GUIDE TO:

THE BACHE COMMODITY GREEN INDEX SM
THE BACHE BIOFUELS COMPOSITE
THE BACHE CLEAN AIR COMPOSITE

June 2009

Prudential

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1. Introduction

1.1 Overview of the Bache Commodity Green Index^{SM} (BCGI^{SM})

The BCGI^{SM} consists of commodities that are anticipated to experience growth as they contribute to reducing the effects of climate change. The index is comprised of two main parts: The Bache Biofuels Composite (BBC) and The Bache Clean Air Composite (BCAC).

The BBC consists of sustainable agricultural products that can be utilized as fuel. The BCAC holds commodities that are directly related to reducing the effects of climate change. These include carbon emission credits and certain metals that are critical components in products such as catalytic converters that reduce emissions of greenhouse gases such as nitrous oxide. The BCGI^{SM} has an initial allocation of 60% to the BBC and 40% to the BCAC.

The primary objective of the BCGI^{SM} is to provide a multi-faceted approach to holding commodities needed in the production of sustainable energy and the reduction of carbon emission. There are additional objectives of the BCGI^{SM} methodology. The first of these is to provide broad, long-term diversified exposure to individual commodities within the biofuel and clean environment sectors consistent with their overall importance to that sector as well as their market liquidity. The second objective is to ensure that the BCGI^{SM} does not become dominated by a single commodity sector or by several commodities within a commodity sector. The third objective is to moderate the volatility inherent in the major commodities. This is accomplished through utilizing the Bache Commodity Index^{SM} (BCI^{SM}) methodology. The BCI^{SM} methodology is a systematic quantitative risk reduction technique based on the commodity price momentum.

1.1.1 Composition in the Bache Commodity Green Index^{SM}

The index comprises the Bache Biofuels Composite (BBC) and the Bache Clean Air Composite (BCAC) and includes 11 Commodities that are traded on major exchanges and through over-the-counter markets located in the United States, Canada, UK, France, and Malaysia. The BCGI^{SM} primarily comprises commodities traded via futures contracts, but includes commodities traded over-the-counter directly or through forward contracts.

The BBC consists of sustainable agricultural products that can be utilized as fuel. Index constituents and weights are determined based on global biofuel consumption. At present, roughly 65% of global biofuel consumption is in the form of ethanol and 35% in biodiesel. This is reflected in the current BBC weights, which is allocated 65% to products used in ethanol production (corn and sugar) and 35% to oilseeds. Over time, the constituents and weights in the BBC are expected to evolve to reflect changes in the mix of commodities used in sustainable fuels.

The BCAC holds commodities that are directly related to reducing the effects of climate change. These include carbon emission credits, which are used to ration the emission of carbon dioxide, and certain metals that are critical components in products such as catalytic converters that reduce emissions of greenhouse gases such as nitrous oxide. The BCAC is currently weighted 70% in carbon credits and 30% in greenhouse metals. These weights are based on estimates of relative liquidity. Over time, the BCAC is likely to add more commodities that play a role in reducing and controlling emissions.

Biofuels are given a larger initial weight in the composite index because biofuel markets are currently larger and more developed. As more countries adopt mandatory carbon emissions caps in coming years, it is expected that the BCGI℠ will become more heavily weighted towards carbon and pollution control markets.

1.1.2 Commodity Weights in the Bache Biofuels Composite, Bache Clean Air Composite, and Bache Commodity Green Index℠

For 2009, the allocations to individual Commodities within each major commodity sector for the BBC are as follows:

Bache Biofuel Composite Components: June 2009

Commodity Market	*Exchange*	*Sector*	*Sub-Sector*	*Allocation (%)*
Corn	CBOT	Agriculture	Biodiesel Feedstock	45.0
Sugar	NYBOT	Agriculture	Biodiesel Feedstock	20.0
Soybeans	CBOT	Agriculture	Biodiesel Feedstock	20.0
Cotton	NYBOT	Agriculture	Biodiesel Feedstock	5.0
Palm Oil	MCX	Agriculture	Biodiesel Feedstock	2.5
Rapeseed	EOP	Agriculture	Biodiesel Feedstock	2.5
Canola Oil	WCE	Agriculture	Biodiesel Feedstock	5.0
Total				100.0

The allocations to individual Commodities within each major commodity sector for the BCAC are as follows:

Bache Clean Air Composite Components: June 2009

Commodity Market	*Exchange*	*Sector*	*Sub-Sector*	*Allocation (%)*
Carbon Futures	ECX	Emissions	Carbon	35.0
Carbon Spot	BlueNext	Emissions	Carbon	35.0
Platinum	COMEX	Metal	Pollution Control	20.0
Palladium	COMEX	Metal	Pollution Control	7.5
Rhodium	Spot	Metal	Pollution Control	2.5
Total				100.0

The BCGI℠ holds 60% of the BBC and 40% of the BCAC. The allocations to individual Commodities within each major commodity sector for the BCGI℠ are as follows:

Bache Commodity Green Index℠ Components: June 2009

Commodity Market	*Exchange*	*Sector*	*Sub-Sector*	*Allocation (%)*
Corn	CBOT	Agriculture	Biodiesel Feedstock	27.0
Sugar	NYBOT	Agriculture	Biodiesel Feedstock	12.0
Soybeans	CBOT	Agriculture	Biodiesel Feedstock	12.0
Cotton	NYBOT	Agriculture	Biodiesel Feedstock	3.0
Palm Oil	MCX	Agriculture	Biodiesel Feedstock	1.5
Rapeseed	EOP	Agriculture	Biodiesel Feedstock	1.5
Canola Oil	WCE	Agriculture	Biodiesel Feedstock	3.0
Carbon Futures	ECX	Emissions	Carbon	14.0
Carbon Spot	BlueNext	Emissions	Carbon	14.0
Platinum	COMEX	Metal	Pollution Control	8.0
Palladium	COMEX	Metal	Pollution Control	3.0
Rhodium	Spot	Metal	Pollution Control	1.0
Total				100.0

1.2 The Advisory Committee

PFDS Holdings has established an Advisory Committee to assist it in connection with the operations of the BCGI℠. The Advisory Committee meets on a regular basis during each calendar year and at other times at the request of PFDS. The principal purpose of the Advisory Committee is to advise PFDS with respect to, among other things, the calculation of the BCGI℠, and the effectiveness of the BCGI℠ as a representative basket of clean energy Commodities and the need for changes in the composition or methodology of the BCGI^{SM}. The Advisory Committee acts solely in an advisory and consultative capacity; all decisions with respect to the composition, calculation, operation or other aspect of the BCGI^{SM} are made by PFDS.

Prior to an Advisory Committee meeting, PFDS outlines to the committee the Commodities and contracts to be included in the BCGI^{SM} in accordance with the selection criteria set below. The proposed composition of the BCGI^{SM} is then circulated to the Advisory Committee members in advance of the meeting and is presented and discussed at the meeting. The Advisory Committee is also consulted on any other significant matters with respect to the calculation or operation of the BCGI^{SM} and may, if necessary or practicable, meet at other times during the year at the request of PFDS as issues arise that warrant Advisory Committee consideration.

1.3 Definitions

Actual Allocation: The number of Futures Contracts in a given market that are actually held by an investor utilizing the Transactions Minimizing Strategy.

Advisory Committee: An established group of individuals who meet to advise on the set of Commodities and the set of allocations to those Commodities that comprise the BCGI^{SM}. These allocation decisions are based on pre-determined criteria and guidelines. The Advisory Committee is comprised of seasoned global markets executives and leading academics selected by senior management of PFDS Holdings.

BBC: Bache Biofuels Composite. It is comprised of certain Bache Single Commodity Indices. BBC may also be used as an acronym for the Bache Biofuels Composite.

BCAC: Bache Clean Air Composite. It is comprised of certain Bache Single Commodity Indices. BCAC may also be used as an acronym for the Bache Clean Air Composite.

BCGI^{SM}: Bache Commodity Green Index^{SM}. It is comprised of certain Bache Single Commodity Indices. BCGI^{SM} may also be used as an acronym for the Bache Commodity Green Index^{SM}.

BSCI: Bache Single Commodity Index. Specifically, for this document, Single Commodity Indexes associated with the BCGI^{SM}. BSCI^{SM} may also be used as an acronym for Bache Single Commodity Index.

Business Day: A day, on which commercial banks settle payments and are open for general business, including dealings in foreign exchange and foreign currency deposits.

Commodity: In respect of a Transaction, the Commodity specified in the relevant Commodity Reference Price. Additionally, a Commodity or Commodities refers to one, a subset or all of the commodities in the Index or Indexes.

Commodity Business Day: A day in which a Transaction for which the Commodity Reference Price is announced or published by an Exchange, a day that is (or, but for the occurrence of a Market Disruption Event, would have been) a day on which that Exchange is open for trading during its regular trading session, notwithstanding any such Exchange closing prior to scheduled closing time.

Commodity Reference Price: A price announced or published by an Exchange or other widely accepted, designated source.

Daily Roll: The portion of the BCGI^{SM} that is sold each day as it approaches expiration, with an accompanying purchase of new Futures Contracts for delivery further in the future.

Daily Roll Quantity: The inverse of the number of Business Days between expirations. If this quantity is rolled each trading day, then the entire position will be rolled in equal installments by the Last Roll Date. For example, if there are 62 Business Days between expirations for a given Soybean Futures Contract, then if 1/62 (1.613%) of the position is rolled each trading day the position will be fully rolled on the Last Roll Date for the nearby Soybean Futures Contract.

Days Between Expirations: The number of trading weekdays between the Last Roll Date of the prior Nearby Contract (the contract that has most recently passed its last roll date) and the last roll date of the current Nearby Contract.

Essentially Similar Commodities: Commodities that demonstrate comparable traits in trading behavior and expected return. Essentially Similar Commodity pairs include gold/platinum and soybeans/soybean meal.

Exchange: The Exchange or principal trading market specified in the relevant confirmation or Commodity Reference Price.

Futures Contract: In respect of a Commodity Reference Price, the contract for future delivery of a contract size in respect of the relevant delivery date relating to the Commodity referred to in that Commodity Reference Price.

Index Holiday: If all the U.S. products in the BCGI^{SM} do not settle (the exchange is not producing a settlement price) then the day is declared an Index Holiday. On an Index Holiday we do not publish BCGI^{SM} value and do not trade any products in the BCGI^{SM}.

Current index holidays include: New Years Day, Martin Luther King Day, President's Day, Good Friday, Memorial Day, July 4th, Labor Day, Thanksgiving and Christmas.

Index Value: The value of the BCGI^{SM}, which is the sum of the number of BSCI^{SM} Units held in each market multiplied by the BSCI values.

Indication Value: The value of the BCGI^{SM} if one or more of the Futures Contracts represented in the index did not trade due to market closure or could not be transacted due to trading limits at the close of trading.

Last Roll Date: The last date that an investor will hold a position in the Nearby Contract. After this date any position in the Nearby Contract must be either rolled or closed out. This value is determined by the PFDS Holdings and will generally be set in a manner that ensures adequate liquidity remaining in the Nearby Contract so that positions can be easily liquidated.

Long-Only Trading Rule: The method of determining the allocation to Nearby and Nextout futures contracts for Commodities that are held in a fixed, 100% long allocation.

Market Disruption Event: An event that would give rise to an alternative basis for determining the relevant price in respect of a specified Commodity Reference Price or the termination of the Transaction were the event to occur or exist on a day that is a pricing date for that Transaction.

Maximum Nearby Allocation: The largest position that can be held in the Nearby Contract. This quantity cannot be more than 100% of the total allocation, and must be zero after the Last Roll Date for the Nearby Contract.

Maximum Roll Quantity: The largest percentage of a Futures Contract that will be rolled on a given day.

Minimum Allocation: For a new Commodity, Minimum Allocation is 1% of the Index Value, or 2.5% of either BBC or BCAC Values, according to whether the Commodity is a member of that Index.

Momentum-Based Trading Rule: The method of determining the allocation to Nearby and Nextout futures contracts for Commodities that are held in a dynamic allocation.

Nearby Contract: A Futures Contract that is close to its expiration date. The Nearby Contract need not necessarily be the Futures Contract with most immediate expiry; it is determined by index methodology. In a Rollover strategy, the Nearby Contract is the position that must be closed out.

Nextout Contract: A Futures Contract with an expiration date further in the future than the Nearby Contract. In a Rollover strategy, the Nextout Contract is the one that will be used to initiate a new position. The Nextout Contract is determined as part of the index methodology and need not necessarily be the contract with maturity immediately following the Nearby Contract. The Nextout Contract always has expiry after the Nearby Contract.

Official Index Value: The value of the BCGI^{SM} if there was an official closing price for all Commodity Futures Contracts represented in the index for that day, and if none of the Commodity Futures Contracts represented in the BCGI^{SM} were subject to trading limits at the close of trading.

Rollover: A Futures Contract calls for delivery of a Commodity at a particular time in the future. An investor in Futures Contracts does not generally take delivery of the Commodity, but rather sells the Futures Contract as it approaches expiration and buys a new Futures Contract for delivery further in the future. This Transaction is called a Rollover or sometimes simply a roll. An investor can roll an entire futures position or roll a portion of an open position.

Rollover Strategy: A method that describes how a particular portfolio of Futures Contracts will be rolled.

Target Allocation: The Target Allocation is the number of Futures Contracts in a given market that some futures trading strategy indicates should be held.

Transaction: Any Transaction that is a Commodity swap Transaction, Commodity basis swap Transaction, Commodity cap Transaction, Commodity floor Transaction, Commodity collar Transaction, Commodity option Transaction, Commodity index Transaction, Commodity forward Transaction, or Commodity spot Transaction.

Unit: Each unit of the BSCI.

Value Weight: The percentage of each BSCI allocated to the Nearby and Nextout Contracts, and to cash.

2. Index Structure and Selection Criteria

2.1 Initial Eligibility Criteria

PFDS Holdings will consider for inclusion commodity markets that satisfy the following initial selection criteria:

Physical Commodities: Financial market assets (e.g., interest rate, currency, and equity) will not be considered. Financially settled derivatives that are based on physical commodities will be considered for inclusion in the BCGI℠.

Emissions Credits: Pollution rights such as carbon emission credits, as well as derivatives based on pollution rights, are considered to be a commodity and eligible for inclusion in the BCGI℠.

2.2 Guidelines for Selection

PFDS Holdings will consider all commodity markets that satisfy the initial criteria. The decision to add or remove a Commodity in the BCGI℠ will be based on the following guidelines:

Minimum Size. The Minimum Allocation to a new Commodity is 2.5% of market value of the respective Index for inclusion in either of the BBC or BCAC.

Essentially Similar Commodities. Commodities that are essentially similar to Commodities that are already included in the BCGI℠ may be excluded. Exposure to Essentially Similar Commodities may be accepted in order manage liquidity or other risks.

Diversification. PFDS will base all final decisions regarding inclusion of a Commodity market on the primary objectives of the BCGI℠. PFDS will consider the risk impact of commodity investment allocation and will emphasize commodity markets and sectors that have been determined to provide risk reduction benefits for portfolios that include multiple asset classes.

2.3 Choice of Exchanges and Pricing Sources for Commodities

PFDS will determine the appropriate Exchange(s) for a given Commodity. Considerations will include the liquidity and transparency provided by the Exchange, availability of over-the-counter derivatives such as swap contracts priced using the Exchange, and the availability of accurate pricing during New York trading hours. For

Spot or forward Commodities, PFDS will determine and use the appropriate pricing source for a given Commodity that is consistent with market transparency and liquidity.

2.4 Announcements

Decisions regarding BCGISM composition will generally be announced at least 60 days prior to the date that the BCGISM changes are to be incorporated into published values, except that PFDS Holdings reserves the right to make immediate changes in the event of a significant change in the trading environment for a particular Commodity.

2.5 Dates

The BCGISM is published on Reuters and Bloomberg every Business Day except for Index Holidays and the Good Friday holiday. BCGISM values will generally be available between the hours of 8:00 pm and 10:00 pm, New York Time.

2.6 Official BCGISM Values and Indication Values

A BCGISM value will be considered an Official Index Value if there was an official closing price for all Commodity Futures Contracts represented in the BCGISM for that day, and if none of the Commodity Futures Contracts represented in the BCGISM were subject to trading limits at the close of trading.

A BCGISM value will be considered an Indication Value if one or more of the Futures Contracts or other assets represented in the BCGISM did not trade due to market closure or could not be transacted due to trading limits at the close of trading. Examples of events that would result in Indication Values include: Holidays declared by Exchanges that are not Index Holidays, market closures resulting from unexpected emergencies, and trading limits that are in effect at the normally scheduled closing time for the market. Examples of events that would not result in Indication Values include: temporary or emergency market closures that are resolved before the regularly scheduled close of trading, temporary imposition of price limits that are removed prior to the close of trading, and market closures that are different from the usual closing time but are sanctioned by the Exchange and are announced at least one day prior to the event.

2.7 Roll Schedule for BCGI^SM Futures Markets

Roll Date*: 5th Day of:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Agriculture												
Corn CBT		Mar		May		Jul		Sep			Dec	
Soybeans CBT		Mar		May		Jul				Nov		Jan
Sugar NYBOT		Mar		May		Jul			Oct			
Cotton NYBOT		Mar		May		Jul					Dec	
Palm Oil MCX	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Rapeseed EOP	May			Aug			Nov			Jan		
Canola Oil WCE		Mar		May		Jul				Nov		Jan
Carbon												
Carbon Futures ECX											Dec	
Carbon Spot BlueNext												
Metals												
Platinum COMEX			Jul			Oct			Jan			Apr
Palladium COMEX		Jun			Sep			Dec			Mar	
Rhodium Spot												

Notes:

Roll schedule applies to composite indexes, sector indexes, and single-commodity indexes

Date is Last Roll Date for Contract nearest to expiration

For example, February 5th is the last roll date for the March Corn future

Note: To be explicit, the Dec ECX Carbon Futures contract will be rolled in the one month prior to Nov 5th.
*Roll starting date

3. Calculation of the BCGI^SM and Related Indexes

The BCGI^SM is currently comprised of 11 Bache Single Commodity Indices (BSCI). The BCGI^SM value is the weighted average of the BSCI values. Units (u) held in each market are multiplied by the BSCI values.

$$BCGI = \sum_{i=1}^{11} u_i BSCI_i \tag{3.1}$$

The BCGI℠ is an *excess return index*. A total return version of the BCGI℠ is also calculated that assumes the index is fully collateralized with Treasury Bills. The total return version of the BCGI℠ on date *t* is equal to:

$$BCGITR_t = BCGITR_{t-1}\left(\frac{BCGI_t}{BCGI_{t-1}}\right)(1+TBR_t), \tag{3.2}$$

TBR is the 3-Month Treasury Bill Return and *TBAR* is the 3-Month Treasury Bill Rate

.
$$TBR_t = \left[\frac{1}{1-TBAR_{t-1}x91/360}\right]^{1/91} - 1 \tag{3.3}$$

Each BSCI is assigned a value percentage in the BCGI℠. The percentages for 2009 are listed in the table below.

There are three trading strategies that will be incorporated for the BCGI℠ using the BSCI units: the **Momentum-Based Trading Rule**, the **Long-Only Trading Rule**, and the **Spot Trading Rule**. PFDS will determine the appropriate trading rule for each Commodity. Additionally, foreign currency conversion rules may be implanted into some of these rules. The methodology for calculating each rule follows below.

Bache Single Commodity Index℠	Commodity Market	Exchange	Percent of Composite	Calculation Method
BSCI_C	Corn	CBT	27.00%	Momentum
BSCI_SB	Soybeans	CBT	12.00%	Momentum
BSCI_S	Sugar	NYBOT	12.00%	Momentum
BSCI_CT	Cotton	NYBOT	3.00%	Long-Only
BSCI_PO	Palm Oil	MCX	1.50%	Long-Only
BSCI_R	Rapeseed	EOP	1.50%	Long-Only
BSCI_CO	Canola Oil	WCE	3.00%	Long-Only
BSCI_CC	Carbon	ECX	14.00%	Long-Only
BSCI EUA	Carbon	BlueNext	14.00%	Spot
BSCI_P	Platinum	COMEX	8.00%	Long-Only
BSCI_PA	Palladium	COMEX	3.00%	Long-Only
BSCI_RH	Rhodium	Spot	1.00%	Spot

3.1 Computing the Number of BSCI Units

Daily Rebalancing

To maintain the appropriate weight for each Commodity, the BCGI^{SM} is rebalanced each day to have the predetermined Commodity weights. Rebalancing generally involves increasing the allocation to the BSCI units that declined in value by more than the BCGI^{SM}, and decreasing the units of the BSCI units that increased in value by more than the BCGI^{SM}. In this way, the percentage of BCGI^{SM} value represented by each BSCI will always be equal to the pre-specified Commodity weights.

Changes in the number of BSCI Units in the BCGI^{SM} are made at the end of the next Business Day. If one or more Exchanges are closed on a particular day, then no changes in those BSCI Units will be incorporated into the BCGI^{SM} on that day, and net changes will be implemented on the next Commodity Business Day. The equation for calculating the number of Units for each BSCI is as follows:

$$u_i = \frac{(BCGI)(w_i)}{BSCI_i} \tag{3.4}$$

Definitions:

Composite:	BCGI^{SM} value
$BSCI_i$:	Bache Single Commodity Index
w_i :	Target percentage for the BSCI in the composite BCGI^{SM}
u_i :	Number of Units of the BSCI to be included in the composite BCGI^{SM} on the following Index Day.

The BCGI^{SM} will be rebalanced on Business Days. This includes all Commodities traded on both U.S. and non-U.S. Exchanges. In the calculations of the BCGI^{SM}, Index Holidays will be counted as Commodity Business Days, but any trading will take place the first Business Day following the Index Holiday. The Transactions that would have occurred on the Index Holiday, plus the following day's Transactions (or, the net changes), will both occur on the first Business Day following the Index Holiday.

3.2 Computing BSCI Values for Momentum and Long-Only Trading Rules

A BSCI is calculated for each Commodity market in the BCGI^{SM}. BSCI values are calculated every weekday except for Index Holidays. Index values for the current Business day will generally be available between the hours of 8:00 pm and 10:00 pm, US Eastern Standard Time.

Each BSCI value is derived from the following prices:

The Nearby Futures Contract for the BSCI Market. The Nearby Contract is the active Futures Contract with the closest maturity date, subject to the restriction that Futures Contracts may not be held past the fifth calendar date of the month prior to delivery. The list of active Futures Contracts is determined by PFDS Holdings.

The Nextout Futures Contract. This is the active Futures Contract that matures just after the Nearby Contract.

Cash Allocation. Each BSCI employs a dynamic asset allocation methodology, and is not always fully invested in Futures Contracts. The allocation to cash is incorporated into the BCGI℠ value and the BCGI℠ return calculations.

BSCI Weights. The number of Futures Contracts in the BSCI is determined by the actual percentage. This quantity is further separated into the percentage held in the Nearby Contract and the percentage in the Nextout Contract. These quantities are determined using a separate algorithm designed to minimize the total turnover in the BSCI. After executing this algorithm, the following index weights are known:

$$\begin{aligned} &w_{N_t} : \text{The BSCI weight in the nearby contract} \\ &w_{N_t} : \text{The BSCI weight in the nextout contract} \\ &w_{C_t} = 1 - w_{N_t} - w_{X_t} : \text{The BSCI weight in cash} \end{aligned} \qquad (3.5)$$

These weights are then converted into the number of Futures Contracts to be held in the BSCI by incorporating the market value of the Nearby and Nextout Contracts. Definitions:

$$\begin{aligned} &BSCI_t : \text{The current index value} \\ &q_N : \text{The number of futures contracts in the nearby contract} \\ &q_X : \text{The number of futures contracts in the nextout contract} \\ &C_t : \text{The number of dollars in cash} \\ &v_N : \text{The market value of one nearby futures contract} \\ &v_x : \text{The market value of one nextout futures contract} \end{aligned} \qquad (3.6)$$

Note that the roll to Nextout Contract will be deferred until the Nextout Contract has been open *and* traded.

Then the quantity of Futures Contracts and cash in the BSCI that will be used to calculate the BSCI on the next BCGI℠ date is:

$$q_{\mathbf{N}} = \frac{BSCI_t \cdot w_N}{v_{N_t}}$$
$$q_X = \frac{BSCI_t \cdot w_X}{v_{X_t}} \tag{3.7}$$
$$C_t = BSCI_t \cdot w_{C_t}$$

So that on date t+1, the new BSCI value will be:

$$BSCI_{t+1} = p_{N,t+1}q_{N,t} + p_{X,t+1}q_{X,t} + C_t \tag{3.8}$$

The return on cash held in the BCGI^SM, referred to as "Treasury Bill Return", or TBR, will be calculated according to the equation in Figure 3.3.

3.3 The Momentum-Based Trading Rule

The Target Allocations using the Momentum rule in the BCGI^SM are based on a lookback strategy. An *x*-day lookback strategy gives a positive signal if the futures price index on date *t* is higher than it was on date *t*-*x*. Otherwise the strategy gives a negative signal. The strategy is called a lookback model because it looks back *x* days but ignores changes in the Commodity price that occurred after date *t*-*x*. The lookback rule was found to provide a higher correlation with Commodity trading advisors than other common rules such as a moving average.

The number of days used to compute the lookback indicators in the BCGI^SM are 15 days for the short-term, 27 days for the medium-term, and 55 days for the long-term momentum strategy.

3.3.1 Computing the Futures Price Index

The futures price index must be computed before the lookback signals can be evaluated. Note that this futures price index is used only to evaluate trading signals and generate the Target Allocation. The futures price index is not actually traded in the index. The futures price index is based on a full long position in the underlying Commodity Futures Contract and uses a slightly different Rollover Strategy than the traded portion of the BCGI^SM.

The futures price index for each Commodity is a weighted average of the return of the position in both the Nearby and Nextout Contracts. The BCGI^SM uses a continuous roll strategy: It holds positions in the two nearest active Futures Contracts, and each day sells some of the front contract and rolls the position into the Nextout Contract. The roll strategy incorporated in the futures price index is linear – if there are 90 weekdays between the Last Roll Dates[1] of the Nearby and Nextout Contract, then 1/90 of the position will be rolled each weekday. This strategy is employed in order to provide the smoothest possible return series from which to generate a trend-following system.

Note that a roll to a Nextout Contract depends on a market price for that contract. In some instances a Nextout Contract may not always be available at the beginning of a roll period; in such circumstances, the roll will be deferred until the Nextout Contract has been opened and traded. Until that occurs, the current date will be considered the "prior expiration" date for computation of the proportion of contracts held in the Nearby Contract. On the date of the first opening and trading of the Nextout Contract, the scheduled "prior expiration date" will be considered the prior expiration date. That is, upon availability of a delayed roll, any accumulated roll will be executed so as to "catch up" with where positions should be had there not been a delay in opening.

Let p_t be the proportion of the investment held in the Nearby Contract on date t

$$p_t = \frac{\text{\# weekdays until last roll date of nearby contract}}{\text{\# weekdays between last roll dates of prior expiration and nearby expiration}} \tag{3.9}$$

The proportion held in the Nextout Contract is $1\text{-}p_t$. At the end of each day (p_{t-1} - p_t) is rolled from the Nearby Contract to the Nextout Contract. The daily return is the percentage gain or loss based on the prior day's total investment:

$$r_t = \frac{totalPL_t}{s_{t-1}} \tag{3.10}$$

The futures price index is computed from these daily returns:

$$FPI_t = FPI_{t-1}(1 + r_t) \tag{3.10}$$

3.3.2 Computing the Trading Rule

The lookback trading rule for a given number of weekdays L_x will take on a positive value if the total return is positive between date $t\text{-}x$ and date t:

$$L_x = \begin{cases} 1 \text{ if } FPI_t > FPI_{t-x} \\ 0 \text{ if } FPI_t \le FPI_{t-x} \end{cases} \tag{3.11}$$

The BCGI[SM] evaluates three lookback signals to determine the Target Allocation: L_{15}, L_{27}, and L_{55}. The minimum Target Allocation is 40% long, and this is increased by 20% for each positive signal:

[1] The Last Roll Date is the last date a futures contract can be held before it must be rolled to the next contract. The Last Roll Date in the index varies from market to market, but is generally in the month prior to the delivery month.

$$TA_t = 0.4 + 0.2 \cdot (L_{15} + L_{27} + L_{55}) \tag{3.12}$$

Changes in the BCGI℠ lookback trading rule are implemented with a one-day lag, in order to ensure that there is no ambiguity.

3.3.3 The Target Allocation

Number of Positive Signals	Target Allocation as % of Maximum Allocation
Zero (all negative)	40% of maximum
One (two negative)	60% of maximum
Two (one negative)	80% of maximum
Three (zero negative)	100% of maximum

3.3.4 The Actual Allocation

The Actual Allocation is the percentage of assets invested in Futures Contracts. The remaining assets are assumed to be invested in cash. The Actual Allocation can differ from the Target Allocation (Section 3.3.3, above) because changes to the Actual Allocation are smoothed in order to reduce turnover and transactions costs. The methodology for determining the Actual Allocation is given in Section 3.5.

3.4 The Long-Only Trading Rule

Some Commodities in the BCGI℠ or its sub-indices may have insufficient liquidity to engage in the additional trading required to implement the momentum-based trading associated with the Momentum Rule. This lack of liquidity may be in the Nearby Contract and Nextout Contracts, or it may be because there is insufficient liquidity in the Nextout Contract only. In that case BCGI℠ uses a Long-Only Trading rule, which is designed to reduce the amount of buying and selling of contracts associated with the Momentum Rule, particularly at points in time farther away from expiration.

For Commodities with BSCI values calculated with the Long-Only trading rule, the Target Allocation is always 100% of maximum. Otherwise, the calculation approach is identical to the Momentum Rule.

Specifically, for Commodities using the Long-Only trading rule, the operative rule is the Transactions Minimizing Strategy (3.5.1), which determines the specific amount of contracts held in Nearby and Nextout Contracts. It is not necessary to calculate the Futures Price Index for that Commodity as outlined in section 3.3.1. The Target Allocation (TA) is set to be equal to 100%. Actual Allocation is determined by the Transactions Minimizing Strategy. Because of the absence of changes in position due to momentum-based rebalancing, in general Target Allocation and Asset Allocation will be very close. However, they need not be identical, particularly in cases where there is substantially different performance in Nearby and Nextout Contracts.

3.5 The Transaction Minimizing Strategy

Momentum-Based Trading Rule

The Transaction Minimizing Strategy (TMS) incorporates many of the features of the Daily Rollover Strategy described above, but with modifications to allow for dynamic asset allocation based on the trading rule, while still minimizing Transaction costs. The Daily Rollover Strategy involves selling a small portion of the position in the Nearby Contract each day and buying a similar quantity of the deferred contract. However, if the intent is to reduce the overall exposure to the Futures Contract, this can be accomplished by selling a small portion of the Nearby Contract as planned, but not buying the deferred contract. The result is a lower overall allocation. Similarly, increasing the allocation can be accomplished by slightly increasing the position in the deferred contract but not selling the front contract. Thus, within certain boundaries, active asset allocation can be accomplished without increasing the transaction costs.

3.5.1 The TMS Methodology

The TMS fixes the Maximum Roll Quantity (MRQ) in a given market equal to the Daily Roll Quantity (DRQ):

$$MRQ = DRQ = \frac{1}{\text{days between expirations}} \tag{3.13}$$

The Maximum Nearby Allocation (MNA) is set equal to the product of the Daily Roll Quantity and the number of days until the Last Roll Date (LRD). This ensures that the entire position can be rolled on or before the roll date without ever exceeding the Daily Roll Quantity on a given date:

$$MNA = DRQ \cdot LRD \tag{3.14}$$

If ΔNB is defined as the change in the position of the Nearby Contract and ΔNX is the change in the Nextout Contract, with TA as the Target Allocation and AA as the Actual Allocation, then:

$$\begin{array}{llll} \text{Case 1}: & TA_t - AA_t \geq DRQ & \Delta NB = 0 & \Delta NX = DRQ \\ \text{Case 2}: & DRQ > TA_t - AA_t \geq 0 & \Delta NB = 0 & \Delta NX = TA_t - AA_t \\ \text{Case 3}: & 0 > TA_t - AA_t > -DRQ & \Delta NB = -(TA_t - AA_t) & \Delta NX = 0 \\ \text{Case 4}: & -DRQ \geq TA_t - AA_t & \Delta NB = -DRQ & \Delta NX = 0 \end{array} \tag{3.15}$$

And, if after this Transaction, the nearby allocation is greater than the Maximum Nearby Allocation (*NB*>*MNA*) then an additional Transaction is needed to bring the nearby allocation to the Maximum Nearby Allocation:

$$\begin{aligned} \Delta NX &= -(NB - MNA) \\ \Delta NX &= NB - MNA \end{aligned} \tag{3.16}$$

Note that in the event a Nextout Contract has not been opened and traded, MNA=0. If it is the case that the Nextout Contract was not opened and traded as scheduled, the MRQ will be set to 1/(days between expiration) upon open and trading of the Nextout Contract.

3.6 The Spot Trading Rule

The Spot Trading Rule is applied to Commodities that are assumed to be held in the index in physical form rather than through a futures or forward contract. Spot Commodities do not have a roll schedule. For the purposes of calculating the Spot BSCI, we assume that:

- There are no storage costs associated with the Spot Commodity
- There is no income from the Spot Commodity (e.g., lease income)
- Commodity purchases can be financed at the Treasury Bill rate

Pricing Source: The pricing source for each Spot BSCI market is determined by PFDS Holdings.

Computing the Total Returns:

Assume the quantity of the Spot Commodity (*q*) and cash (*C*) in the BSCI that will be used to calculate the BSCI on the next BCGI[SM] date are:

$$\begin{aligned} q_t &= \frac{BSCI_t \cdot w_S}{v_{S_t}} \\ C_t &= BSCI_t \cdot w_{C_t} \end{aligned} \tag{3.17}$$

On date *t*+1, the new Spot BSCI value will be:

$$BSCI_{t+1} = \frac{p_{s,t+1}q_{N,t}}{1+TBR_t} + C_{t+1} \tag{3.18}$$

Note: The Spot position is discounted by the Treasury Bill Return because BSCI values are *excess return* indices. As discussed earlier, the Spot Commodity is being implicitly financed at the Treasury Bill yield.

3.7 Currency Conversion

BSCI values are published in U.S. dollars. However, many BCGI^{SM} components are quoted in other currencies. In converting non-U.S. dollar prices into U.S. dollars, the following assumptions are made:

For futures markets quoted in foreign currency:

- All collateral is held in U.S. dollars
- No margin requirements

For spot markets quoted in foreign currency:

- All spot positions held in the index at the end of each trading session are leased until the next trading session.
- No storage costs or lease income
- Any collateral is held in U.S. dollars

To accomplish this, Commodity prices are converted into U.S. dollars (p^{USD}) before calculating the BSCI values. For futures-based BSCI values,

$$BSCI_{t+1} = p^{USD}{}_{N,t+1}q_{N,t} + p^{USD}{}_{X,t+1}q_{X,t} + C_t \tag{3.19}$$

And for Spot BSCI values,

$$BSCI_{t+1} = \frac{p^{USD}{}_{s,t+1}q_{N,t}}{1+TBR_t} + C_{t+1} \tag{3.20}$$

All non-U.S. dollar prices will be converted into U.S. dollars at exchange rates prevailing at the close of trading in New York or close of trading in London. PFDS will determine the appropriate pricing source for a given currency, and will consider such factors as currency market liquidity, transparency and synchronization with the timing of the close for the underlying asset.

Note: Currency conversion in the BCGI^{SM} takes place at a different time of day than the settlement time for most foreign commodity futures and spot markets.