Commodity Derivatives and Risk Management
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Lecture 40
Real Estate Derivatives

Hi all welcome to this last session on Commodity derivatives and risk management and we will continue with discussion on different contracts which are traded at LME, London Metal Exchange as you may be recalling that we discussed about different kinds of derivative contracts which are offered at LME so let us continue with that discussion.

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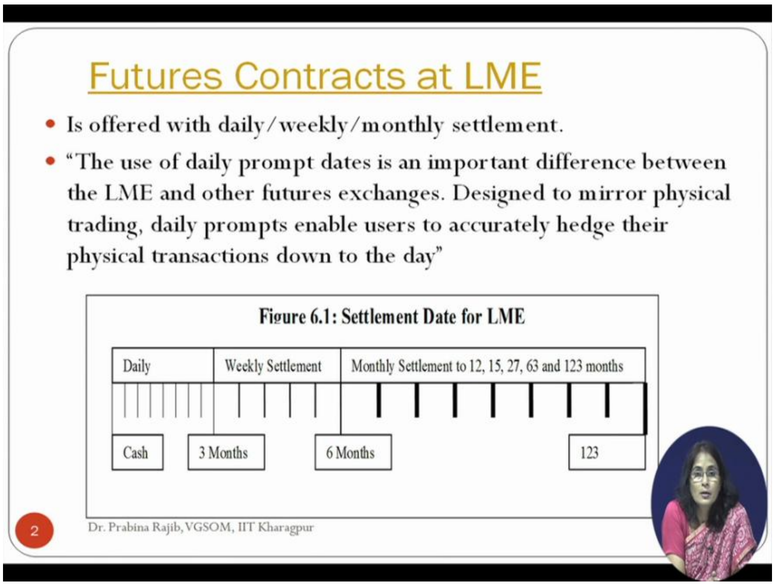

So you have futures and option contracts as well as traded average price options, swaps, etc gets traded at LME. Let us quickly focus on what is the trading calendar at LME so if you can see this particular contract, you have this portion is that it runs from daily. It is this cash 2 or 3 months and weekly settlement 6 months and you have monthly settlement goes into 123 months, so what do you mean by this daily settlement?

Uh, if you recall normally forward normally futures contract have monthly expiry but LME provides futures contract to be taken for 8 days, 9 days, 10 days, 11 days, so if you are if a company is interested to take a futures contract for 10 days or 11 days or anytime up to 3 months, that they are free to take as long as there is counter party who is interested to take a reverse position. So buyers and sellers can take futures contract maturing any day up to 3 months and post 3 months post 3 months, there are contracts which are maturing on weekly settlement.

Like let us say from today, if a company wants to take long futures for 3 months 7 days, this company will be able to take or 3 months 14 days, it will be able to take. So this facility is available for 6 months and post 6 months, the company will be only able to take contracts for monthly maturity and it can go up to 123 months, that is today some company wants to take a long or short futures for 10 years or little longer than 10 years, 10 year 3 months, that facility is also available provided there are counter parties to take short futures position.

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So similarly there are option contracts are available at LME and all option contracts have futures as underlying ad so unlike futures contracts, options do not have daily or weekly settlement. All option contracts leads to their monthly maturity contracts and option contracts when the contracts expire, the buyers and sellers take long futures and short futures as we have discussed earlier.

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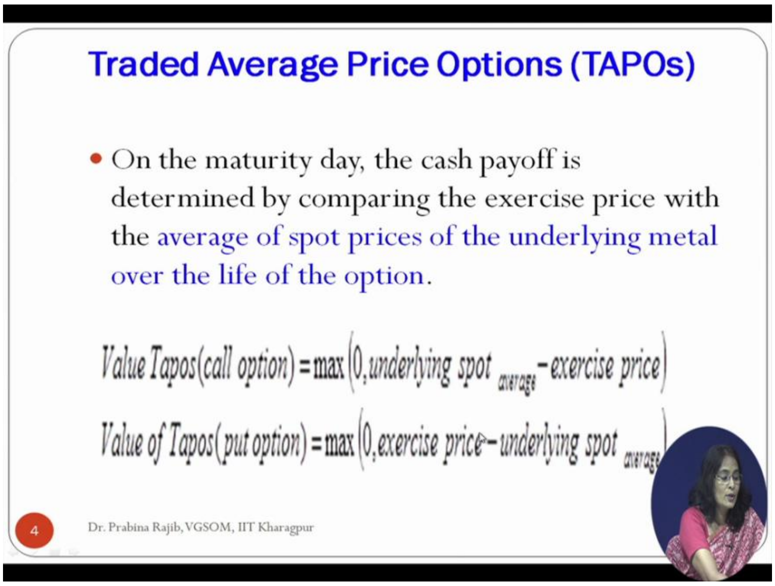

A very interesting option which is available at LME which is known as traded average price option or TAPO, so what exactly is a TAPO? If you see normally a call option will be in the money when the underlying spot price on the contract maturity date is greater than exercise price. That is we write ST is greater than X but here if you see we not written the T, but we have written the average price so a in case of a TAPO, the average price is considered as the spot price so average spot price is considered and that is compared with the exercise price to arrive at the arrive at the whether the option in the money or out of money and accordingly the option is in the money, the option is exercised and the buyer gets the long call position. He gets long futures it takes a long futures position.

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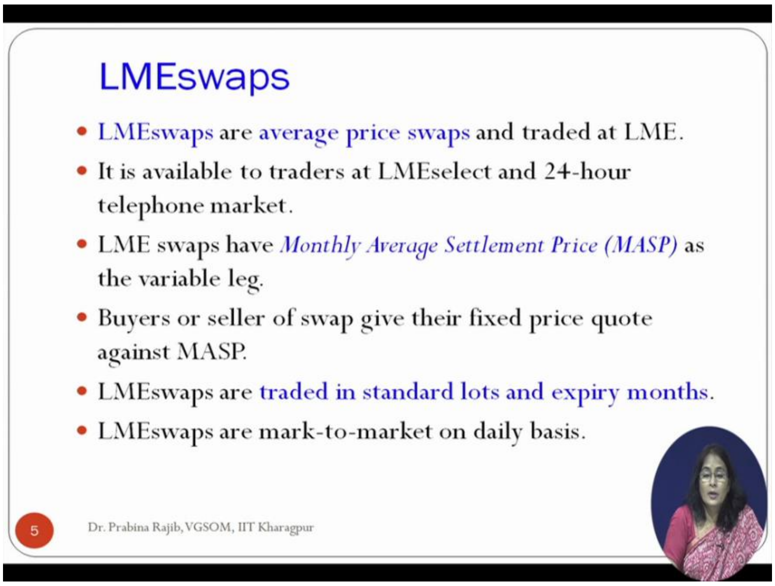

Now, at LME also there are swaps available, exchange traded swaps, if you recall normally swaps are OTC contracts, but at LME there are standard maturity standard lot contracts are available and buyers and sellers can enter into these exchange traded swaps which are known as your LME swaps. Let us say a copper concentrate or a copper cathode buyers and copper tube seller.

Suppose a company which buys copper cathode and sales copper tubes, its fear is that copper price is going to up and it will not be able to pass on that price increase to its customer because of there is heavy competition in the copper tube market so it is fearing that price is going to go up accordingly it will be able to accordingly it will be able to enter into this LME swap to mitigate this particular price.

And these swaps are not OTC contracts, these are exchange traded contracts and these swaps are if you can see these are swaps are marked to market on daily basis like any futures contract these swaps are marked to market on daily basis. Also there is in some earlier sessions we had discussed about index, commodity futures index so LME prepares a index called LMX, so that is your London Metal index and this index takes the value from weighted average futures price up to 30 months for 6 commodity contracts traded at LME and like any index, you have to have constituent and you have to have the weights.

So the constituent comes from the price of these 6 commodities and what is the weights, weights are decided based on the average global production of that commodity over the last 5 years and the average trading volume of each of these commodity over the last 5 years so all these 5 things are taken into consideration to arrive at a weight so what is the weight for different commodity, it is also available at London Metal Exchange website. So, on a daily basis London Metal Exchange informs what is the LMX value and also interestingly there is a futures contract on LMX, so people can buy and sell futures contract on the index that is the LMX.

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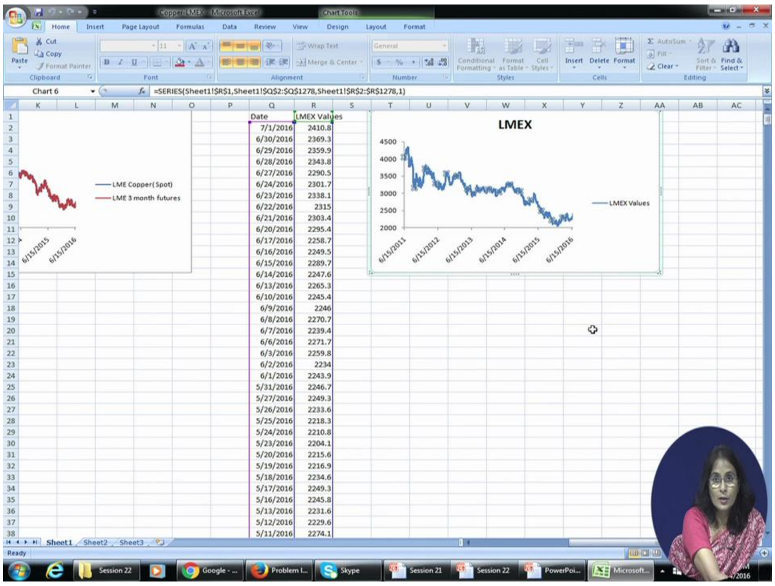

Now let us go to if you see this is the data which I have downloaded from Bloomberg to show you how the LMX has moved from this data is from 2011 to 2016. This LMX has a value of base value of 100 which was in the year 1984 so value has if you can see around 2011, this was quoting around something around 4000 odd points, now it is quoting around 2400 odd points which is I mean all of that the globally all commodity price has gone metal prices have gone down significantly and that can be seen from the LMX values.

I also did a little bit of small modeling between copper a spot at LME and 3 month futures at LME and if you can see, this value shows the Contango and backwardation. I will make available this particular excel file for so let me again open this. If you can see this one so you have during this month of June, you have a Contango followed by considerable period of backwardation in the copper market, so this particular slide show this particular excel file shows the Contango backwardation calculation for copper futures and copper 3 month futures and copper spot price from the LME data.

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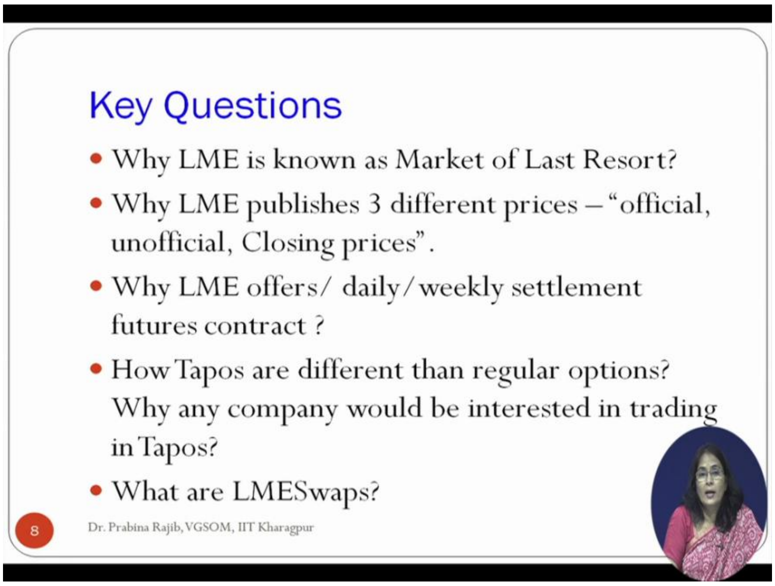

Now, with this we will come to what are the key questions with respect to LME as a exchange and contracts which are offered by metal contracts which are offered by LME. So why LME is known as market of last resort and why LME publishes 3 different prices that is official, unofficial and closing prices and how these prices are different from each other and why LME offers daily weekly settlement on future contract unlike any other commodity exchanges? What are TAPO' and how they are different from regular options and why any company would be interested in trading in TAPOs and finally what are LME swaps?

Of course, LME considering the wide verity of contracts which are traded at LME you a lot of a lots of time can be spend on understanding different aspect of LME futures and option trading. However for the time being we will be only discussing this and we will be proceeding with another interesting commodity derivative contract that is your derivatives on real estate.

Okay, so let us discuss another derivative contracts o very interesting underlying that is the real estate prices. So again one thing I would like to tell that the real estate derivative do not trade in any Indian exchanges however there is some development has happened with respect to creation of real estate indices, which form the basis for or underlying for derivative instruments. Now, let us go to understand what is real estate what are the real estate derivative contracts which are trade in global exchanges.

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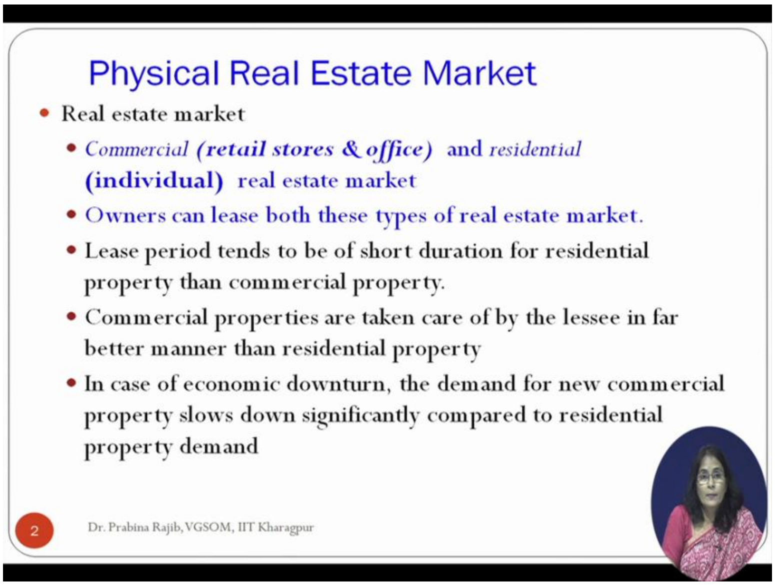

Now let us first understand a little bit on physical real estate market. This real estate market can be categorized as commercial real estate market and residential real estate market and residential is self explanatory; I do not need to explain that. However, commercial real estate can be categorized as for real estate for office spaces and real estate for retail stores. And owners of both these kinds of real estate, both residential and commercial can lease these 2 or rent these 2 rents these 2 types of real estate properties. And let us compare the difference between the leasing aspects for these 2 types of market these 2 types of real assets so real estate assets so what are the differences?

Normally lease period is to be tend to be longer for commercial real estate property than your residential property and commercial real estate property are normally well taken care by the lessee unlike a residential property and in case of a downturn, economic downturn, the demand for new commercial properties slows down significantly compared to residential property demand and accordingly the price for commercial a commercial properties does down in case of economic downturn more than the residential real estate property.

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However these real estate price in general exhibit certain unique characteristics so what are these unique characteristics? Housing prices normally tend to be sticky specifically you know residential real estate prices normally tends to be sticky in the sense that by sellers do not want to sell at a price which is lower than the purchase price. This purchase price acts as a physiological barrier or floor and if somebody has bought a house for let us say Rs. 60 lakhs or Rs. 75 lakhs, then they wait till they get a higher price to sell the sell these assets rather than sell it at a lower price, so this is that is why it is residential prices are normally considered to be sticky prices.

And residential properties normally exhibit very high seasonality and it is not only in India, it is all over the world. Residential prices have considerable amount of seasonality and what is the reason, specifically in western countries US, UK and Australia, people normally do not buy house during Christmas time so that is the lean period and in India, you have most real residential property purchases happen during October to March that is during your second half of the financial year that is post Deepavali or during Deepavali. Most of the new purchases for houses happen.

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So in this context, I will like to discuss a little bit on REIT's or Real Estate Investment Trust which are being discussed in Indian context in a significant way. However no new REIT, no REITs have been undertaken as of now because only recently SEBI has given the go ahead to creation for creation of REITs, so REIT's are nothing but a mutual fund. In a regular mutual fund or a equity mutual fund, the unit holders contribute money and that money is used to create a portfolio and the dividend from the equity investment as well as the interest from the dividend from the equity investment and the capital appreciation by selling the equity shares get distributed to the unit holders so exactly REIT, REITs function in the same manner.

The unit holder of REITs contribute money and that money goes to create a pool of real estate property and the real estate property can be rented out and from the rent, unit holders should be given regular income. In fact, REITs are supposed to mimic the rental earning from owning a property, so and REITs provide opportunity to small investors to diversify their investment into another asset class that is the real estate with very little capital investment. So if a particular investor wants to own a house, he can do so only by spending considerable amount of money but with a REIT may be 5000 or 6000 worth of rupees, he the investor will be able to take exposure into the real estate market and have REIT as part of its portfolio.

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Now, let us go to what are the different types of derivative contracts trade on real estate. Actually, many real estate indices are calculated by different agencies and these real estate real estate indices form the underlying for futures and options which are traded in different exchanges. Let us discuss how some of these real estate indices are calculated and reported. Some of the popular real estate indices are S&P/ Case-Shiller Home Price Index. Housing Price Index of USA. Halifax House Price Index of UK and FTSE Commercial Property Index Series of UK and NHB Residex of India, that is National Housing Bank creates and reposts index called Residex. How this is also calculated, we will briefly discuss. Now, let us go to understand briefly how these how these indices are created.

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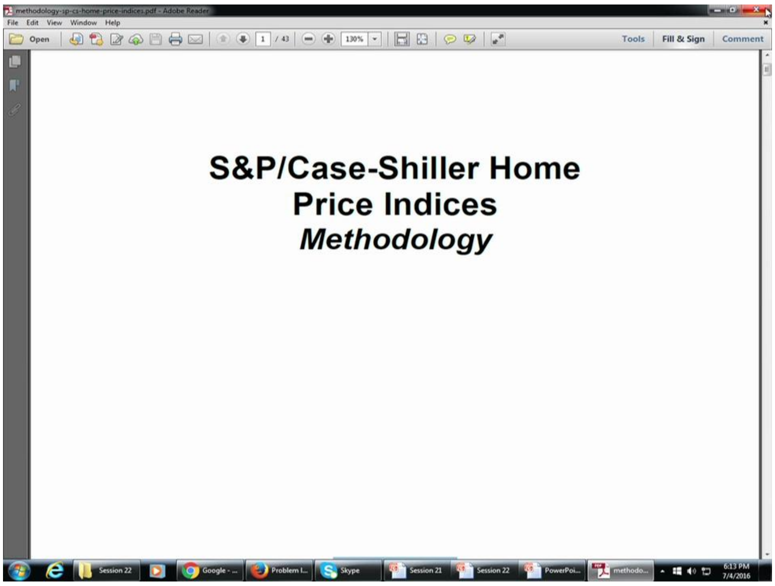

In fact the whole a whole mechanism or methodology of calculation of S&P/Case-Shiller Home Price Index Methodology is available in this document. If you give a Google Search, this document will be freely available. This document was updated last on February 2015 and as you can see, it is a 43 page document which indicates how this Case Shiller Home Price Indices are calculated, but I will just quickly take you through how this index is calculated.

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Now, this is this set of indices are calculated by Standard & Poor's so S&P prepares this index S&P prepares 23 index and out of this 23 index, 20 indices are for 20 cities in USA and 3 are composite indices and these 3 composite indices are for one for national index, one for 10 city index and another for 20 city index. And all these indices have a base value of 100, which is equated to January 2000 so how exactly these indices are calculated, S&P/Case Shiller house index follow value weighted repeat sales methodology.

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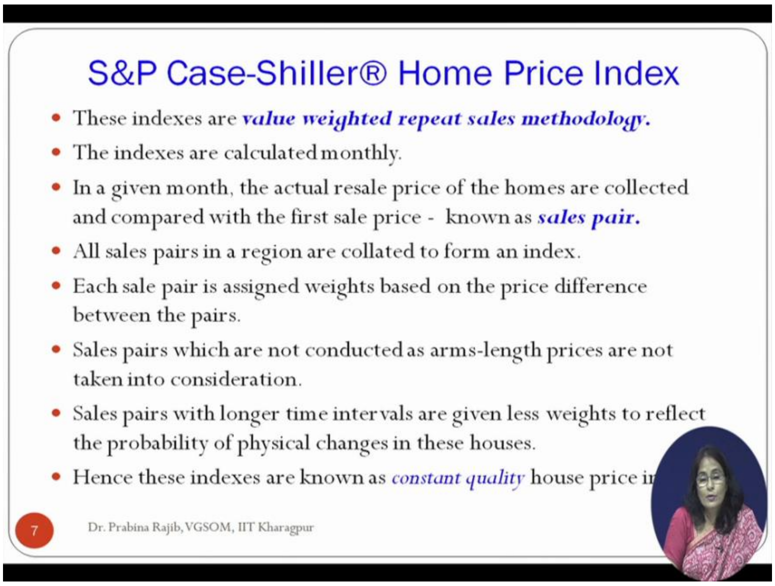

Let me repeat it uses value weighted repeat sales methodology so what that means? The S&P identifies let us say at a given point of time, given month, let us say in a particular area, 20 houses have been sold. 20 old houses have been sold so it is a repeat sales methodology, it does not take into consideration new houses which are getting sold, so older houses which are already been occupied by some owners when they are selling those houses that price gets incorporated into the index.

So let us say a particular region, the S&P found out that there are 10 houses have been sold in a given month, so the difference between the original price, the price at which the house was sold for the first time and the current sale price. So that is considered as a sales pair. Let me repeat that 10 houses got sold in a given month in a given region and S&P wants to find out the house index for that particular region, so the price at which each of these 10 houses are sold that price will be paired with the original price at which the houses were each of these houses were sold. So each house, the original price and the current sales is will be known as a sales pair and each of the sales pair will be given a weight. So 10 sales pair, 10 weightage will be taken into consideration to calculate the index.

Now, there are there are certain precautions which are taken by S&P for calculating these indices, so what are these precautions so as you can see, all sales pair in a region are collated to form an index, each sales pair is assigned the assigned weights based on the price difference between the pair, so actual current sale price minus the original price will be determining the weight however, sales which are not conducted at arms-length prices will not be considered for index calculation.

That is one precaution, the second precaution is sales pairs with longer times intervals are given less weight so if a particular house has been sold some 15 years back and now only only after 15 years it is being sold then and on an average, other houses have been sold at 7 to 8 years then these sales pair, 15 year old sales pair will be given weightage to reflect the probability of physical damage, physical change in the house because these houses these indices are known as constant quality house price index. So as these indices are known as constant quality house price indices so certain precautions are taken by the S&P/Case Shiller S&P to calculate these indices.

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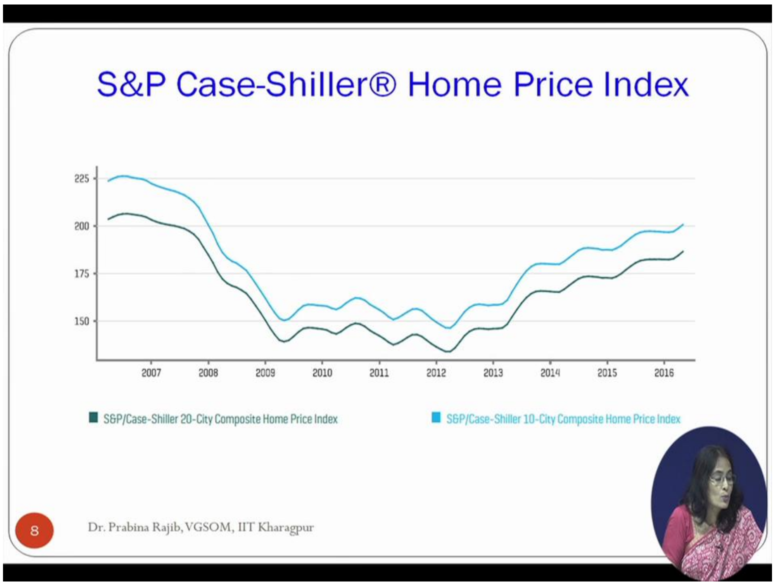

Please see this one, this particular picture shows the value of S&P/Case Shiller index for 20 city composite index and 10 city composite index so from the 20 city, some 10 cities has been identified and the composite index is calculated from those 10 city and 20 city composite index is also calculated in the same manner. So if you can see, this is coinciding with your subprime when house prices nosedived significantly. You have and very little buy and sell was happening for the new houses as well as older houses also. The index came down to almost near 2000 level that 2000 index got created with the value of 100, so it almost touched the 2000 and over time, this index has been this index has gone up substantially and it is hovering around 200 value in as of 2016.

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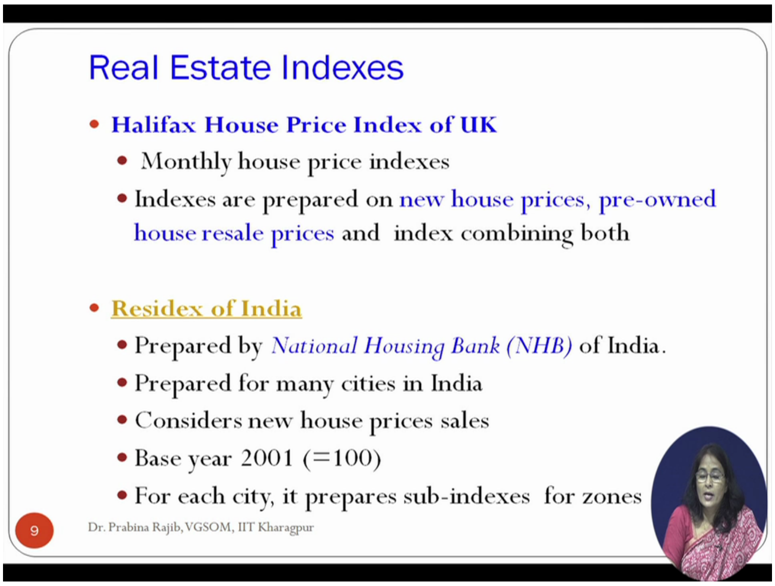

Similarly besides these S&P/Case Shiller index, Halifac House Price Index of of UK is calculated and this this index not only takes care, this index not only takes care of pre owned houses, it also takes care of new houses. The index is calculated by taking into consideration new house sales as well as second hand house sales. Now, let us quickly go to the Residex of India. This is calculated by calculated by the National Housing Bank of India. Its base year is 2000, which is equated to 1 and please see this detail; I hope you are able to see this.

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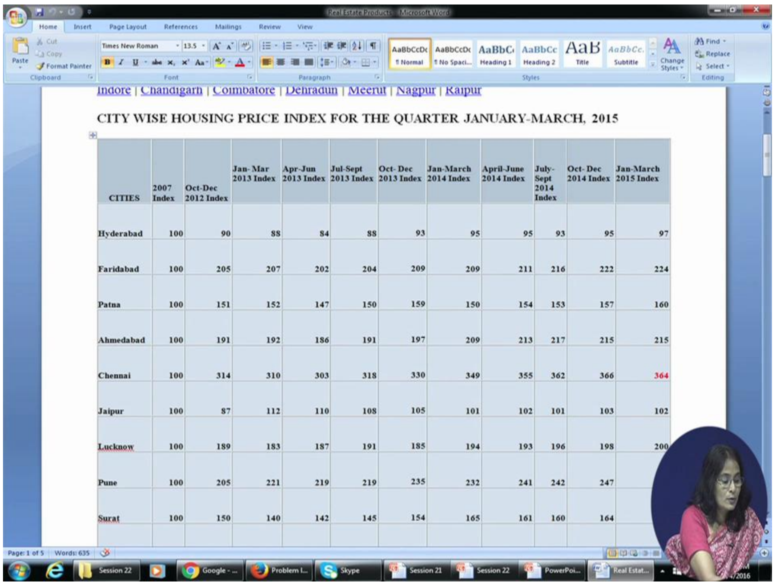
Indore | Chandigarh | Coimbatore | Dehradun | Meerut | Nagpur | Raipur

CITY WISE HOUSING PRICE INDEX FOR THE QUARTER JANUARY-MARCH, 2015

CITIES	2007 Index	Oct-Dec 2012 Index	Jan- Mar 2013 Index	Apr-Jun 2013 Index	Jul-Sept 2013 Index	Oct- Dec 2013 Index	Jan-March 2014 Index	April-June 2014 Index	July-Sept 2014 Index	Oct- Dec 2014 Index	Jan-March 2015 Index
Hyderabad	100	90	88	84	88	93	95	95	93	95	97
Faridabad	100	205	207	202	204	209	209	211	216	222	224
Patna	100	151	152	147	150	159	150	154	153	157	160
Ahmedabad	100	191	192	186	191	197	209	213	217	215	215
Chennai	100	314	310	303	318	330	349	355	362	366	364
Jaipur	100	87	112	110	108	105	101	102	101	103	102
Lucknow	100	189	183	187	191	185	194	193	196	198	200
Pune	100	205	221	219	219	235	232	241	242	247	[illegible]
Surat	100	150	140	142	145	154	165	161	160	164	[illegible]

I will just focusing on the first city that is the 2000 index was equal to equal to 100 for Hyderabad and for different quarter, different quarter, it has been calculated and currently that that is the last data which is available January, March 2015 index this is a quoted at 1997.

This if you can see this one, this is if you this is 97 similarly a Chennai is the most expensive in terms of house prices. Chennai, you have 100 value in 2007 and it is 364 by January March 2015 and one thing I would like to mention here, it is not calculated based on old sales, it is calculated based on new sales only. So based on the new sales registration price, his index is calculated and this does not consider second hand sales of the houses.

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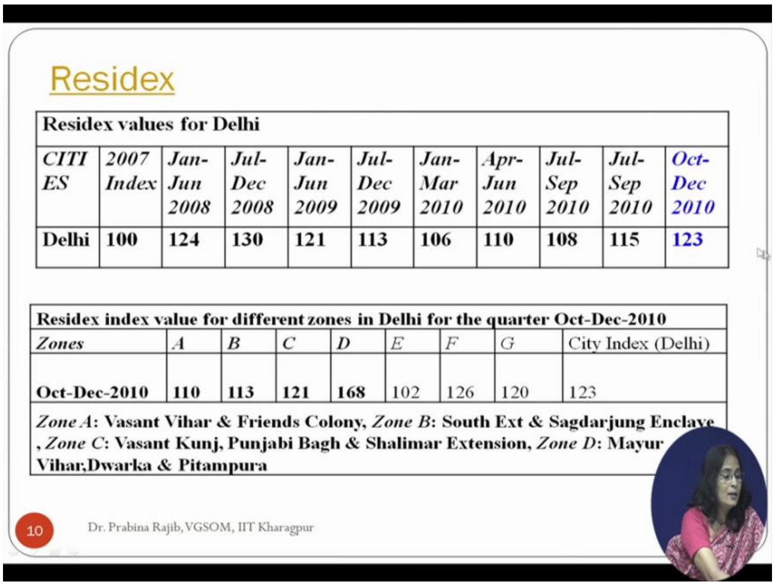

And how exactly this is little more detail. Let us say a Delhi has a value of 123 for October-December quarter and Delhi again, Delhi is a big place so which I mean house sales at which, which locations has to be taken into consideration. National Housing Bank has divided Delhi into certain zones. Like let us say 7 zones, Delhi has been divided and this again, for each zone, they calculate the index and all these the zonal indices are taken into consideration to calculate the CT index.

And as I mentioned, Chennai has in terms of new price in terms of prices of new prices, Chennai has gone up the maximum that is 2000 in the year from 100 value of 2000 it has gone up to 364 by January 2015. And like any derivative contract with underlying this real estate indices forms your underlying for futures and option contract.

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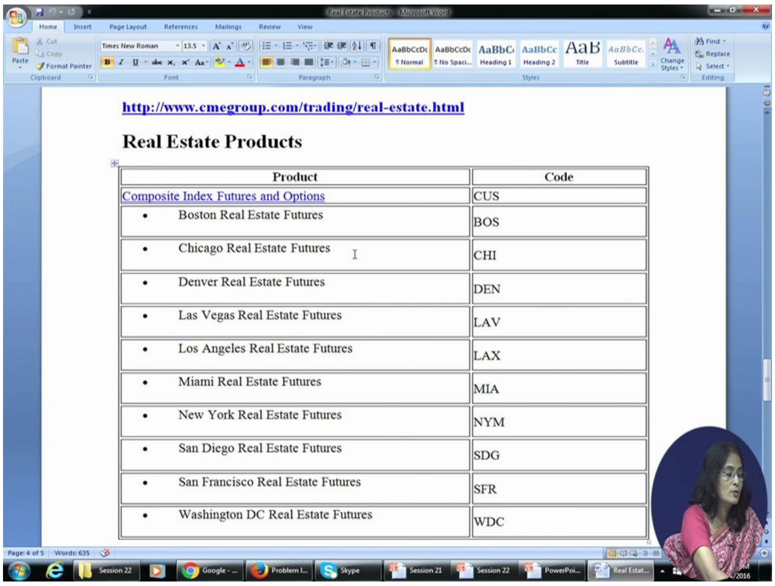

So I will just quickly take you through. Of course in India, it is not available. this is if you can see, this is your at CME, these are the real estate products which are available. You have a Boston Real Estate Futures, Chicago Real Estate Futures, so the underlying is this city or city indices or state indices so you have composite index futures and options. So that is also somebody is interested to take futures and options on the composite index that is also available.

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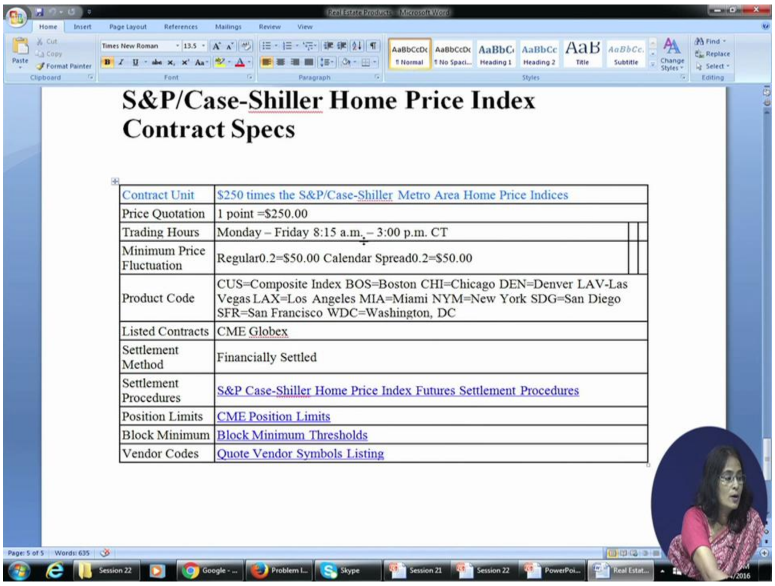

And this is a contract specification for S&P/Case Shiller Home Price Index Futures contracts specification. If you can see this one, so what is the contract unit, contract unit is dollar 250 times S&P/Case Sheller Metro area home price index and what are the product quotes, so depending upon different city, somebody wants to take futures position on house index for a specific city or it would be for the national index trader is free to choose.

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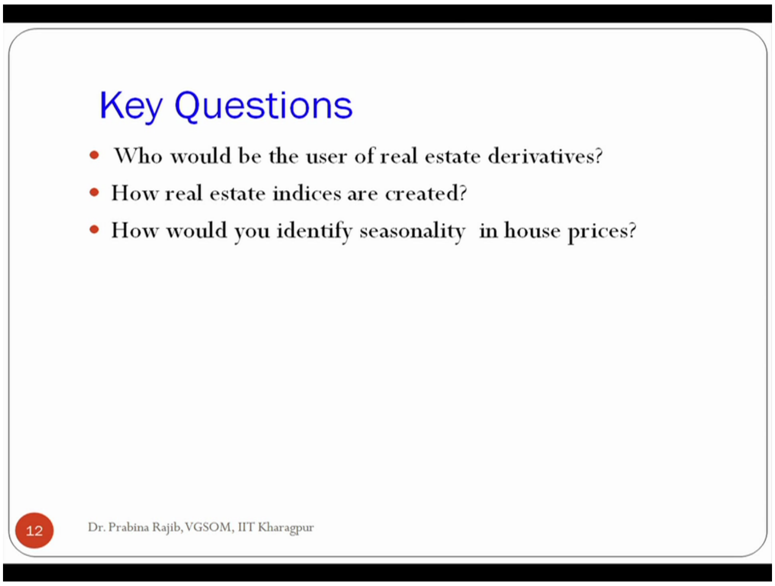

So what are the key questions pertaining to this particular session. Who would be the user of real estate derivative and how real estate indices are created, how you would identify seasonality in house prices. With this, we come to the end of these 40 sessions and there are many contracts which are available for trading which we could not discuss in detail. In fact there is a significant amount of trading happens in coal futures. There are also trading happens in fish futures. That is salmon futures are traded, that is animal contracts are traded in terms of feeder cattle and live cattle and hog cattle so there are contracts on butter, there are contracts on whey, so many other commodity contracts are traded.

So in these 40 sessions, I have tried to cover as many as different contracts however, this not this is the commodities which I have discussed is not exhausted in list and if you are interested to know more about these commodities, how the commodities are contract specification, how these contracts are priced value, you can go to the a different website and search and learn more about it and almost all websites provide some kind of a user manual and some kind of frequently asked questions so from there, you will be able to broaden your knowledge.

And in India, as I mentioned, commodity derivative has started though it has yet to reach a critical mass but I am very hopeful that in near future, this commodity exchange will be able to draw a more number of hedgers to its platforms as well as provide many other kind of a derivative contracts or provide derivative contracts on many other different underlying which are not currently available in India.

With this I end my session and any questions, any queries, I will be more than happy to contact if you contact, I will be more than happy to answer those queries and also in each of this session, my e-mail address is mentioned. Post this course anytime if you have any query pertaining to commodity derivatives, I will be more than happy to answer and interact with you all. So thanking all of you and today I cannot say that looking forward to interacting with you because this is going to be our last session. Once again I hope you will enjoy these seeing these 40 videos and learn about commodity derivatives, Thank you all of you.