

Two noteworthy characteristics of the returns of non-stablecoin cryptoassets are their high volatility, which brings with it a high level of risk, and their high intraclass correlation, which limits the benefits that can be had by diversifying across multiple cryptoassets. Yet cryptoassets exhibit no correlation with gold, a highly-liquid yet scarce asset which has proved to function as a safe haven during crises affecting traditional financial systems.

Although volatility poses challenges in terms of increased uncertainty, there are also benefits to be had from its proper management through diversification and regular rebalancing (Bouchey et al., 2012, *The Journal of Wealth Management*. Volatility harvesting: Why does diversifying and rebalancing create portfolio growth?). This is exemplified by the so-called Shannon's Demon approach in which two, ideally uncorrelated, assets – at least one of which is highly volatile – are periodically rebalanced to maintain an ideal target allocation. The resulting expected growth rate is greater than the arithmetic mean of the individual expected growth rates, while the variance of the returns is less than the mean of the individual variances (Poundstone, 2005. *Fortune's Formula*).

The CGI is a low-volatility index that utilises the concept of volatility harvesting through (a) forming a basket of cryptoassets and (b) combining it with gold using weighted-risk contribution as a rebalancing mechanism. By decreasing volatility levels, it seeks to yield superior risk-adjusted returns when compared to a number of alternative strategies, including holding cryptoassets or gold alone. Further, it presents a moderate turnover, which should translate into moderate operating costs.

1.3 Primary Objective and Constraints

The CGI is designed with the aim of providing diversified exposure to the alternative asset space in a way that yields a superior risk-return profile when compared to holding such assets in isolation while being orthogonal to traditional financial markets. Accordingly, the index must:

1. Be comprised of wrapped-DGLD (wDGLD), wrapped bitcoin (wBTC), and wrapped Ether (wETH)
2. Utilise some means of principled risk control leading to lower volatility
3. Be specified in a clear and unambiguous manner to facilitate validation and reproducibility
4. Hold constituent assets on a long basis only
5. Not make use of leverage

2 Index Design

2.1 Constituent Weighting

Given weighting $x = (x_1, x_2)$ in a case of two assets with standard deviation of returns σ_1 and σ_2 respectively, and correlation ρ , the vector of risk contributions is:

$$\frac{1}{\sigma(x)} \begin{pmatrix} x_1^2 \sigma_1^2 + x_1 x_2 \rho \sigma_1 \sigma_2 \\ x_2^2 \sigma_2^2 + x_1 x_2 \rho \sigma_1 \sigma_2 \end{pmatrix}$$

Considering the case of uncorrelated assets ($\rho = 0$), and supposing that we desire the risk contribution of asset 1 to be α times the risk contribution of asset 2, we need to solve for x_1 in:

$$x_1^2 \sigma_1^2 = \alpha (x_2^2 \sigma_2^2)$$

Given $x_i \in [0, 1]$ and $\sum_{i=1}^2 x_i = 1$ this yields:

$$x_1 = \frac{\sqrt{\alpha} \sigma_1^{-1}}{\sqrt{\alpha} \sigma_1^{-1} + \sigma_2^{-1}} \quad (1)$$

For the CGI constituent weighting, we examine each constituent's native asset (i.e. for wrapped bitcoin we investigate bitcoin, for wrapped-DGLD we investigate DGLD). We follow a bi-level approach that involves studying the historical volatilities of a crypto-basket (containing BTC and ETH) and gold (DGLD), separately in order to inform the crypto-gold asset allocation decision.

The Index is calculated following a two-stage allocation scheme that involves:

1. Computation of the historical volatility of (a) the Equally weighted crypto-basket, and (b) DGLD;
2. Asset allocation among the crypto-basket and DGLD expressed as the bivariate weighted risk contribution problem presented in Equation 1. The risk contribution ratio is set as $\alpha = 9$, indicating that 90% of the total risk emanates from the crypto-basket.

2.2 Rebalancing Schedule

In order to fully capture the diversification benefits of the time varying correlations between DGLD and the cryptobasket, a monthly rebalancing frequency is employed. Constituent weights are announced on the last business day of the running month. The rebalancing is employed on the first business day of the following month.

2.3 Index Calculation

In the CGI, the crypto-basket is formulated as an Equally Weighted basket of 2 defined cryptoassets, each with a weight of 0.5. The crypto-basket price base level is set on 100 on July 1st, 2015.

The crypto-basket price level on day t from January 2nd, 2016 onwards is calculated as:

$$EW_t = \left(1 + \sum_{i=1}^2 x_{i,R(t)} \times \left(\frac{P_{i,t}}{P_{i,R(t)}} - 1 \right) \right) \times EW_{R(t)} \quad (2)$$

Where,

- $R(t)$ is the most recent CGI rebalancing date preceding t
- $P_{i,t}$ is the closing price for cryptoasset i on day t , expressed in USD
- $P_{i,R(t)}$ is the closing price for cryptoasset i on the last rebalancing date preceding t , expressed in USD
- $x_{i,R(t)}$ is the weight of cryptoasset i on the last rebalancing date preceding t , equal to 0.5
- EW_t is the crypto-basket price level on the last rebalancing date preceding t

The weighting among the crypto-basket and gold (DGLD) in the CGI is computed through:

$$x_c = \frac{\sqrt{\alpha} \sigma_c^{-1}}{\sqrt{\alpha} \sigma_c^{-1} + \sigma_g^{-1}}, \quad x_g = 1 - x_c \quad (3)$$

The risk contribution ratio is set to $\alpha = 9$, x_c and x_g are the weights for the crypto-basket and DGLD and σ_c and σ_g the historical volatilities of the crypto-basket and DGLD logarithmic returns.

The Index base level is set on 1 000 on January 1st, 2016:

$$\text{Index}_0 = 1\,000 \quad (4)$$

The Index level on day t from January 2nd, 2016 onwards is calculated as:

$$\text{Index}_t = \left(1 + \sum_{i \in N_t} x_{i,R(t)} \times \left(\frac{P_{i,t}}{P_{i,R(t)}} - 1 \right) \right) \times \text{Index}_{R(t)} \quad (5)$$

Where,

- N_t is the set of the 2 CGI components (crypto-basket and DGLD) on day t
- $R(t)$ is the most recent CGI rebalancing date preceding t
- $P_{i,t}$ is the closing price for constituent i on day t , expressed in USD
- $P_{i,R(t)}$ is the closing price for constituent i on the last rebalancing date preceding t , expressed in USD
- $x_{i,R(t)}$ is the weight of constituent i on the last rebalancing date preceding t , equal to the WRC allocation result
- Index_t is the CGI price level on the last rebalancing date preceding t

3 Data Handling

3.1 Rounding of Data

The following rounding of data are used for the Index calculation and publication:

- Prices are rounded to eight significant figures
- Weights are rounded to four decimal places
- Index levels are rounded to two decimal places

3.2 Stress Events

The calculation of the CGI level is obstructed when no data is provided from the data provider, or due to any other unforeseen events. In the event of failure of the data provider to deliver relevant data, the CGI Steering Committee will do its best effort to determine relevant component prices from alternative providers that are readily available. In this scenario, the CGI price level will be based on the constituent prices determined by the CGI Steering Committee.

4 Index Governance

4.1 CGI Steering Committee

The CGI Steering Committee is responsible for:

1. Determining the calculation methodology and the rules governing the publication of Index levels
2. Making periodic reviews of the Index to validate the robustness of the methodology and to analyse the impact of methodology changes
3. Organising consultation with Index stakeholders if necessary
4. Ensuring that the Index offers a reliable and representative view of the market

The CGI Steering Committee may include individuals or representatives of companies, academics, external counsels, or market participants.

The CGI Steering Committee assembles once a year in November. However, at the request of a member of the committee, the Index Committee may meet on any other day of the year to discuss potential market emergency and force majeure events or any other situation, which makes an extraordinary meeting necessary.

All CGI Steering Committee decisions will be published without delay following the decision. CGI Steering Committee members as of February 2021:

- Michael Petch, CoinShares
- William J. Knottenbelt, Imperial College London
- Katerina Koutsouri, Imperial College London

As of February 2021, Michael Petch chairs the Steering Committee.

5 Methodology Review and Changes

This methodology may be supplemented, amended in whole or in part, revised or withdrawn at any time. Supplements, amendments, revisions and withdrawals may also lead to changes in the way the CGI is compiled or calculated or affect the CGI in another way.

In the absence of exceptional circumstances affecting the calculation or methodology, the CGI is reviewed annually in November to ensure that:

1. The CGI continues to measure the market interest under consideration
2. The methodology and computation are in line with the original purpose of the CGI
3. The quality and quantity of the input data remain sufficient

Changes will be subject to the review and approval of the CGI Steering Committee which will receive all the information related to the change. In case of material changes, a notice will be provided at least two weeks in advance.

A change is considered material on the basis of its economic and financial impact and of its consistency with the original purpose of the CGI and the market interest the Index measures. Changes made to the CGI methodology or with computation parameters decided during the annual review are published after the review date and implemented on the first rebalancing date following the review.

The results of the CGI Steering Committee will be published and distributed in a timely manner to data vendors and news sources.

6 Expert Judgment

The CGI is based on written and transparent rules and procedures with the purpose of minimising as much as possible the exercise of discretion and expert judgment. The CGI is built from input data that is not interpolated, extrapolated or adjusted. In case of lack of data, the last available data is employed.

Nevertheless, the exercise of expert judgment may become necessary in case of errors and CGI restatements, delayed and missing data, hard forks, airdrops, or unexpected situations arising from market stress.

In the event that expert judgment is exercised, this will be done by resorting to the written procedures reported in the methodology and by communicating the decisions taken to the CGI Steering Committee in order to prevent conflicts of interest and to protect the integrity and the independence of the CGI determinations. In addition, the interest of the CGI users and the market integrity will be taken into account.

7 Errors and Index Restatements

Even though the process of calculating the CGI is completely automated and pre-defined, an error can be discovered after the publication of the CGI.

In case of a material error the CGI will be redetermined, and the CGI clients will be notified about the error and the date of the publication of the redetermined CGI. An error is considered material on the basis of its size, the dates of its discovery and of its occurrence, and the impact of the CGI redetermination on the users. The discovery of any error is reported to The CGI Steering Committee.

8 Limits

The issues presented in the following non-exhaustive list may limit the ability of the Index to represent the market it is intended to measure, the ease of replication by investors, and more generally the usefulness of the Index to users.

The Index level is computed following the rules outlined in this methodology, and these rules may limit the ability of the Index to represent the market it measures.

Different users may have different aims, and the Index is not necessarily suitable for the aim of each user.

The market the Index is meant to measure is volatile. In particular, cryptocurrencies may be subject to market movements much more than traditional asset classes such as stocks and bonds as a consequence of illiquidity, market trends and changes to market structure. Gold, despite being characterised by a volatility much lower than that of cryptocurrencies, may be subject to market movements as well.

The input data provider may fail to provide accurate and timely data.

Cryptocurrencies reference rates are derived from several trading venues, each of which is characterised by a different market structure, and the price of a cryptocurrency may sometimes be different across different trading venues.

In addition, cryptocurrency exchanges may suffer problems that usually do not affect regulated equity, bond and commodity exchanges, such as distributed denial-of-service, trading halt, hacking of private keys, lack of standards comparable to those of regulated exchanges, rapidly evolving technology, and uncertain legal frameworks.

There may be uncertainty about the primary chain in case a hard fork takes place.

The present methodology may change and some users may not be reachable for notification before a change takes place.

Certain circumstances may require the exercise of discretion and expert judgment.

Finally, the publication of the Index may cease. Should this occur, the regulation regarding user transitions will be followed, but the existence of a suitable substitute is not assured.

9 Disclaimer

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