A Comparative Study of the Determinants Affecting the Formation of Commodity Derivative Indices

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Abstract

The paper discusses the diversity found in the formation and functioning of commodity derivatives across a wide array of commodity exchanges. Commodity exchanges in India lack in certain characteristics which do not let them fully capture the realities prevailing in the market place. Therefore a comparison has been made on the lines of exchange functioning among world exchanges vis a vis Indian commodity exchanges.
Key words: Rollover, Weighing Methodology, NYMEX, CBOT, COMEX, LME, NYBOT, CME.

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1. INTRODUCTION

Commodities have been used for trade since ancient times, when barter system was prevalent i.e. exchange of a specific commodity for another commodity. Barter system was implemented and executed on an individual level. Therefore, the need of market aroused due to the shortage of commodities and individuals with common needs. A big step forward in the market formation process was the introduction of gold as a currency, or in some places currency coins that were introduced, aided in the process of market formation backed by the innovative minds of the humans. Market formation helped in boosting the economy of the world as a whole as well as the spread of trade in the world. One of the largest ancient commodity markets was supposed to be in Venice. The major drawback of this market was that it was unregulated i.e. individual vendors were responsible for the trade that took place and lead to a possibility of default by the vendor or the consumer. This problem led to a reform in the system and emergence of commodity exchanges, which visualised a more reliable market mechanism by making a body which was to regulate the mechanism of the market also called as a market regulator. The first such commodity specific exchange was CME (Chicago Mercantile Exchange) which was established in the year 1898. Slowly the markets grew strong with the help of organised exchanges and the problem of liquidity in the spot markets which led to a larger problem of market completeness. To counter these problems derivatives were introduced in the market and their trade was initiated. A derivative is a contract that derives its value from an underlying asset at a future date and of a fixed quantity also called as lot.

To have a complete idea of the commodity exchanges and global commodity market both spot as well as derivative markets, an index is assigned to each market, either by the regulators or by third parties who are basically asset management companies. An index may be of a particular exchange or of a combination of exchanges constructed by making use of commodities traded on those exchanges. Indices prove to be a benchmark for the functioning of exchanges as well as depict the entire market scenario.

A commodity price index is a fixed-weight index or weighted average of select commodity prices, which may be based on spot or futures prices. It is normally designed to represent the broad commodity asset class or a specific subset of commodities, such as energy products, bullion etc. These subset indices are often traded on the exchanges and are called ETF (Exchange Traded Funds).

The world's first commodity index was Thomson Reuters Equal Weight Commodity Index that was built in 1957. The first tradable commodity index that was made available was Goldman Sachs Commodity Index in the year 1991 and was traded in NYMEX (New York Metal Exchange). Rest of the paper presents the analysis of the factors normally taken into account to devise the major futures commodity exchanges and across the world and compare them on the basis of several dimensions.

2. INDEX CALCULATION METHODOLOGY

Every commodity index is supervised by an advisory committee. The major role of the committee is to look after the following aspects in the construction of an index.

- Methodology for selection of commodities to be part of the index.
- Methodology for calculation of weights.
- Methodology for rollover. **(Rajib, P. 2014)**

Methodology for Selection of Commodities.

Commodities that are significant to world economy are given more preference over less significant commodities. As these commodities are identified the exchange in which they are traded are sought for, and once the exchange is chosen then the contract that has to be included in the index is taken.

Methodology for Calculation of Weights.

Weight for an individual commodity contract is based on one of the following criteria:-

- Weights based on world production: In this technique the commodity with more production is given a higher weight over a less produced commodity.
- Weights based on trading liquidity: In this technique the more traded contract is weighed over a less traded contract or given more preference.
- Weights based on world production and trading liquidity: This technique combines the above two techniques in a specific ratio as decided by the committee.
- Equal Weights: In this technique all contracts are weighed equally and no commodity is given less or more preference.

3. METHODOLOGY FOR ROLLOVER

A distinct feature of a commodity index is that its contracts expire that are its underlying assets. Therefore, an index is calculated in a rolling manner. The exchange decides the rolling period from a first nearby basket to the second nearby basket of commodities. Based on this two types of Indices are found:

- Rolling Period Commodity Indices
- Commodity Indices without Rollover

Based on the above methodology a study of the major commodity indices of the world follows.

4. MAJOR WORLD COMMODITY INDICES

Based on the World Banks report on the major commodity exchanges the following community indices are studied as follows.

I. Standard and Poor's Goldman Sachs Commodity Index (S&P GSCI)

It was the very first commodity index that was designed as a tradable index, so it was built in a way that it can replicate actual commodity market performance. The index is a US dollar denominated index and its value is derived from the total dollar weight of the basket divided by the normalizing constant. The settlement time of the index is 4:00 pm EST (Eastern Standard Time). The base value of the index was set to 100 on January 2, 1970.

The weights of the commodities are taken according to the world's production quantity whose data is taken from (OECD) Organisation for Economic Co-operation and Development. Liquidity is also taken into account while calculating weights.

For a commodity to be in GSCI, there are a number of eligibility criteria as:

- Security is issued and outstanding and not held by Goldman Sachs or its affiliates in the primary capacity.
- Security is zero-coupon.
- Liquidity should be on the higher end for at least three months.
- World Production data of at least 5 years should be present.

Commodity Price Weight (CPW) is equal to the percentage of total quantity traded multiplied by its world production average divided by 1 million.

II. Multi Commodity Exchange-Commodity Index (MCX-COMDEX)

It is a composite index constructed by Research and Development Planning Committee of MCX and Indian Statistical Institute (ISI). It was launched in June, 2005.

The commodities for the index are selected according to the liquidity of their contracts. The index is set to a base of 100 in March 2001. The index is rebalanced annually.

As COMDEX is a composite index it consists of three sub-indices namely:

- MCX-AGRI-20%
- MCX-METAL-40%
- MCX-ENERGY-40%

The index uses rollover methodology and is rolled over monthly.

III. Tokyo Commodity Exchange Index (NIKKEI-TOCOM Index)

This index is Japanese Yen based and was started in March, 2002. This index was made to represent market's overall picture as well as create a liquid investable asset for the investors based on the commodities market.

The index can contain commodities that are traded in TOCOM only. The commodities are weighed according to the relative size of the trades in cash as well as futures market. The contracts traded have a settlement date from fifth or sixth month.

The index was set to base 100 on May, 2002. The index is rebalanced in March annually in which the weight percentage is reviewed and edited if needed and it is effective from first trading day of June.

The rollover days for the index are 5th to 9th business day of the next month.

IV. National Commodity and Derivatives Exchange (Dhaanya-NCDEX)

It is INR based index designed specifically for the agricultural commodities. The index is captured in real time.

The weights of the commodities are decided according to the liquidity of the exchange and the national production values in equal proportions. Only contracts traded in the exchange are considered for inclusion in the index.

The contracts selected are near month contracts, and rolled over every 90 days. Index is also rebalanced every three months to adjust the weights accordingly.

V. Continuous Commodity Index (CCI)

This index is constructed by Thomson Reuters, and was the very first commodity index of the world constructed in the year 1957. This is a non tradable index, therefore, it was constructed to view the overall the picture of the market.

There is a set of seventeen commodities that are selected by Thomson Reuters and are taken with equal weights of 5.88% per component. It is a non rolling index and is rebalanced every 15 minutes hence called Continuous Commodity Index.

VI. Summer Haven Dynamic Commodity Index (SDCI)

It was constructed by Summer Haven Index Management. It acts an active benchmark for investors to invest in commodity markets. It is the most innovative index in the Commodity

derivatives. This index is based on backwardation i.e., that low inventory commodities will other perform high inventories.

It is based on 14 commodity contracts from 27 eligible contracts. Seven commodities are selected with higher backwardation and next seven commodities are selected having greatest twelve month price increase. Commodities selected with highest backwardation or least contagion. Rebalancing of the index is done every fifth to last business day of every month. It is a non-rolling index. Every component is weighted at 7.14% per component.

VII. Astmax Commodity Index (AMCI)

It is a Japanese Yen denominated index. It is based on TOCOM derivatives. It provides investability, transparency and sensitivity to underlying commodities.

It is weighted on the basis of high liquidity and investability. It is a non-roll over Index.

VIII. CRB-Thomson Reuters

The index is based on CPS (Commodity Price Series) and liquidity of the commodity contracts. Liquidity is termed as Percentage of trade done on the commodity contract in the index. Index is made my multiplying the percentage and CPS to make the CRB index.

The index consists of commodities listed in NYMEX, CBOT, COMEX, LME, NYBOT and CME. Commodities selected are categorised into four groups.

The index is rolled over from the last day of the contract to the 6th business day of next month. The index is rebalanced annually on January.

IX. Rogers International Commodity Index (RICI)

It is a composite US $ based Index, devised by James B. Rogers, Jr. It acts as a trading vehicle for the prospective and intentional investors. It consisted of 37 commodities futures contract, quoted in four different currencies traded on nine exchanges.

RICI aims to provide stability to the liquidity of the commodity markets. The commodities selected are weighed on the basis of liquidity and World Consumption of commodities.

The index was set to a value of 1000 on July, 1998. The index is rolled over from 3 days prior to end of contract date to end of contract date.

X. Deutsche Bank Liquid Commodities Index (DBLCI)

It is a major European commodity index which is investable in nature and depicts the overall picture of the European commodity market. The index is traded in US $, Japanese Yen, GBP and Euro.

It consists of six commodities namely

- Sweetlight Crude Oil(WTI)
- Heating Oil
- Aluminium
- Gold
- Wheat
- Corn

The weights of the commodities are adjusted according to the liquidity and volatility of these commodities.

The index is rolled over every 2nd to 6th business day of next month of the near contract. The index was set to base 100 in the year 1988. The index is rebalanced every year in November since 2004.

XI. Constant Commodity Index (CMCI)

The index was developed to promote the trade in commodity markets. The index is composed of 24 commodities categorised in 5 groups. The standard contract maturity of contracts is from 3 months to 36 months with few single component indices with standard maturity from 48 months to 60 months.

The base of the index was set to 1000 on January 29th, 2007. The rollover period for the index is four months. The index is rebalanced annually on December.

XII. Credit Suisse's Commodity Benchmark Index (CSCB Index)

It was constructed in the year 1975 and 1978. It was one of the first investable commodity future index. The commodities are weighted using world production and global market liquidity. The index is a US $ based index.

The commodities are taken from five major sectors namely Energy, Industrial Metals, Precious Metals, Agriculture and Livestock.

The index is rebalanced monthly and valuation frequency is 15 seconds making it the world's fastest and most updated Index. The rollover period of the index is from the date of expiry to the 5th business day of the far month contract.

XIII. Merrill Lynch Commodity Extra (MLCX Index)

It is a cost efficient benchmark for commodity market performance and used for investment in commodities market. It is a US $ based index.

The commodities in the index are weighted according to the liquidity and value of global production. The commodities are taken from six different market sectors Energy, Base Metals, Precious Metals, Grain and Oil Seeds, Livestock and Soft commodities and others.

The rolling period of the index is done from the end of the near month contract to the fifteen day of the next month to smoothen market impact. Commodities Contracts are taken from NYMEX, COMEX, CME, CBOT, CME, ICE, NYBOT. The primary requisite for the commodity is that at least 5,000,000 contracts sold. Liquidity is taken by total traded value, contract size and average price of the commodity. Weights are taken by average of last three years of world production.

XIV. National Association of Securities Dealers Association Automated Quotation System Commodity Index (NASDAQ–CI)

The index is US $ based index. This was made in January, 1999. It consists of thirty-three commodities.

The commodities are weighted according to the market value weight and average dollar trading value in the ratio 2:1 respectively.

The basic eligibility requirements for a commodity to be included in the index are:

- Contract must be physically settled.
- Contract must be traded in any US or UK Exchange.
- Contract must me US $ denominated.
- Contract must be traded for the previous paper.

The index is rolled over from the end of the near month contract to the fifth business day of the next trading month. The index is rebalanced annually in the month of January.

5. CRITICAL COMPARATIVE ANALYSIS AND POSITION OF INDIAN COMMODITY INDICES

The main objective of this paper is to compare the Indian commodity indices with the major commodity indices of the world. After a critical study of the world's major commodity indices we

can see the following major distinctions or points of differences between the indices. To summarize the points of differences a table has been constructed which is as follows

Table 1: Table showing various factors affecting formation of commodity derivative indices.

Indices	Purpose	Trading in Index	Weighing Methodology	Roll-Over Period (Days)	Rebalancing	Maturity of Contract	Year of Origination
S&P GSCI (U.S.A)	Mimic Market	Yes	World Production Average	21-30	1year	30days	1970
MCX-COMDEX (India)	Composite Index	No	Market Average	30	1year	30days	2005
NIKKEI-TOCOM (Japan)	Mimic Market	Yes	Liquidity	35-39	1 year	30days	2002
Dhaanya-NCDEX (India)	Mimic Market	No	Liquidity & National production average	90	90 days	90days	2005
CCI (Global)	Mimic market	No	Set of 17 commodities	-	15 minutes	-	1957
SDCI (U.S.A)	Investing Benchmark	Yes	Set of 14 commodities	-	25-30 days	30days	2005
AMCI (Japan)	Investing Benchmark	Yes	Liquidity(TOCOM)	-	1 year	30days	2002
CRB (U.S.A & U.K)	Investing Benchmark	Yes	Liquidity	30	1 year	30days	2005
RICI (¥)	Composite Index	Yes	World Consumption Average	27-30	1 year	30days	1998
DBLCI (Europe)	Investing Benchmark	Yes	Liquidity	32-38	1 year	30days	1988
CMCI (U.S.A)	Mimic Market	Yes	Set of 24 commodities	160	1 year	3months-36months	2007
CSCB (U.S.A)	Investing Benchmark	Yes	World Production Average	30-35	30 days	30 days	1975
MLCX (U.S.A)	Mimic Market	Yes	Set of 6 different sectors	30-45	1year	30 days	2011
NASDAQ-CI (U.S.A)	Investing Benchmark	Yes	Set of 33 Commodities(liquidity)	30-35	1 year	30 days	1999

¥= Traded in four currencies and nine exchanges and four countries that are U.S.A, U.K, France and Japan.

Using the major commodity indices as a benchmark to analyze the Indian Commodity Indices we can infer to the following distinctions that make the Indian Indices stand apart.

- The most important factor of differentiation is that where major world indices are weighed on the basis of world production or consumption of commodities, the Indian commodity indices

fail to take into account the global scenario of the commodities. Therefore, their reliability as a benchmark for the markets might be questioned in the global scenario.

- The Indian commodity indices are based on short-term contracts whereas some of the global indices are backed by contracts of duration upto 3 years like the Constant Commodity Index designed by Bloomberg.

- The Indian commodity indices are non tradeable (index value as such is not used as an underlying) and hence have no pressure to ensure liquidity of the index or to make index a representation of the market. They also do not seem to contribute much towards making the market complete, whereas the aim of the more advanced indices is to access the global and complete picture of the market as well as ensure liquidity in the index.

- The rollover of the Indian commodity indices is relatively less transparent as rollover is done on the immediate next day of contract expiry, whereas in majority of the indices it is found that rollover takes place over a period of days and average is taken out, in order to prevent any abrupt changes in the index.

Keeping the above things in mind it can be inferred that the Indian commodity indices lack financial innovation and this could be due to the fact that the Indian commodity market is a fairly new market only a decade has been passed since its inception. Therefore, it can be said that the Indian commodity indices do not capture the true picture of the commodity markets to an extent and hence it is a non tradable index which seems to be a right strategy at this point of time. As the index is quite weak and still to grow a lot more in terms of financial innovation and methodology of development of the index.

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