

Quantitative Finance
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Module – 07

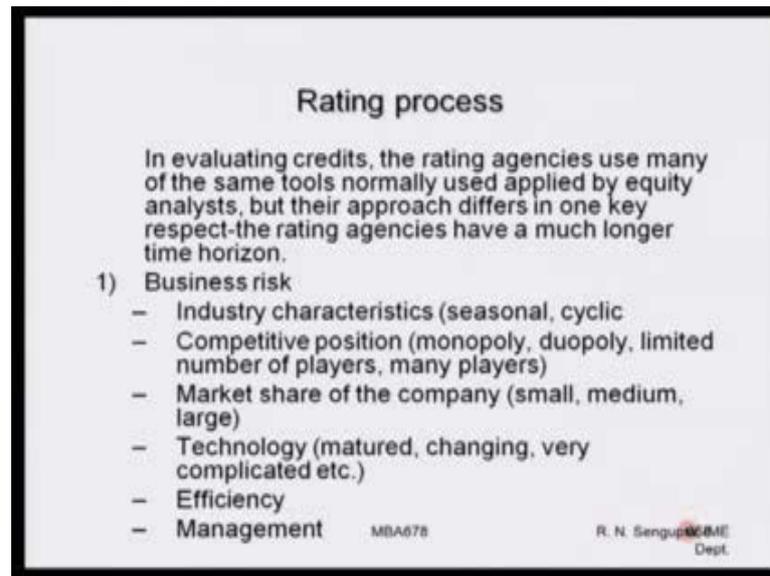
Lecture – 39

Welcome back to this quantity finance program. In the last day where we ended we have just started the credit rating analysis and clearing agency. I had given a very brief background about standard and inputs, what are the ratings schemes like those triple a, double a, and so on so forth. Spoke about Moody's also and then I have basically differentiated and clubbed them as per the norms, is not what I am saying is basically as per the norms. Their credit rating and their default risk, and their probability to default with corresponding to their probability that they will give back all the money or they would not default.

So, they are opposite to each other, but how is we see later that why it is important in the sense that why both probability of default as well as probably not defaulting would be important, and state that with a very simple example. And then we all also seen before that the concept of vega, delta, gamma, rho hand how the overall portfolio value, rate of change portfolio values which is basically overall percentage change in positive and negative direction with respect to stock price, with respect to double derivative of stock price, with respect to standard deviation of prices, with respect to time, with respect to the risk all this things are important. And I also discussed that even through that was very fretting, but I am sure you got the just of them concept is that giving the Taylor series expansion how you can find out all the terms correspondingly.

And if you remember goes before I start of the class today before you remember I have discussed also about the Wiener process, it was lemma, and simple derivation of the concept of ((Refer Time: 01:59)) models, there also use some parts of Taylor series expansion.

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Rating process

In evaluating credits, the rating agencies use many of the same tools normally used applied by equity analysts, but their approach differs in one key respect-the rating agencies have a much longer time horizon.

- 1) Business risk
 - Industry characteristics (seasonal, cyclic)
 - Competitive position (monopoly, duopoly, limited number of players, many players)
 - Market share of the company (small, medium, large)
 - Technology (matured, changing, very complicated etc.)
 - Efficiency
 - Management

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So, for coming back to the rating process. So, continue our discussion in evaluating credits on the rating of the concept of default, non-default the rating agencies use many all the same tools normally used applied by equity analysis, see whatever we are discussing on the basically the fundamental concepts of how a company on how an entity can be analyzed on the financial concept. And these are under the preview of fundamental analysis which I did mention, that it is used very heavily and you can get a good asset of information the company. So, and that concept comes under the purview a party on the concept of accounting principles, that you know what is a profit and loss account you know what is balance sheet you know what are the issues, and how their issues are calculated, what is the concept of depreciation, what is the concept of different type of asset liabilities and all they consider.

So, this people who have a background in accounting or who are interested in getting a concept of back accounting, and then go and fundamental principles, and then follow the route which have taken about the quality finance, and that would give you much better purview, and an overview about the area of quantity finance as like quantity finance as such is a standalone concept, where you discuss more quantitative techniques, but if you are available the financial texting also. Then you have a much better grasp power the overall concept of the fundamental. So, coming back here, they use the same tools normally used applied by equity list their approach differ in one key respect and rating agency have a much more longer time horizon. So, what I am talking is about the time horizon, and as you remember I did mention in the last few classes time in again that

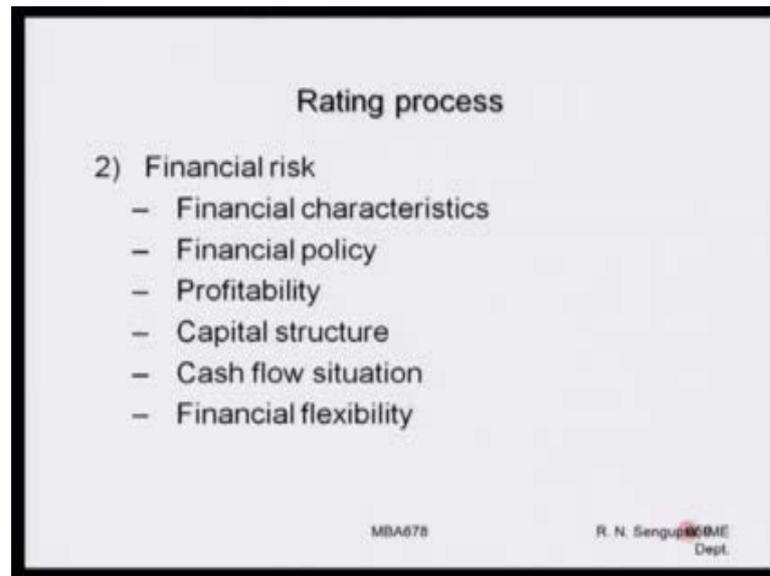
vitality it really is dependent on time then the rate of change of, which was in the generate winning process they were two concept a and b. So, drift rates and the white noise text on vitality there are dependent on time. So, those are important factors which are in some way considered by the credit rating agencies they consider the business industry characteristics either seasonality cyclic.

So, if you are going back to the forecasting method we did consider the fault in the winter method, halt methods seasonality, and all this things were considered in a very simple terms. And I am sure the assignments for you to do assignment 1, 2, 3 when will see understand what was the relevant, what we are discussed in lectures, and how you can implement them using the small problems, which are already uploaded in the web and which would be uploaded for different type of weeks weekly sessions then the beyond under the business cycle the composition, when is monopoly market globally oligopolistic market limited number of players; many players are depending on the demand. And supply because number of players the demand, and supply basically comes to the composition very fast.

So, you will be added to find out what type of market, is it a very, very technically advanced market where were products admin change in each and every day or is very stable market dependent on the trying to analysis. The overall concept of all the companies doing will find, and what is the market share of the company weather is a lie is it like in till or is it likes. For example, in Indian transport company railways. So, in case if you want to analyze the railways on the fundamental principles whether the market series huge of, there are there the soul market leaders, and they are the only market share holders.

So, depending on that you will try to analyze how the companies doing you will see one mentioning the technology of technology is advancing is rapidly developing the technology like in the night sector, in the sector of mobile phone in computer, what is it some very old technology is been still followed depending on how the progress of the industrial taken place, if find about the efficiency how the company is doing and or what is the management principles do they want to really propagate the concept of technology, concept of opening open discussions, and try to be push forward the company's fundamentals and try to do better in the market. So, the how is the though they may not be considered quantitatively, but yet they are considered qualitative.

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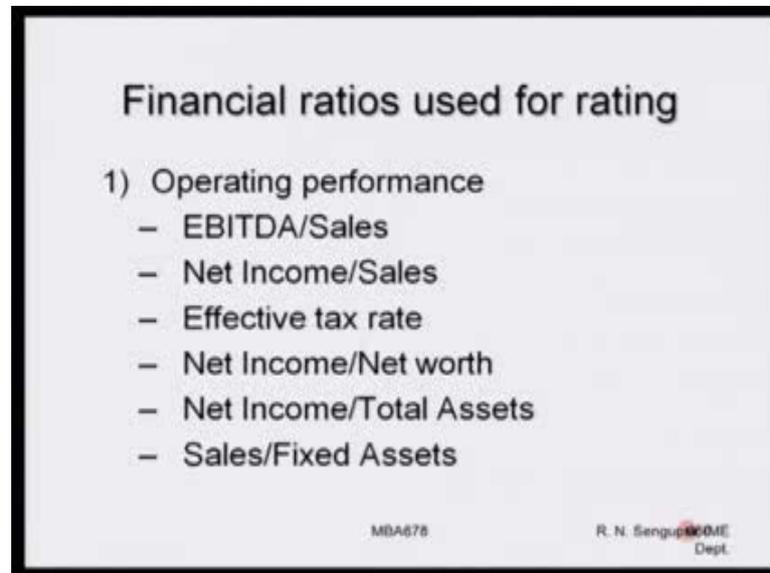
Then you also consider the next bracket the financial risk. What are the financial characters in the company liabilities, what is acid what is total boring weather the interest rate is very high, where I am based on the fact, that it is borrowed money from the market or whether the shareholders are the actual promoters who have both input money they have their own money. So that means, the overall level of this for them is high, but overall risk for the other investors must be low, what is the financial policy of the company do they give high evidence, do they give low evidence would they play back all the amount of money with a technology advances on to do the company would they play, all the money in around it develop in our basically tried to build up different type of tried basically this amount of money investors as dividend or do they keep it as a offer.

For next year's business depending on all the companies doing, you will also try to find out all the rating in his will try to find out what is the proper way to probability, what did the capital structure, how the capital structure has been broker into depending on loans assets liabilities, and what type of acids to have whatever liabilities do you have visited long time liabilities, short term liabilities the overall risk for long term liability higher is the overall risk is low short term liability is lower depending on at what rate you barrow the money.

So, you find out the cash flow situation depending on when you need the money, whether the value fit cash to basically help your company in our order to visit your business to the marketing principles properly have your money investing in sales, have your money invested in RND, and so on and so forth. You fine on the financial

flexibility of flexibility how reject is the company do they have a policy with the can going to the market and borrow money or do they have their internal generation to a large extent be there able to find the requirements accordingly.

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You will find out the operating performance characteristics issues will find the ratios EBITDA to the sales, you have find out income tax to sales, you have to find out an effective rate of tax rate, which is there is it a growing economy or is it in the super example. If you are trying to open up in e business or if your business in the area of non conventional energy service, you get off huge amount of tax relief or you will have different scheme based on in which you can get relief financial relief. So, what is your net income by the net work, this is very high, is it low what is your overall ratio come to total assets seems to fix assets.

Then you are also try to find out what is a profit before tax for sure profit after tax for the dividend policies which you have all this thing there are about 13 to 14 issue is based on which you cannot place at a glance get a good view about how the company has been doing and if you have the quarterly data like less than to be difficult for you to get from outside source. So, if you have internal they have the policies, you can find get the data, if you have data for quarterly data for the super examples in 4 years. So, now see to give you a good idea that, are all companies money.

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Financial ratios used for rating

2) Debt service coverage

- EBITDA/Interest
- [Free cash flow – Capital expenditure]/Interest
- [Free cash flow – Capital expenditure - Dividends]/Interest

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Then you have then have the financial issues on the debt service coverage, you will find out the EBITDA by interest of free cash flow minus the capital expenditure by the interest rate, you have the free cash flow minus capital expenditure manager minus dividends by the interest rate. So, interested basically the amount of money which have to pay for any amount of money which is borrowed.

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Financial ratios used for rating

3) Financial Leverage

- Long term debt/Capitalization
- Long term debt/Tangible Net worth
- Current Liabilities/Tangible Net worth

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The financial leverages would be long term debt by capitalization, long term debt by tangible net worth of the company current liabilities, which are there by the tangible net worth of the company and on so on and so forth.

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The slide is titled "Financial ratios used for rating" and lists eight liquidity ratios under the heading "4) Liquidity". The ratios are: Current ratio, Quick ratio, Inventory/Net Sales, Inventory/Net working capital, Current debt/Inventory, Raw materials/Total Inventory, Work in Progress/Total Inventory, and Finished goods/Total inventory. At the bottom left, it says "MBA678" and at the bottom right, it says "R. N. Sengupta IITM Dept.".

In liquidity case you have current ratio, quick ratio, inventory, net sales, you have the inventory no to do net working capital current date to inventory raw material into total inventory work in progress to total inventory finished goods to total inventory; and all these things will find out the cycle along the money is basically, there are in the market in the since, say for the examples selling goods and the buyer say that he or she will be back the money in 1 month or 2 months. So, how is 1 month to month is the lock in period of your money. So, you will try to busy get back the money as fast as possible by while on other hand, if you are trying to pay vendor will be basically try to pay them as late as possible. So, this cycles by which the money is rotated by you in your company should be as soon as possible says that there is no get cash in the sun, the cash is not lying idle will try to utilize it as soon as possible. All the information collected in a general science by the raters of the rating agency based on they do the analysis.

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Financial ratios used for rating

5) Receivables

- Aging of receivables: 30, 60, 90, 90+ days
- Average collection period

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Then, you also try to find out what are the receivable aging receivable, this is how fast you get is it 30 days, 60 days, 90 days and 90 plus days where is receivable are very late. Obviously, they become bad debts what is average collection period, this is what is talking about that on an average how quickly is the money rotated complete cycle. So, that is known as average collection period.

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Rating analysis procedure

- 1) A banker begins by finding why the company needs a loan. Using his/her preliminary knowledge of the company, the banker will test this need against the bank's current policies. If there is a green signal then the bank proceeds further.
- 2) The company's B/S, P/L account are analyzed to highlight the financial structure of the company. Figures for business segment operating results, budgets, business plan are all helpful for this credit analysis process. Hence a thorough understanding of the financial statements is very important.
- 3) The trial balance is analyzed, along with the supporting schedules, footnotes.
- 4) The accounting principles are analyzed to see the consistency.

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The rating agency proceeds received in this way banker begins. I am considering bank point only bank begin by finding out by the company needs alone. So, if say for example, in USA company has approached for a loan from any industrial development bank or the bank for running a business, how is they would analysis they will analysis on the

different points. So, they will first why do you need along do you have your own money, if the case is encourage to utilize your money or some part of that says that they know that you are interested in earning business on a long-term businesses, that you also pay the amount of this not them only using his or her family in knowledge company in the banker will test need again the bank current policy is a good bank willing to get loan for a certain type of business.

If the business is a very high risky business; obviously, than the professor to the bank to land that money in that business good very low, if there is a green single then the bank basically proceeds, so if all of them. So, in you have set of scores like what is the business, what is the word liability asset of the company, what were from with different areas they are trying to visit on the business, what is the market share, what is the overall probability of the company, what is the all the ratio which have just mentioned in the last few sites over depending on the bank take the decision, when is going to go for a loan the company's balance sheet, and profit and loss account and analysis and show highlight the financial structure, the company figures for business segment operating budget its business cycles are all helpful in trying to analysis, what is the overall financial situation on the company.

So, thoroughly understanding on the financial statement is very necessary. So, again I am searching a highlight the fact that if you are interested to basic understand this policies of ratings. Then obviously, a very good thoroughly knowledge of... What accounting principles ratio, financial statement is necessary the trial balances also and lies, because if you before you make the balance sheet and profit and loss account, you use the trial balance of the debit and credit concepts. And then you will see the trial balance is and as along with the shoppers stop supporting schedules footnotes document, and then based on that you make analysis accounting principles and analyze to see the consistency how good or bad the company has been doing in the last 3 or 4 years.

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Rating analysis procedure

- 5) The purpose for the loan is evaluated and so is the projected cash flows.
- 6) Hard and soft assumptions are identified.
- 7) The industry's structure is analyzed, like emerging trends, company's position within the industry, the potential of regulatory actions.
- 8) The company's executive management and their operating strategies are evaluated. Managers involved with the specific projects are evaluated.
- 9) Loan and security documentations are prepared, covering such issues as conditions of loan, mode of payments, guarantees, conditions of default etc.

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In the purposes alone is violet is... So, its projected cash flow is also analyze, see if you remember the cash flow and mentioned is basically say for example, going to get a cash today's down the line, you try to find out what is the overall present value of that money or else and down the line, you want to find out and what is over all money my need good will obtain from the company, and new try as the banker what is the overall projective money. As of now what are the hard and soft assumptions, you try to analysis overall management overview, is it professional knowledge it basically family run business will try to find out that how good or bad or the top management weather there willing to take place on your own account or over their account that they are very conservative.

So, all this policy there are analysis the industry structural analysis a very old industry would you try to find out as a banker, what is the competition, what is the market share, how the big duck market days off as the market is growing are there any other competitors, is it oligopolistic market, is it of monopolistic market, is a market 100 number of players, there are demand and supply changes rapidly. And it comes to the computer very fast, all this things are generally taken care of the companies act to execute management, and their operating strategy this is a valid as I was saying that were how the company is doing, what is the management managers you more involved with the specific, there are also validate there over and policies of running a business do that taken into account loan and security documents of the prepared covered in such issues, and conditions of loans how long the loan would be what is the interest rate, who are the current, what is a political and condition and different all this things analysis.

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What the banker should think

Each industry has its own unique structure and dynamics. A firm's position is affected by the relative level of maturity of its industry. A mature industry for example, is characterized by market saturation, lack of technology opportunity and a trend toward a decreasing rate of return. A firm attempting to prosper within any industry has to contend with potential entrants, existing rivals, suppliers, buyers, substitute products. Its competitive weapon may include barriers to entry, cost control through economies of scale, control of distribution channels, favourable government policies, retaliatory pricing, product differentiation, product innovation etc.

Thus when the bankers/evaluator is trying to make judgments about the company for loans then the person should try to analyze what the strategies of the company are, what are its advantages, etc.

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What should the bankers think? It industry as a zone in unit structure and dynamics reforms position is affected by the relative level of a maturity of the bank mature industry. For example, is characters in the mark market saturation as a saturator is a market a lack of technology opportunities and a train towards decreasing rate of return on increasing rate of return all thing are analysis form attempting to process for any industrial to contain with potential, and existing label suppliers wires, its competitive appointment to various entry cost control economy of scale, cost of the distribution inventors, and support us in the bank as a valid is trying to make judgment about the company for loans; all these things disadvantages should be considered query rationally.

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Problem for banks

- 1) Lack of experts.
- 2) Too much focus on any particular sector of economy.
- 3) Biasedness.
- 4) External dictate so as to lend to particular sector, company etc.
- 5) Lack of knowledge.
- 6) Unforeseen circumstances/situations.

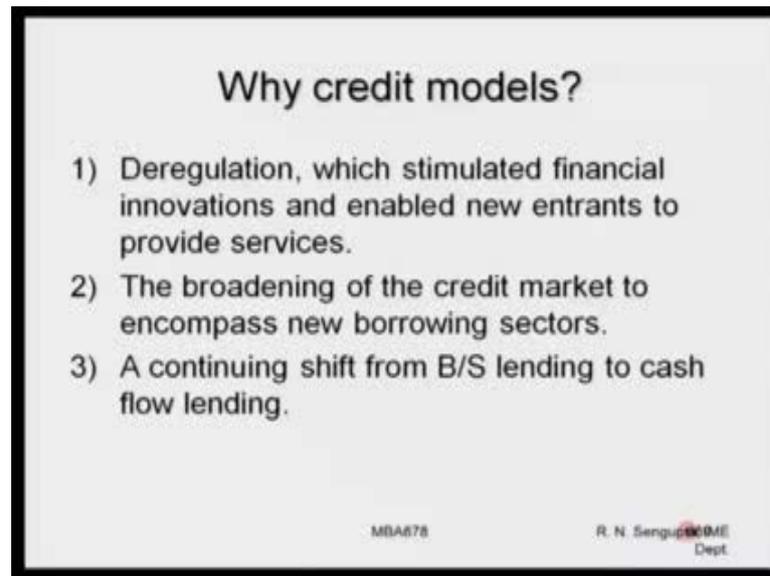
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So, what are the problems on the banking general? It is there a lack of experts, domain experts people have good knowledge about accounting principles of good knowledge of an industry experience is really lacking specially India too much focus on any particular sector of the economy is also bad. If you are trying to analyze a company from his business perspective will try to see that whether the company is spread over all the economy, and its only concentrate in one sector. If you concentrating on only 1 sector; obviously, will try to see that how it has been doing in the long run up after 4 years in that particular sector whether this biasness.

So, considering that the economy is doing well or return economy is not doing well whether they business in trying to evaluate the decision of trying to give a loan should also be done away with external dictates westerly to particular sector company should be avoided as far as possible do not go for that, but; obviously, you will ask a question that consider. Lets us consider a very simple example we have the state bank of India, which is the bank of India, and we all know what they have businesses in very remote parts of India which is not profitable for them that is true, but you should also understand fact that considering the overall economy than consist the governments mandate, that it has to be basically serve the poor and the people from the rural areas in remote parts of India, this is a strategy of time to have state bank on India is very good. So obviously, I am giving examples. So, if company like that approaches the banker or approaches rating agency or are to be evaluate, it is all these things in should be taken into account with is able to fulfill some of its social and so called applications to the society; these are some all the other than non quantitative and very qualitative effect, very shortly affects which has to be considered by any rating agencies unforeseen circumstances.

Say for example, we all know about the devastating effect of Mumbai affected during the bombing in Mumbai, and what effect it had in the financial situation. Say for example you can see the morning affect in the USA. So, all this things is if they have deviating effect on economy, we are not aware affirmed. So, you should also be able to take care of some unforeseen circumstances has that, you can go see that if there is some unforeseen circumstances, what is the overall risk default the company will face, and you as a banker or are willing to basically take care of.

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Now, will consider that want very simple what are the credit model, and why a credit models is needed? Deregulation which stimulate financial innovations, and enabled new entrance to provide services team in the market and obviously as different players came into the market here to basically have different models in order to evaluate the credit worthiness. The broadening of the credit market to encompass new borrowing sectors also came into being... Initially as we saw the initial parts on the overall industry, if you Spanish its overall industries growth through the world in the last 200 years, it has been more of an industrial development where own manufacturing late stress on and slowly than it become a more of, now it is becoming more of a service 1. Is not the manufacturing is decreasing, but it has least level, well they now in comparison to that service sector is basically increasing.

So, obviously, if somebody if you are trying to basically plan to give loan to a service sector industry keeping in mind the basic principles of the manufacturing industry that would not ((Refer Time: 20:34)). You have to basically evaluate accordingly. A containing shift in a balance sheet lending to the balance sheet account on lending to the cash flow, and how the cash flow is happening that should basically be analyzed very thoroughly in order to understand the credits models. Again I am laying the stress, the balance sheet, the trial balance on the profit and loss account in details if their study that gives you a lot of information how the company is running.

So, with this we will end today's class at least not the overall concentrated models, but will continue our discussion and next class and try to of the why territory models are

utilize, and then continue discussing what are the different type of credit rating models feature used in general to analyze different forms.

Thank you.