Commodity Derivatives and Risk Management
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Lecture 19
Seasonality in Agri Commodity Contango and Backwardation Part 2

Welcome to the this session on Commodity Derivatives And Risk Management and if you recall last class I had given each of you an assignment to find out the seasonality index associated with Gold and DAP fertilizers price. Now just to give you a recollection, if you remember seasonality index can be found out by dividing the average price prevailing for a given month or a season or a quarter divided by the total price average price of over the time into 100. So this is the seasonal index or seasonal index in percentage terms.

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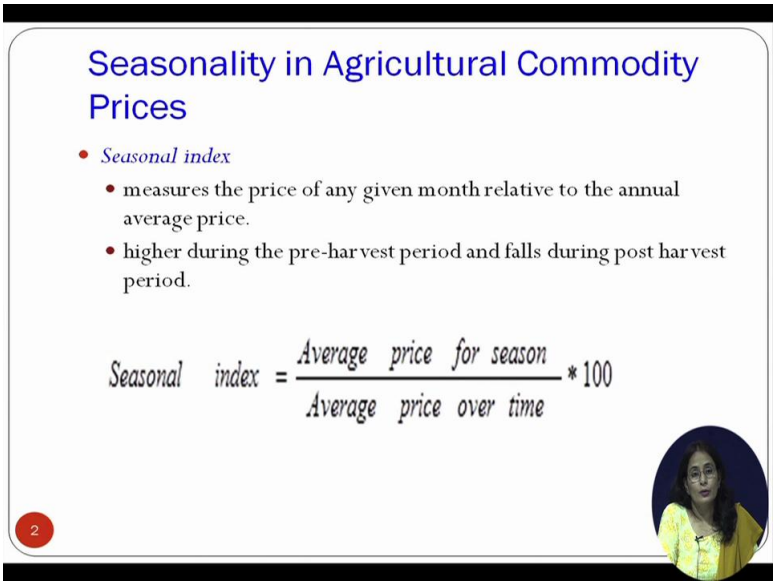

So this index shows the average price for the season divided by average price overtime and I am sure you get got time to work out the seasonality between gold and gold prices as well as the prices of DPA fertilizers. So can you please tell I mean can you please identify which months are high seasonal months and low seasonal months? As I mentioned there is no way of me coming to know whether you have done it or not had it been a regular class probably I would have asked you to show me your result, and I am sure being a simple excel assignment you would have found you would have found it quite easy to answer this question nevertheless let me show you what is the answer to this particular question or which months have higher seasonality and lower seasonality between these two commodities.

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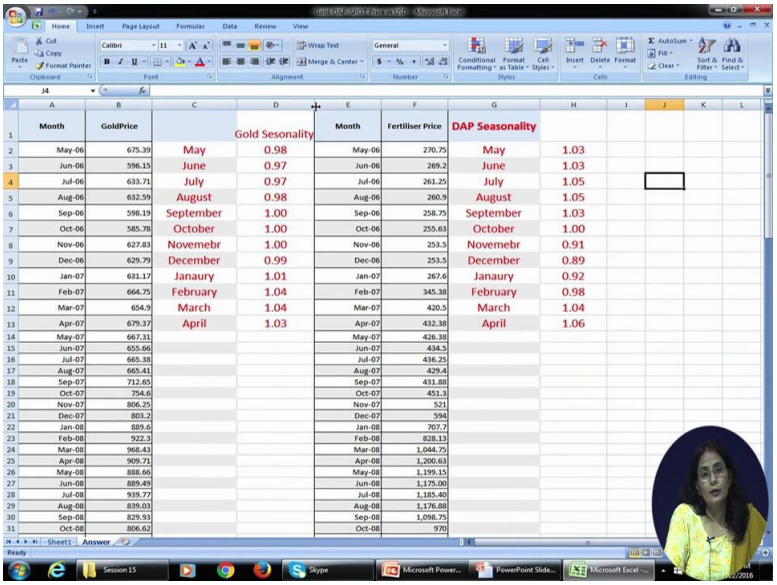

Month	GoldPrice		Gold Sesonality	Month	Fertiliser Price	DAP Seasonality	
May-06	675.39	May	0.98	May-06	270.75	May	1.03
Jun-06	596.15	June	0.97	Jun-06	269.2	June	1.03
Jul-06	633.71	July	0.97	Jul-06	261.25	July	1.05
Aug-06	632.59	August	0.98	Aug-06	260.9	August	1.05
Sep-06	598.19	September	1.00	Sep-06	258.75	September	1.03
Oct-06	585.78	October	1.00	Oct-06	255.63	October	1.00
Nov-06	627.83	Novemebr	1.00	Nov-06	253.5	Novemebr	0.91
Dec-06	629.79	December	0.99	Dec-06	253.5	December	0.89
Jan-07	631.17	Janaury	1.01	Jan-07	267.6	Janaury	0.92
Feb-07	664.75	February	1.04	Feb-07	345.38	February	0.98
Mar-07	654.9	March	1.04	Mar-07	420.5	March	1.04
Apr-07	679.37	April	1.03	Apr-07	432.38	April	1.06
May-07	667.31			May-07	426.38		
Jun-07	655.66			Jun-07	434.5		
Jul-07	665.38			Jul-07	436.25		
Aug-07	665.41			Aug-07	429.4		
Sep-07	712.65			Sep-07	431.88		
Oct-07	754.6			Oct-07	451.3		
Nov-07	806.25			Nov-07	521		
Dec-07	803.2			Dec-07	594		
Jan-08	889.6			Jan-08	707.7		
Feb-08	922.3			Feb-08	828.13		
Mar-08	968.43			Mar-08	1,044.75		
Apr-08	909.71			Apr-08	1,200.63		
May-08	888.66			May-08	1,199.15		
Jun-08	889.49			Jun-08	1,175.00		
Jul-08	939.77			Jul-08	1,185.40		
Aug-08	839.03			Aug-08	1,176.88		
Sep-08	829.93			Sep-08	1,098.75		
Oct-08	806.62			Oct-08	970		

Uh let me take you through so this is an answer to okay let me increase the size, 16 this is the DAP seasonality and let me make it lets say 16 okay. I hope all of you are able to see these values and let us compare the seasonality percentage points of seasonality data in gold. So if you can see the lower seasonal point is a month of May that is 0.98 we see, the higher seasonal value of 1.04 in the months of February and March. Okay one thing I would like to tell is that in whenever we model this seasonality we will never get the value of 1 for a given for all months, so there has to be some variations in the spot prices and that spot price is going to be reflected in some value other than 1.

So but still can we consider this let us say 0.99 to be less seasonal value than 0.1 1.01, theoretically speaking yes however, when only when there is substantial amount of difference in these numbers then only we can say that in some months have high seasonal months and some months are low seasonal months. So if you analyze the points for May to April as mentioned here there is not much of a difference in case of a gold. Now let us come to the DAP seasonality and its identify which the list or the months having the lowest price that is a December, December has the value of 0.89 and which one is the highest month July and August have the highest months of 1.05, so how do we interpret this number that is July and August month prices on an average is increased 5 percent this will be the average prices prevailing in the rest of the year.

So okay let us interpret the month of December which has the value of 0.89 so how do we interpret that value that this point 0.89 indicates that on an average during the month of December gold price falls by 11% as compared to the annual average value. So when we

compare the distribution of this seasonal indices values over months over 12 months for DAP as compared to the gold you can see that there is a greater amount of variability in the seasonal index values in case of a DAP fertilizer. So we can very clearly see that November and December are lower price months and July August are high price months.

So this is in a very-very simple way of identifying seasonality associated with a commodity's price. there are a lot of advance statistical models available and software packages are also available, you can use those software packages to identify seasonality or seasonal component associated with the price series, but I have I have realised this is something which is very easy and very quick way of indentifying seasonality in a in a commodity price series. Or it could be any data it need not be commodity prices it could be sales, it could be cost of production it could be any priced data.

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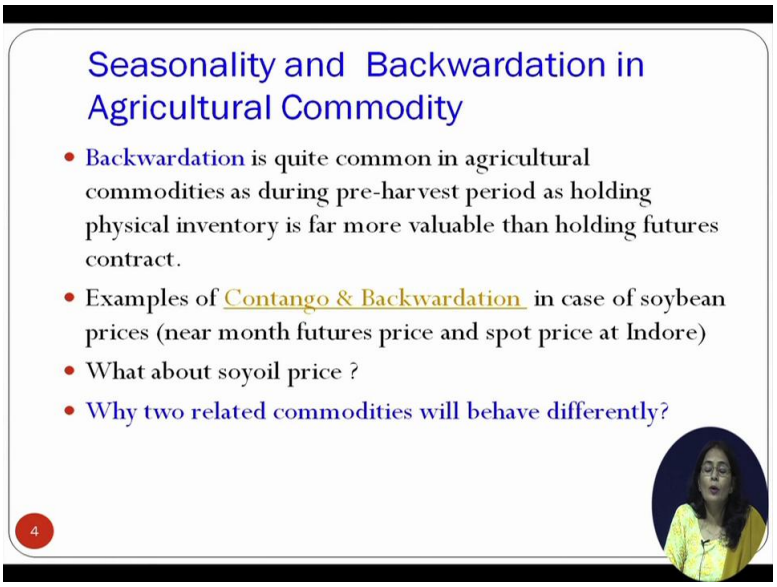

With this let us go to the remaining part of the session so in this in today's session we will also be discussing about the seasonality impact of seasonality on Contango and backwardation of a commodity spot and futures price. If you recall we have discussed in some of the one of the earlier session what do you mean by Contango and what do you mean by backwardation.

And Contango is a situation where the spot price is less than the near month future's price and near month future's price future's price is less than the next near months future price so on and so forth, that is spot price is less that M1 and M1 is less than M2 and M2 is less than M3 so on and so forth. So that is a market which is called a Contango market, and which is a

backwardation market; backwardation market is is a market where reverse happens that is spot price is greater than M1 and M1 is greater than M2 and M2 could be greater than M3, so and so forth.

Now and if you recall we also discussed that during the pre harvest period when normally agricultural commodities tend to have lesser supply at that point of time you commodity spot future's price tend to exhibit backwardation. Now let us check in real life whether backwardation happens and if backwardation happens how often backwardation happens. Now as as an example of checking the Contango and backwardation relation between spot price and future price, I have used the commodity which is soya bean. So I have compared the spot price of soya bean spot price prevailing at Indore which will be the near month future price traded at NCDEX.

And the reason for me choosing Indore market is Indore spot market price the reasons are 2 fold, 1 is the bases delivery centre for contract specification of NCDEX soya bean futures contract is Indore. And Indore is also the largest spot market for buying and selling soya bean so and this when talk about spot price of soya bean, we normally prefer to the spot price prevailing at Indore so this is the reason why I have considered the spot price prevailing at Indore and the NCEDEX future NCEDEX future's price on soya bean. Now let us see what the Contango backwardation happens and if happens what is the regularity with each Contango and backwardation happens.

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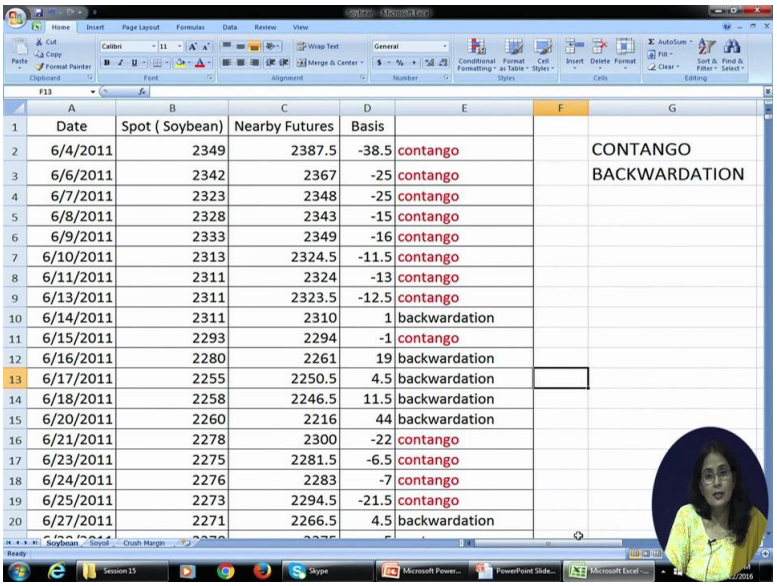

	A	B	C	D	E	F	G
1	Date	Spot (Soybean)	Nearby Futures	Basis			
2	6/4/2011	2349	2387.5	-38.5	contango		CONTANGO
3	6/6/2011	2342	2367	-25	contango		BACKWARDATION
4	6/7/2011	2323	2348	-25	contango		
5	6/8/2011	2328	2343	-15	contango		
6	6/9/2011	2333	2349	-16	contango		
7	6/10/2011	2313	2324.5	-11.5	contango		
8	6/11/2011	2311	2324	-13	contango		
9	6/13/2011	2311	2323.5	-12.5	contango		
10	6/14/2011	2311	2310	1	backwardation		
11	6/15/2011	2293	2294	-1	contango		
12	6/16/2011	2280	2261	19	backwardation		
13	6/17/2011	2255	2250.5	4.5	backwardation		
14	6/18/2011	2258	2246.5	11.5	backwardation		
15	6/20/2011	2260	2216	44	backwardation		
16	6/21/2011	2278	2300	-22	contango		
17	6/23/2011	2275	2281.5	-6.5	contango		
18	6/24/2011	2276	2283	-7	contango		
19	6/25/2011	2273	2294.5	-21.5	contango		
20	6/27/2011	2271	2266.5	4.5	backwardation		

This particular I hope you are able to see eh the details. Of course this eh this Excel file will be made available to you when you will be undergoing or seeing these videos. So let me start how have I had gone calculating calculated the Contango and backwardation just simple excel calculation you have spot price of Soybean mentioned in the column B. And nearby future price that is M1 that nearby future price which is mentioned in column C and we have calculated the basis. Basis as you recall, basis is spot minus the futures price, so the basis on the first day that is on your first day of the data for which I have considered is minus 38.5 indication spot A is lesser than the nearby future price.

And this data I have downloaded from the Bloomberg's database of Vinay Gupta school of Management, IIT Khadakpur. And for our regular MBA student as well as PHD in Finance and Dual Degree Financial Engineering students, we have subscribed Bloomberg dominals and these dominals are extensively used by our students and research scholars for doing research and understanding more about the front aspects of financial market Indian Financial Market as well as Global Financial Market.

Now let us focus on to this discussion on basis. So the basis we have calculated, so this data I have downloaded from 2011 to it has gone up to sometime up to 20th June 2016. So this data has been downloaded from for a period of almost Five years. So now let us go to understanding the Contango and Backwardations, so if basis is negative it will be a Contango market and if basis is positive it is a Backwardation Market. So this simple Excel calculation shows that period of Contango followed by period of backwardation. If you see this period is complete backwardation then there is some period Contango and there is Backwardations so and so for.

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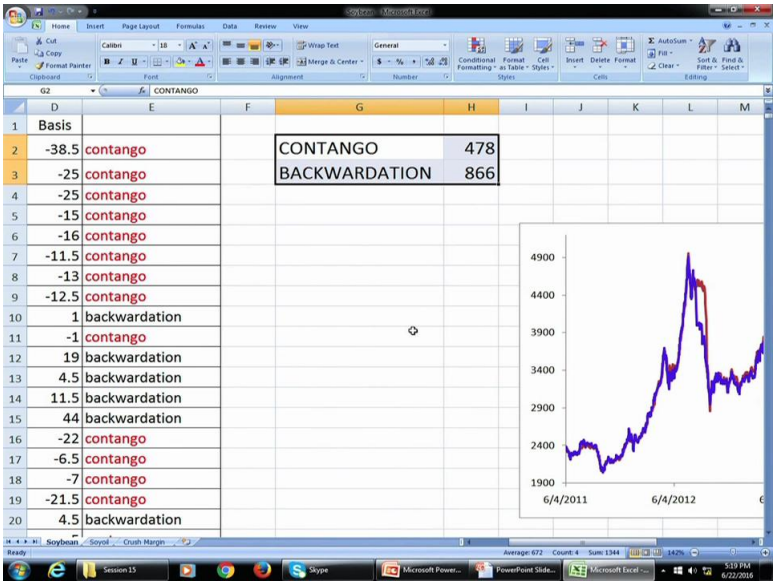

And I just did a simple tally of number of days of Contango and number of days of backwardation for the data period which I have which I have considered for this particular discussion. So I have around 1300 data 1300 data points and you could can see the backwardation is for 866 days (())13:32) Contango for 478 days. So soya bean market is exuberating more number of days backwardation days as compared to the Contango market. So is seasonality cause for it? Let me refresh, seasonality is one of the most important cause which contributes towards backwardation.

But when it comes to 5 years of data and you have almost two third of the data, two third data is have back warded price series compared to one third as a Contango, so there could be some there could be reasons which is over and eve up the seasonality. So that as a person who is analyzing the prices of ah, why this is going to happen if you analyze if you prove further, you will be able to get a clue why soya bean has backwarded for a long period of time and that also we are going to discuss in detail.

Ah okay with extending this discussion little further, if that soya bean is crust to arrive at or to produce soya oil and soya meal. And what is Soya oil? The popular brand of edible oil which you may be consuming on daily basis or at your home you must be buying different branded soya oil packets soya bean oil packets so Soya bean is crushed to arrive at two products that is your sorry soya oil and Soya meal. And what is a Soya meal? Soya Meal if this popular brand of Nutrella nuggets, so that is one product which we consume as soya meal we consume. And predominately in India soya meal is consumed as as poultry feed.

So companies which are into farming poultry and fishery, so they are they use the soya meal because these are highly nutritious and it helps the chickens to achieve the desired weight very quickly. So majority of consumption of soya meal in India is for poultry and animal field. Now let us go to understand more on what is the Contango and backwardation situation in case of soya oil, soya oil is a derivative product from soya bean, so instinctively we will think that whatever is happening in soya bean market will probably reflect in the soya oil market. Now let us go and check whether the similar kind of situation is there as far as the Contango and backwardation is concerned.

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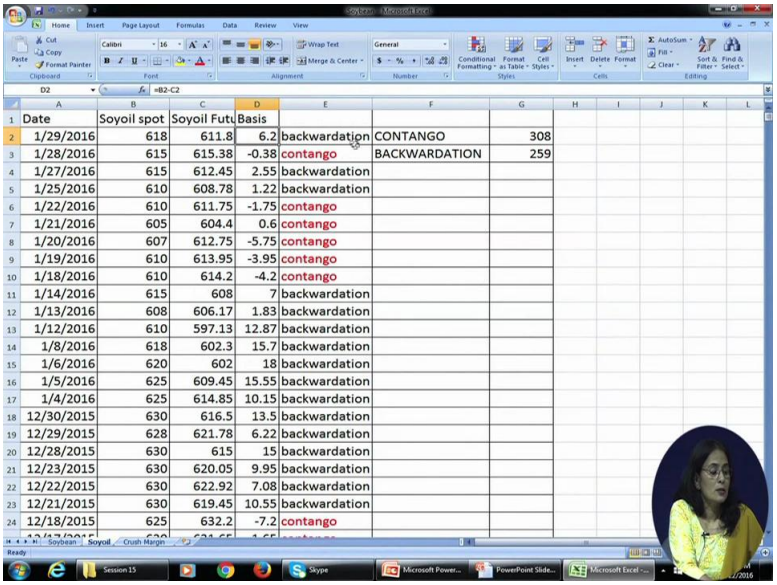

	Date	Soyoil spot	Soyoil Futu	Basis			
2	1/29/2016	618	611.8	6.2	backwardation	CONTANGO	308
3	1/28/2016	615	615.38	-0.38	contango	BACKWARDATION	259
4	1/27/2016	615	612.45	2.55	backwardation		
5	1/25/2016	610	608.78	1.22	backwardation		
6	1/22/2016	610	611.75	-1.75	contango		
7	1/21/2016	605	604.4	0.6	contango		
8	1/20/2016	607	612.75	-5.75	contango		
9	1/19/2016	610	613.95	-3.95	contango		
10	1/18/2016	610	614.2	-4.2	contango		
11	1/14/2016	615	608	7	backwardation		
12	1/13/2016	608	606.17	1.83	backwardation		
13	1/12/2016	610	597.13	12.87	backwardation		
14	1/8/2016	618	602.3	15.7	backwardation		
15	1/6/2016	620	602	18	backwardation		
16	1/5/2016	625	609.45	15.55	backwardation		
17	1/4/2016	625	614.85	10.15	backwardation		
18	12/30/2015	630	616.5	13.5	backwardation		
19	12/29/2015	628	621.78	6.22	backwardation		
20	12/28/2015	630	615	15	backwardation		
21	12/23/2015	630	620.05	9.95	backwardation		
22	12/22/2015	630	622.92	7.08	backwardation		
23	12/21/2015	630	619.45	10.55	backwardation		
24	12/18/2015	625	632.2	-7.2	contango		

Similarly I have downloaded data this data set is little different depending upon the availability of data, so it is running from 2016 till 2013 so almost 3 years of data. And if you see again the same thing I have taken the spot price, I have taken the future's price, I have calculated the basis, and basis is spot minus future. And this is Contango market or backwardation market, I have just a simple excel formula it gives me the number of days where this market has exhibited Contango, visibly number of days over backwardation.

So you have 308 days of Contango over 259 days of backwardation. So, almost 560 data points out of 560 data points so you have 308 days of Contango and more number of days of backwardation. If you recall just now we discussed about the number of days of backwardation and Contango with respect to soya bean and the number of days of backwardation is far higher almost double the amount in case of soya bean, but situation reverse when we at considering the spot features price relationship for soya oil.

So my next question to you all is that where even if soya bean is derived from soya oil why so there be a difference in Contango and why should these two prices be moving in a different direction or different manner? Now let us, so answer to this last question of mine is that why this two related commodity will behave differently? This lies be the understanding of what factors influences the price of these two related commodities? Now let us before I go into the discussion on what factors influences what factors influences soya bean and soya oil prices, let me ask a question to you I have some. Okay I have some oil seeds here at my disposal.

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So it just got mixed up. Give me a couple of minutes let me segregate them, so that you will get to see clearly what this are. So these are your now, how many of people will be able to identify what are these seeds? I will just give you 10 seconds or 15 seconds, so please tell me how many of you will be able to identify which one is a Soybean? Okay, there is no way of me knowing whether you are able to or not able to answer this question of mine. Okay let me give the answer; this is your Rajma or red kidney bean or red rajma. This is another variety of rajma, this is your green moong, this is your yellow peanuts yellow peas I am sorry yellow peas , these are your these are your green peas dried green peas, these are your yellow peas, and these are your Soybeans.

So, now why some of you must be thinking that why am I why am I spending some time on this half an hour on video, asking you questions which could be not be so important or can be considered as ridiculous. My objective is not to ask this ridiculous question, why am I doing this is that, if at all you are going to be a commodity derivative trader and you would like to

take exposure on future options or any other contract related to the commodity, you can only formulate it price direction; only when you understand what are demand, what are the demand, who produces, who consumes this commodity, who are major producer, who are the major consumer, from which country this commodity has commodities are produced, consumed.

What are the export-import regulations there, what are the export-import regulations in India and what are the competing products. So only when you are able to understand the commodity different fundamental aspect of the commodity, you will be able to then you will be able to formulate a view the future price direction. Otherwise it could be a severe loss making proposition on your part. So, the fact that people who are producing or consuming it or value chain partner of a commodity, they are in the business of handling that commodity on day to day basis. And their business or their operation requires them to know more about the company, more about the commodity.

However if you are a speculator and you are going to be trading commodities just because you want to get some profit and make some make an investment and get some profit out of it, then it becomes very important for you to understand. What are the factors which influences the price, which starting from what is acreage of plantation, who is consuming, who is doing what, what kind of government regulations are happening. So that is the, considering this to be very-very important, all this understanding about this commodity or a commodity starts with knowing what is a commodity.

So the remaining part of the session we are going to discuss the different aspect of Soybean, soya oil and soya meal, hence I thought to do a, spend a little time to sensitise and highlight the importance of understanding about a particular commodity by getting to see that commodity, touching, feeling and knowing more about the commodity. So now let us go to our today's agenda of what are the factors that influence the Soybean, soya meal and refined soya oil prices in India.

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Now why have I chosen Soya oil as one of the representative commodity to discuss, considering the fact that around 40-45 every commodity are traded at NCDEX, every commodity future are trade at NCDEX and MCX. The reason for my choice of Soybean is that, Soybean is the most popular and largest produced oil seed. About 55% of the total oil seed produced in all over the world is comprises of Soybean., and Soybean also with respect to India, in Soybean future contract is one of the longest running futures contract at NCDEX. And going to the different factors influencing the Soybean, soya meal and refined oil prices; I am sure that entire Soybean seeds cannot be consumed as it is.

A Soybean seed has to be has to be pressed or crushed to extract soya oil and soya meal. And soya oil and soya meals have different usage and different demand, different supply, different constraints, different export-import rules and regulations, and that is the reason you will come across the way, how the price of Soybean moves vis-a-vis soya oil or soya oil vis-a-vis soya meal. Even if these three commodities are inter related to a derive from the other but the price pertaining to this three commodities do not move in a synchronised manner. So I would like to we are almost the time has come so I would like to wind up this session at this point of time, let me summarise what we discussed.

We discussed about how to calculate the seasonality index for two commodities that is Gold and DAP fertilizer, we also discussed how commodities spot and future prices exhibit Contango and backwardation. We also discussed even though two commodities which are highly seem to be related because they derive, one is derived from other that is soya oil crushed soya oil is derived from crushing Soybean, but still the way future spot and prices

move for both these commodities are significantly different. In the next session we will continue the part of analysis pertaining to the soya oil, Soybean and soya meal Thank you all of you. As every time every day I see looking forward interacting or meeting you all in the next session, Thank you all of you.