Behavioral and Personal Finance
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Module – 01
Behavioral Economics and Finance
Lecture – 17
Overconfidence Bias in Financial Markets

Welcome back to the course Behavioral and Personal Finance. How many times has it happened to you that you have made some estimates or forecasting and you have gone wrong? Well, it happens to most of us more often. In stock market it happens even more. Particularly, when individual investors try to estimate some forecasts and base their decision on those forecast values. Many a times it so happens that their forecasts go wrong and in the process they make money mistakes which causes losses to them.

This session is focusing on this particular bias where people tend to make over valuation or under valuation based on their own forecasts and has gone wrong. This tendency is known as Overconfidence Bias.

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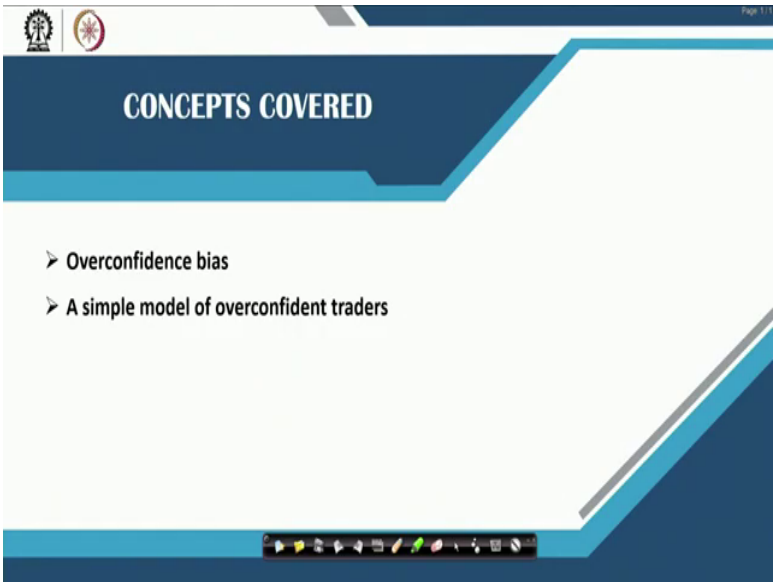

In this session, we will touch upon two major topics: one – how overconfidence bias effects individual investors decision making process, and we will also try to understand through a simple quantitative framework where we will explain how overconfidence level of investors might influence their decision making in terms of the demand for shares.

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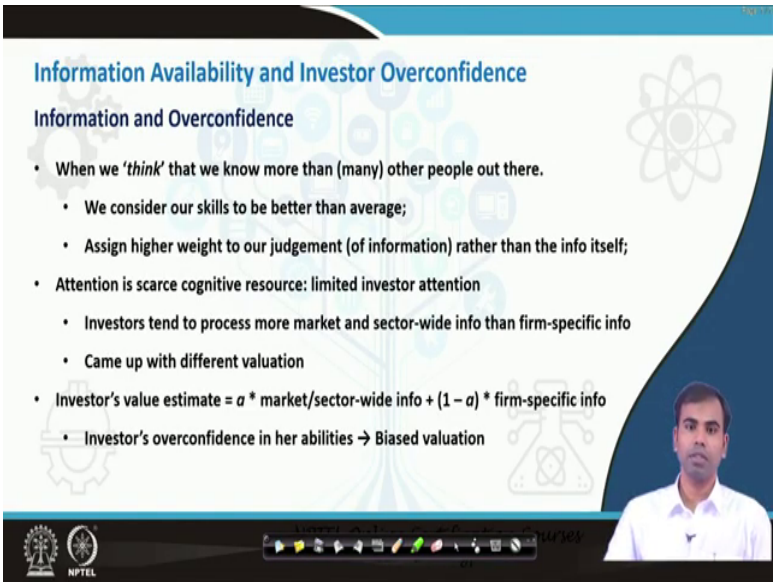

When you talk about overconfidence we basically understand the tendency of individuals to put higher weight is to their own calculations or their own opinion. Basically it comes from the tendency that we think of our own opinion of higher value compared to the opinion that we received from some external prompt. This kind of bias where people assign overweight to their own judgment and calculation and put lesser weight to the judgment or opinion or the information coming from different sources and thereby they base their decision.

On these calculations we all know that attention is a rare cognitive resource and many a times we have to divide our attention to different activities. When it comes to making financial decisions our attention is divided to several tasks such as gathering information, analyzing those information and then making the final decision. When we try to gather information we

gather information from different sources as we have earlier discussed that sources which are freely and easily available are preferred by individuals in terms of the source of information.

And, when they try to incorporate the decision with the help of that information they tend to assign higher weights to the information that comes for free or with less effort. Similarly, because of less attention available for the decision making they tend to assign higher weights to their own judgment of the information. Suppose you receive some information in the form of the management quality of a particular company where you are planning to invest your money.

Now, when you hear this information about the management quality you make your own judgment of that information. And, when you make a decision whether or not to invest you consider your own judgment of significantly higher value compared to the judgment that is given by some other analysts or some other sources.

So, this kind of bias leads to investors value estimates as a function of some likelihood or some weights through the market wide information which they are getting from different sources and the information that is specific to firm. Now, when we try to understand the firm specific information the information might contain the financial, non-financial such as quality of management, market share and other features of a company. And, when we talk about market wide or sector wide information we basically mean the information pertaining to the macroeconomic issues.

This type of bifurcation of the value estimates coming from two different sources would indicate whether or not individual investors is attention is going towards overconfidence or under confidence. If it is either of the two cases where the calibration is not done properly their valuation will be biased.

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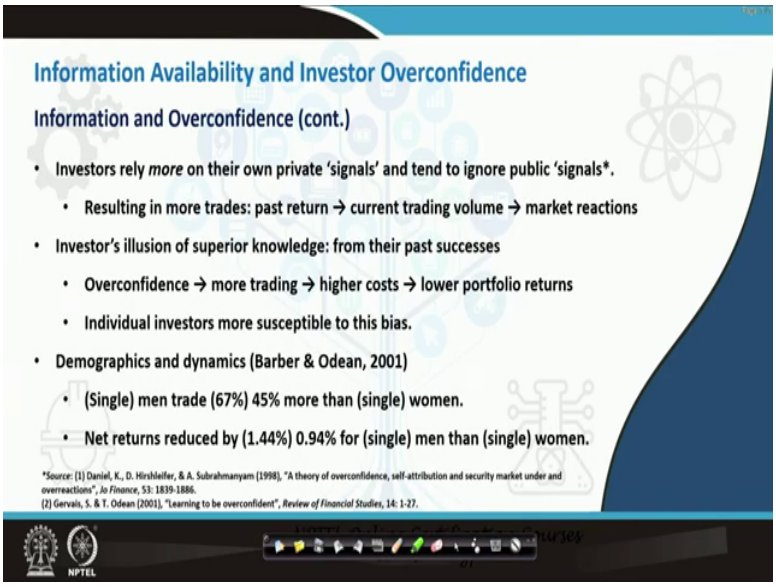

If you try to extend this discussion further we know that investors rely more on their own judgment or signals compared to the signals that they are getting from external sources. In stock markets such as judgment bias basically lead to higher volume of trading by individual investors because institutional investors are not affected by these biases as much as the individual investors.

When individual investors trade higher which means the trading volume in individual investor category would be significantly higher as influenced by overconfidence bias that would lead to market overreactions or under reactions and ultimately it will also incur higher cost for individual investors and thereby their net portfolio returns would be reduced. Essentially when an investor trade more often they incur certain cost in terms of transaction

cost or security transaction taxes or any other cost in the form of taxes or brokerage charges or any other similar expenses.

So, whatever money you are going to make after doing the trading the net profit or the net return from the portfolio investment or from that particular investment strategy is reduced by the extent of the cost that you are incurring in that particular transaction, which implies that if you trade more the transaction cost would be higher and your net return would be lower to that extent.

When we discuss about a judgment or overconfidence bias essentially it could be attributed to several factors including availability of information or representativeness bias or other behavioral heuristics which we have discussed earlier. Some other factors that might be affecting individuals judgment error or overconfidence bias in this case could be their demographic features.

In one of the landmark studies carried out by Barber and Odean in 2001, suggested that gender specific features might affect the trading behavior of individual investors. They carried out empirical research and found that men trade 45 percent more often than women do. Which means that men seem to be overconfident in their trading capabilities and information processing abilities and that is why they trade more often compared to women to the extent of 45 percent higher than the women do.

When they talk about the marital status of those men and women, the result was even more striking. They found that in their sample single men trade 67 percent more often than single women. When we considered this higher trading by men compared to trading by women we can understand how it would affect their net return. In their study they found that the net return for men who trade more often was 0.94 percent lower than for women. Which means men ultimately made lesser amount of money compared to women because of higher trading.

And, the result for single men and single women was even more surprising because single men made 1.44 percent less return in terms of net return compared to the single women. This

is just one of the demographic attributes that might explain why certain people trade more often than some other people.

In some studies that we have conducted earlier, it was indicated that people with professional qualifications such as an MBA or chartered accountancy or investment certifications are more confident about their abilities to trade and time the market and that is how they trade more often than those with no such professional qualification. This overconfidence behavior ultimately makes people or individual investors to lose more money.

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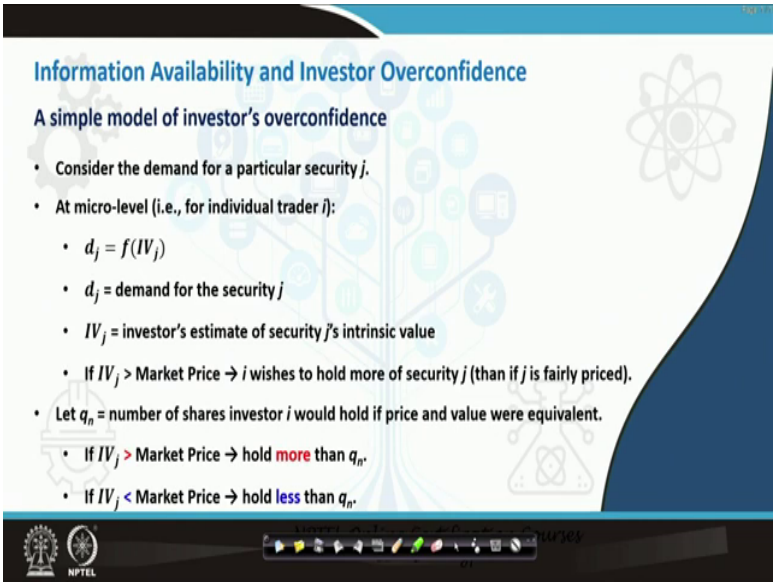

We can try to understand how this overconfidence tendency or the overconfidence bias among individual investors would determine how much they are going to demand in terms of trading volume. We have just seen that higher trading volume might lead to lower net returns

because traders would ultimately incur certain transaction costs and that will reduce their net returns. Here we are going to discuss briefly simple overconfidence investors model.

Where we will try to explain how individual investors overconfidence in terms of high or low overconfidence would determine the trading volume a certain by that particular type of investors. To begin with I will start explaining each and every term here first.

Suppose that the demand for and in particular security j is given as d j and it is a function of intrinsic value of that particular security. So, the security j is intrinsic value IV basically determines how much demand the investor I is going to seek. So, there is an investor I who would be demanding certain amount of shares for security j and that is basically a function of intrinsic value.

If we quantify this demand to be q n in terms of number of shares for that particular security j it would be high if the price and values are not matching. So, if market value of the market price of the security j is higher than intrinsic value. The investor would expect to hold less than quantity n and if intrinsic value is higher than the market price then investor would hold more than q n.

So, basically q n indicates here the number of shares investor would hold if the price and intrinsic value were equivalent. So, it implies that if intrinsic value is higher than the market price the investor would hold more than q n, and if intrinsic value is less than the market price then investor would hold less than q n for the security j.

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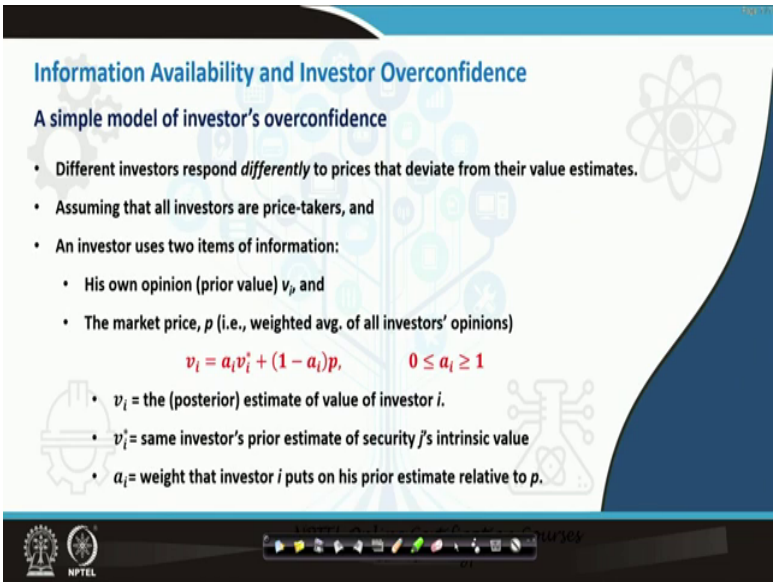

If we extend this argument further, we know that different investors respond differently to the information pertaining to prices and value estimates. For example, if an investor holds us here and price goes up by a certain extent, his reaction would be different from a different investor who would also be facing the same situation and that depends on his or her demographic characteristics or expectation from the market or any other such features.

So, assuming that all investors are price takers here, in this particular market all investors are price takers and an investors uses two sources of information or basically two types of information one information is his own opinion of prior estimate basically the prior value estimate of the security j which is given as v i and the other piece of information that the investor uses is the market price that is p which is basically nothing, but weighted average of all investors opinion.

So, we can say that the value estimate for investors j that the value estimate for investor i would be given as a i and v that is given here as investors prior estimate of security j's intrinsic value and a is basically weight assigned to that particular estimate and 1 minus a is the remaining weight assigned to the price.

So, there are two pieces of information – investors own value estimate and the price coming from the market which is a weighted average function of all investors estimate. Here a could be ranging from 0 to 1, if you try to use this argument of value estimate for an investor we can take this further.

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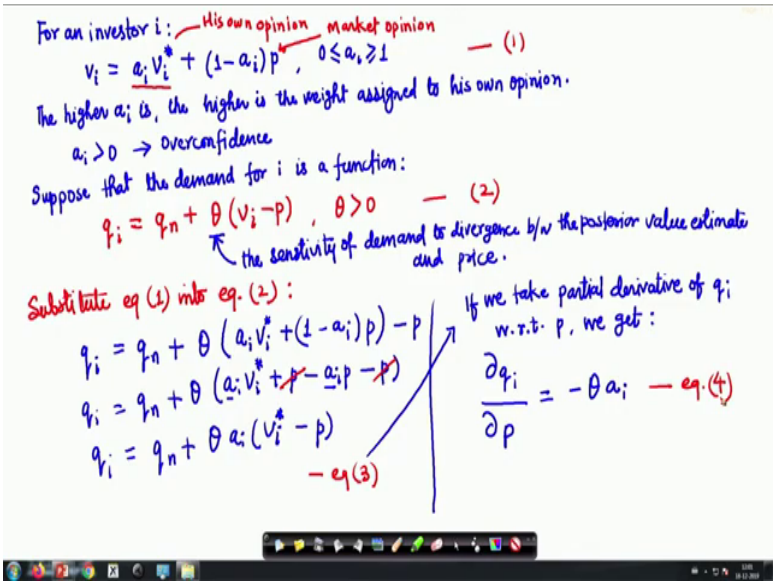

So, we have just explained that for an investor i the value estimate for a particular security would be the weight assigned to the value estimate of that security a priori and the remaining

weight will be assigned to the information that is coming in the form of price of that particular security where the value the weight a i would be ranging from 0 to 1.

Now, we know that the higher weight is assigned that is the higher a is, the higher will be the weight given to the investors own opinion which means if investor put more weight to his own opinion his. So, basically a the first component of this function is the weight assigned to his own opinion and the remain the second part of this equation is the weight assigned to market opinion or market information.

We know that since there are a large number of investors in the market and that they are viewing the system to determine the p basically which is the weighted average opinion of all investors in the market, any value of a being greater than 0 will indicate some sort of overconfidence. So, if a is going to be non-zero basically more than 0 it indicates some sort of overconfidence and higher the a is the higher overconfidence it indicates.

Which means, if I am an investor and I am putting more value to my own judgment or own opinion which is given as v star, the a will be higher and it indicates that I am more confident about my own opinion or my own calculations. So, the higher the weights assigned to a in terms of weight for my own opinion the lower will be the weight assigned for the market opinion.

So, if we take this argument further and next we suppose that the demand for an investor that is i demand for investor i is a function as follows. So, if the demand for investor i is quantified as q i where q n is the standard demand for all investors individually plus theta, where theta is the sensitivity of. So, here theta basically theta is the sensitivity of demand to a divergence let us call it a divergence between the value estimate, the posterior value estimate and the price.

So, we can see here that theta is the sensitivity of value estimate which the investor was making earlier and the p that is market price which is basically a weighted average function of all investors opinion. So, your demand as an investor your demand would be driven by the standard demand function which is q n plus any sensitivity that you assign because of the

divergence between your own posterior estimate and the price which is basically the weighted average estimate of the entire market.

Now, if we keep these equations as equation 1 and this equation to be equation 2 and we try to substitute equation 1 into equation 2 what we are going to get here is the demand function q i is equal to q n plus theta here v i basically is a i v i star plus 1 minus the remaining weight into the price minus p which was given earlier in the equation.

So, if we simplify this equation further we get q i as q n plus theta into if we just simplify it for making it more straightforward we will have where this p these two p will be cancelled and finally, we will have q i as equal to q n plus theta. Here these two a will be taken out and we will have v i star minus p.

Further, if we take the from here if we take partial derivative of q i with respect to p we get is equal to minus theta and a which indicates that higher would be the investors level of overconfidence if you look at the final equation that we have which is basically this is the equation 3 and this finally, is equation 4.

So, if you look at equation 3 and 4 you we know that the higher the investor confidence is the more responsive demand is to the change in price which means if an over can investor is overconfident the demand for particular share or security will be very much responsive to the price which is prevailing in the market. If we try to show it graphically this particular function as the demand function force investor j sorry investor i we will get to see a curve something like this.

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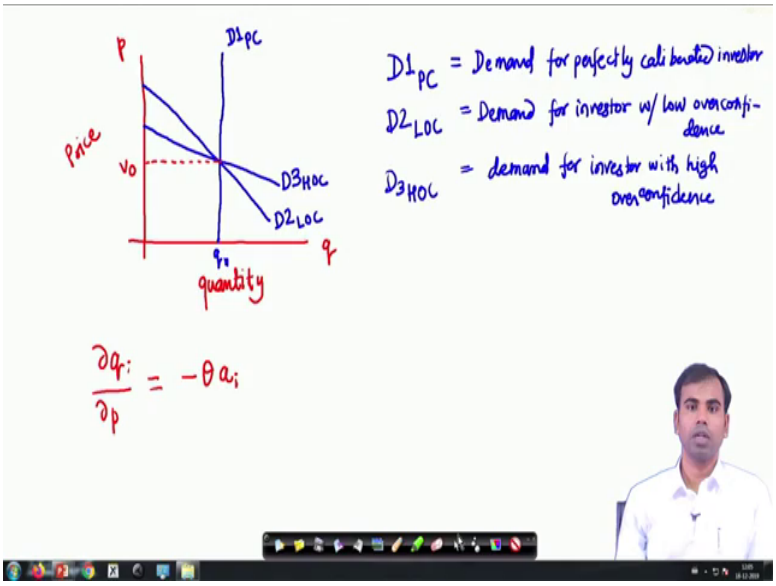

So, if the price and quantity curve is shown where q is the quantity and p is the price. So, if we show that this is the price curve and this is the quantity curve. So, quantity for the demand of us here the for investor let us say if the quantity for investor which has done the right calibration which is basically the perfect calibration in terms of there is no bias towards over confidence or under confidence that investor would be.

So, if we say that D 1 D 1 is demand 1 for perfectly calibrated investor. So, demand for perfectly calibrated investor which means he is not affected by the bias and D 2 is low over confidence investor.

So, demand for investor with low overconfidence and D 3 as a high overconfidence investor this will be demand for an investor with high overconfidence and we follow the same

equation which is basically the equation 4 which was the quantity with respect to the price is a function of negative sensitivity of price and value divergence with the weight you assign.

So, if this is the final function the graph for these three investors with perfectly calibration, low over confidence and high over confidence would look something like this for perfectly calibrated investor the demand function would not be changing as a response to the price. So, this is the demand function 1 for perfectly calibrated investor and if it is demand for coming from an investor with low over confidence the response will be very steep and it would look something like this where it will be demand 2 for low over confidence investor.

And, if we have an investor who is highly overconfident or high overconfident the demand would be less steeper and it will look like this where demand for high overconfident investor would be here and since most of the investor would agree to a common value. So, the price will be common at this point of time where you can say the value is common for all these investors.

So, this is how investors overconfidence can be modeled in a very simple framework where you can determine whether an individual investors is low overconfident, high overconfident or not affected by overconfidence and thereby you can determine the demand for that particular investor given the level of overconfidence. We can also discuss more examples with some realistic numbers.

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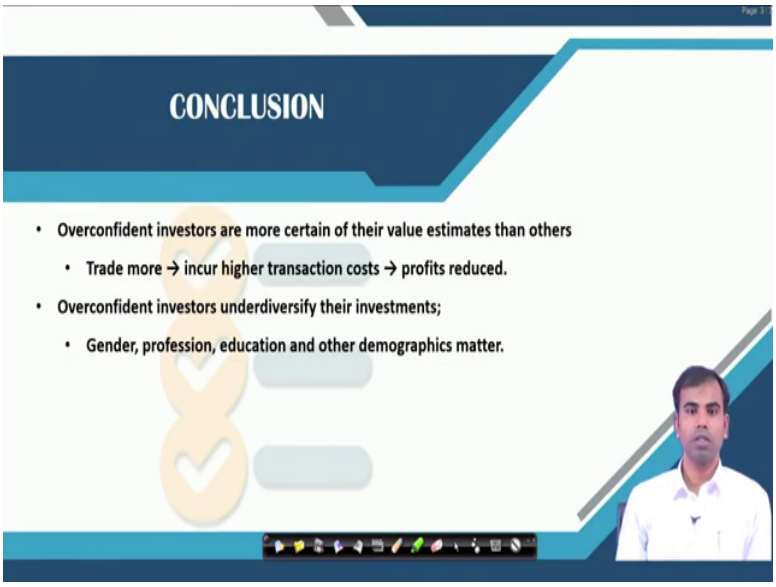

But, for this session we will like to conclude here by saying that the overconfidence is basically a behavioral bias that determine the investors response to certain information and whether the information is coming from his own estimates or is coming from some external prompts, investor would assign higher weight to the own calculation and own estimates compared to the information that is coming from external sources.

As a result of this over confidence in his own judgment and opinion investors tend to trade more in the process they incur more cost and their net returns from their investment would be reduced to that extent. Another result of this overconfidence bias could be the under diversification of investments which means when investors are overconfident in their own abilities they tend to under diversify and their investment will be concentrated around certain things where investor would feel comfortable and more confident about.

And, that is where features are attributes such as gender, profession, education and other demographic inputs might matter more for determining the level of overconfidence or under confidence in an investor. With this I conclude the session.

Thank you very much.