Research Paper

Precious Metals Index

The main purpose of introducing the precious metals index is to provide a different vehicle of investment for traders.

1) Precious Metals Index

A precious metals index tracks the price movement of 4 precious metals, gold, silver, palladium and platinum. The main purpose of introducing the precious metals index is to provide a different vehicle of investment for traders. Introduction of such an index, we believe, will create a separate image for us as currently, exchanges are only introducing commodities that have a physical attribute and are traded worldwide. This will be the first product that has been developed inside Nepal and if introduced, MEX will be the first exchange in Nepal to offer such a vehicle for investment.

A precious metals index is a financial instrument that serves as a benchmark for a basket of certain precious metals. In our case, the precious metals index will track the movement of gold, silver, palladium and platinum. While the name of the index is yet to be determined, it will help the investor in determining at a glance how the precious metals are performing in the market. This index will be beneficial for those individuals who want to invest in precious metals but lack the time and the capital to invest in individual commodities. The concept of a precious metal index while being a novel concept in Nepal is a very popular instrument for investment worldwide with S&P GSCI Precious Metals Index (S&P PMI), Dow Jones Precious Metals Index (DJPMI) being notable ones.

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2) Index Methodology

For the calculation of the index, we have come up with 2 alternatives. After careful scrutiny of the feasibility of both methodologies, one will be selected.

2.1) Volume based weighting method:

Under this method, individual commodities are given weightage according to the volume traded. Since palladium and platinum was introduced on March 2011, the month of March was taken as the base month. Also, during March 2011, silver had the most volume traded, followed by gold and then platinum and finally palladium. Hence, silver will bear maximum weightage (0.80), followed by gold (0.19), platinum (0.75) and then palladium (0.25). The one problem that we have found with this method is that silver prices will have maximum effect on the index. Further, since Silver was traded most in March, therefore its weightage was more. However, this might not always be the case as other precious metals might generate greater volume in the future which will balance out the index. Hence, there will be a constant need for adjustment which will be tiresome and it could create unnecessary fluctuations in the index.

2.2) Equal weightage method:

Under this method, all the four commodities will be given equal weightage, i.e. 0.25. This method seems more practical as there will be no need for constant revision of the weightage. However, since the commodities are given equal weightage, there will be less volatility in the index.

Calculation method under volume based method:

For volume based method, firstly it was important to calculate the volume traded for individual commodities. Since palladium and platinum was introduced on 4th March 2011, the closing price of the same day was taken as the base price. Likewise, the total volume traded during the month of March was used to determine the weightage. The total volume traded during March was:

Gold	Silver	Platinum	Palladium
1784	4985	62	16

The total volume for these commodities was 6847. To determine the weightage of each of these commodities:

Gold = (1784/6847)*100 = 26.06
Silver = (4985/6847)*100 = 72.81
Platinum = (62/6847)*100 = 0.91
Palladium = (16/6847)*100 = 0.23

The base price for these commodities will be the closing price of 4th March 2011.

Gold	Silver	Platinum	Palladium
34,137.65	825.72	19,628.40	44,074.08

The formula for calculation of the index is:

(W(gold)*P(gold)/B(gold)+W(silver)*P(silver)/B(silver)+W(palladium)*P(palladium)/B(palladium)+W(platinum)*P(platinum)/b(platinum))*1000

Where,
W(…) = Weightage of the commodity in percentage
P(…) = Current price of the commodity
B(…) = Base price of the commodity

To see how this calculation works,

Time/commodity	Gold	Silver	Paladium	Platinum	Index
5-Feb-2011	34672.67	927.36	18982.8	43090.8	1,101.20
6-Feb-2011	35070.32	950.52	19046.4	43384.82	1,125.91
7-Feb-2011	35079.96	949.92	19023.6	43384.82	1,125.38
8-Feb-2011	35152.26	949.8	19060.8	43384.82	1,125.67
9-Feb-2011	35188.41	950.88	19098	43384.82	1,126.92
10-Feb-2011	35229.38	953.52	18930	43384.82	1,129.69
11-Feb-2011	35200.46	952.56	18930	43476.4	1,128.61
12-Feb-2011	35128.16	949.44	18968.4	43211.3	1,125.15
13-Feb-2011	35183.59	951.72	18943.2	43165.51	1,127.65
14-Feb-2011	35128.16	950.16	18781.2	43057.06	1,125.80

" Note: Above datas are hypothetical."

Calculation method under equal weightage method:

Under equal weightage based method, we have allocated a weightage of 0.25 to each individual commodity. The formula for the calculation is the same with only a minor adjustment to the weightage which is now 0.25 is as follows:

(W(gold)*P(gold)/B(gold)+W(silver)*P(silver)/B(silver)+W(palladium)*P(palladium)/B(palladium)+W(platinum)*P(platinum)/b(platinum))*1000

Where,
W(…) = Weightage of the commodity in percentage (0.25)
P(…) = Current price of the commodity
B(…) = Base price of the commodity

To see how this calculation works:

Time/commodity	Gold	Silver	Paladium	Platinum	Index
5-Feb-2011	34672.67	927.36	18982.8	43090.8	1,020.89
6-Feb-2011	35070.32	950.52	19046.4	43384.82	1,033.29
7-Feb-2011	35079.96	949.92	19023.6	43384.82	1,032.89
8-Feb-2011	35152.26	949.8	19060.8	43384.82	1,033.86
9-Feb-2011	35188.41	950.88	19098	43384.82	1,034.92
10-Feb-2011	35229.38	953.52	18930	43384.82	1,033.88
11-Feb-2011	35200.46	952.56	18930	43476.4	1,033.90
12-Feb-2011	35128.16	949.44	18968.4	43211.3	1,031.41
13-Feb-2011	35183.59	951.72	18943.2	43165.51	1,031.93
14-Feb-2011	35128.16	950.16	18781.2	43057.06	1,028.37

" Note: Above datas are hypothetical."

3) Conclusion

This index would be the first of its kind in the country. This would really help to lift our status in the Nepalese commodity market. While there is a need to introduce this as a futures contract as early as possible, it is also imperative that the index is set error free. In this regards, the roll over contracts of commodities will have a different calculation method altogether since the prices of both the existing contracts need to be considered for this purpose. It is also important to bear in mind that this report focuses solely on making the index. Making a futures contract for the purpose of trading is beyond the scope of this report. However, should the index work as planned, the development of futures contract shouldn't be hard to formulate.

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WATER DERIVATIVES

NEXT BIG INVESTMENT OPPORTUNITY

Introduction

A lot of heads must have turned and a lot of eyebrows must have been raised seeing this topic for research. But water-constituting 70% of the total surface is a vital and an undervalued commodity whose scarcity is felt daily. According to a growing number of investors, the market for water could be the next big investment opportunity of the 21st century.

Water Derivatives are financial instruments that can be used by organizations or individuals as part of risk management strategy to reduce risk associated with adverse water conditions. Theoretically, water futures would be an agreement to buy or sell a certain number of litres of water at a pre-agreed price on a certain date. Water futures can be used to hedge against risk-that water would not be available at a particular point of time. Speculators might invest in water futures in the hope that farmers would need it in the summer and be prepared to pay more. To protect itself against the rising water prices, a farmer would buy futures contract to cover the amount he is likely to need.

Importance of Water Derivatives

Water derivatives, if traded on a platform, could become the newest financial tools for the ardent investors looking to diversify their portfolio. Since water derivatives have not been established on any platform in the world, researchers are leaving no stones unturned in their quest for establishing the water derivatives without any loopholes in the system.

The risk of water availability is the painful reality of life for much of the Nepalese economy. Risks are borne not only by users of water, but by all parties that make up the rural economy including banks, insurers and suppliers. Unlike equity or commodity markets, there is no market into which users and investors exposed to water availability risk, can effectively hedge that risk.

It may not seem important at first, yet the implications of this missing piece of infrastructure are profound. Farmers with water availability risk currently do not have means of hedging against drought conditions. Consequently, service providers to these farmers assume similar exposure and add the requisite risk premium thereby increasing the cost of doing business for farmers. Finally, investors seeking large scale capital investment opportunities either avoid this sector, or are forced to price this risk accordingly. The result is increasingly high costs compounded by even greater inefficiency.

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Objectives of establishing Water Derivatives

The ultimate objective of the Water Derivatives is to reduce the risk premium for parties wishing to invest in economic activity and water resource infrastructure. However, the objectives for establishing the water derivatives are explained below.

• Water Derivatives will be a critical piece of national economic infrastructure that will underpin and strengthen the commercial viability of parties with an exposure to water availability.

• Water Derivatives would encourage investment in infrastructure through improved decision making resulting from the discovery of prices relating to future availability risk.

• Investing in water derivatives could enhance the public's awareness of available water resources and thus usage.

• Knowledge gained from the markets could increase the productivity and efficiency of Nepalese water use.

Benefits resulting from Water Derivatives

The major expected benefits of the Water Derivatives are as follows:

• An effective water derivatives market will encourage water saving, better pricing and an efficient usage of available water resources.

• Better community understanding of the need to preserve Nepalese scarce water resources.

• Promotion of water efficient technology to comply with the highest international standards.

Developing the Water Derivatives Index

The first step in the development of the index is to identify the commodity or index on which the market will be based. In this case, the key task is to create recognized benchmarks that mirror the risk profile of parties with exposure to water availability. These can be concluded as the water indexes. Such an index needs to be independently and objectively priced and in doing so, ensure that it is not manipulated artificially . Once an index is established, a market on what is the future price or value of the index can be formulated.

MEX Water Index

The MEX Water Index is a conceptualized term which will be used for this research purpose. The MEX Water Index will be a water index, which will reflect aggregated reservoir storage in the key water storage systems of the capital, Kathmandu. The index will incorporate storage data reflecting the

percent of full capacity for the storage units in the index. In the instance of multiple storage facilities, these will be weighted averaged according to capacity.

How the Index will work?

The index will represent the actual storage in the reservoir as a percentage of the 'Full Capacity' or 'Total Capacity'. The index will move up and down in response to the actual water stored. The maximum index value will be 100. The minimum index value will be zero. As storage increases in response to water inflows, the respective index will also rise and vice versa.

Calculating the Index

The MEX Water Index will comprise of the main eleven reservoirs in Kathmandu namely, Mahankalchaur, Bansbari, Balaju, Maharajgunj, Sundarighat, Sainbhu, Bode tigani, Tahakhel, Katunje, Minbhawan and Anamnagar. The following data illustrates how this index will be created.

Taking the weighted average for the storage units in the system, the above table shows that the MEX Water Index on 13th October 2011 was 49.85%.

Indexes reflecting present reality

One of the fundamental principles underpinning the index is that they reflect the physical reality-this being that when the index is low, by definition there has been little rainfall in the Kathmandu Valley. Conversely, when the indexes are higher, it indicates there has been plenty of rainfall in the aforementioned region.

What would a Water Futures Contract look like?

Contract specifications:

A futures contract listed on the MEX Water Index would provide a future price indicator as to expectations of where the market believed the index would be in the future. Proposed key contract specifications are detailed below:

Name	MEX Water Index
Symbol	MWI
Contract Size	NPR 10,000 based on an index value of 100
Price Quoted	NPR/0.01
Minimum Price	100
Movement Trading Hours	10:00 am to 3:30 pm on each trading day
Last Trading Day	All trading in expiring contracts ceases at 12:00 pm. Non expiring contracts continue to trade as per the normal trading hours.
Cash Settlement Price	The relevant MEX Water Index average of the contracts' expiry day's final minute i.e. from 11:59 to 12:00 will be taken as the final settlement price.

Reservoirs	Full Capacity in Cubic M	Actual Capacity on 13th Oct. 2011	% of Full
Mahakalchaur	9750	5850	60%
Bansbari	2000	800	40%
Balaju	3600	1440	40%
Maharajgunj	4500	1800	40%
Sundarighat	800	320	40%
Sainbhu	5400	2160	40%
Bodetigani	1000	400	40%
Tahakhel	1000	400	40%
Katunje	2000	800	40%
Minbhawan	3080	2002	65%
Anamnagar	2700	1890	70%
Total	**35830**	**17862**	**49.85%**

(Source: Kathmandu Upatyaka Khanepani Limited (KUKL) at a glance-Third Anniversary 2066-67)

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Quality:

Group	Parameter	Unit	Maximum Concentration Limits
Physical	Turbidity	NTU	5(10)**
	pH		6.5-8.5*
	Taste & Odor		Would not be objectionable
	Total Dissolved Solids	mg/l	1000
	Electrical Conductivity	µc/cm	1500
	Iron	mg/l	0.3(3)**
	Manganese	mg/l	0.2
	Arsenic	mg/l	0.05
	Cadmium	mg/l	0.003
	Cyanide	mg/l	0.07
	Fluoride	mg/l	0.5-1.5*
	Lead	mg/l	0.01
	Ammonia	mg/l	1.5
Chemical	Chloride	mg/l	250
	Sulphate	mg/l	250
	Nitrate	mg/l	50
	Copper	mg/l	1
	Total Hardness	mg/l	500
	Calcium	mg/l	200
	Zinc	mg/l	3
	Mercury	mg/l	0.001
	Aluminum	mg/l	0.2
	Residual Chlorine	mg/l	0.1-0.2*
Micro Germs	E-Coli	MPN/100ml	0
	Total Coli form	MPN/100ml	95% in sample

(Source: Ministry of Physical Planning)
** These standards indicate the maximum and minimum limits.*
*** Figures in parenthesis are upper range of the standards recommended.*

Note: The contract specifications are formulated using examples from other exchanges due to the data unavailability regarding the same.

Hedging against a drought

Assume the following situation exists in November 2011:

• A farmer in the outskirts of the Kathmandu Valley is planning to plant a crop in June 2012 but is concerned that if dry conditions prevail, water will either be unavailable or too expensive. He calculates that the loss from a failed crop would be approximately NPR 50,000 whereas the profit resulting from positive conditions would be NPR 100,000.

• The current level of the MEX Water Index is 49.85.

• The farmer decides to sell 20 June MEX Water Futures Contract at 49.85.

Outcome 1:

During spring, farmer fear prevails and there are drought conditions. As a result, storage in the MEX Water Index falls to only 25. As a result, the farmer's crops fails due to the drought conditions.

The June 2012 MEX Water Index Futures contract expires at 25.00 resulting in a profit of NPR 49,700 (49.85-25*100*20 contracts) offsetting the loss borne by the farmer from the failed crop.

Outcome 2:

During spring, good rains fall and the level in the reservoir actually rise above what was even expected with the MEX Water Index attaining a level of 75.00. The farmer has a successful crop earning the expected profit of NPR 100,000. However, the 2012 MEX Water Futures contract expires at 75.00 resulting in a loss of NPR 50,300 (75-49.85*100*20 contracts). This is offset by the profit earned from the successful crop.

However, in the second outcome, the farmer will have decided to close out the contracts before maturity by buying before the expiry of the June 2012 contract thereby reducing the losses incurred.

Challenges

Inspite of numerous advantages of the Water Derivatives, there are few challenges that we faced during the making of this research paper. The challenges faced are discussed below.

1. According to Kathmandu Upatyaka Khanepani Limited (KUKL), there are altogether 43 reservoirs within and outside the Kathmandu Valley. Apart from the 11 major ones, the other 32 reservoirs constitute less than 14 % of the total capacity. Hence, we had taken the data of only 11 major reservoirs for the research.
2. Data regarding the major reservoirs were not easily disseminated by the concerned authorities thereby leading to ambiguity in terms of given data available.
3. The requisite data in Nepal is not reliable and the KUKL department is not well equipped for better dissemination of information.
4. Lack of effective legal and economic framework
5. Training of qualified specialists for working with these instruments
6. Attracting companies interested in hedging their losses

Conclusion

The exact way that water derivatives would fit into the global commodity market is still ambiguous. It could be comparable to current markets in Australia, or even micro-markets in the US, in which water rights are sold and traded simultaneously as the state management of water supplies. What does this mean for the future of investors with no significant investment available? Well, that is uncertain, but one thing is for sure, there are many individuals that would like to make a profit on the liquid of life, water.

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