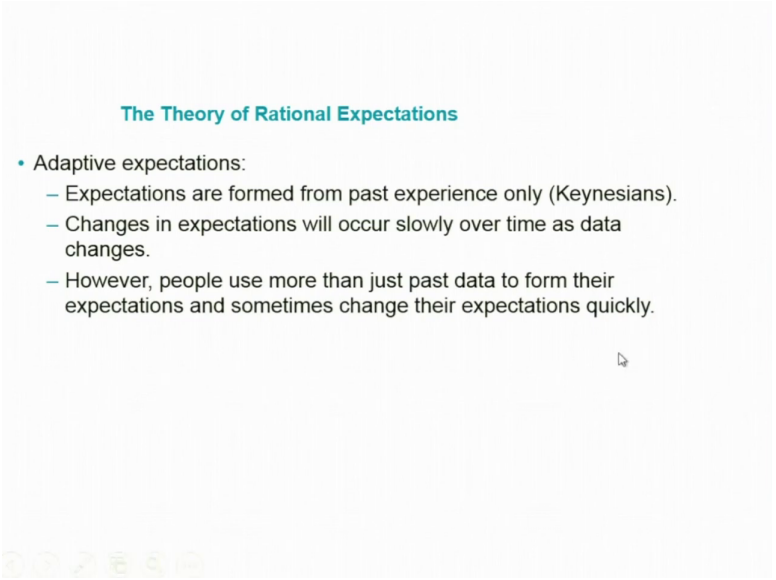
Economics of Banking and Finance Markets
Prof. Sukumar Vellakkal
Department of Economic Sciences
Indian Institute of Technology, Kanpur

Lecture - 12
Determination of stock prices - II

(Refer Slide Time: 00:17)

Hi welcome. iI this session we are going to discuss the Theory of Rational Expectation and how theory of rational expectation going to play a crucial role in determining the prices of stocks as well as of alternative assets. The theory of rational expectation is also called as the efficient market hypothesis and known as the theory of efficient capital markets as well.

(Refer Slide Time: 00:49)

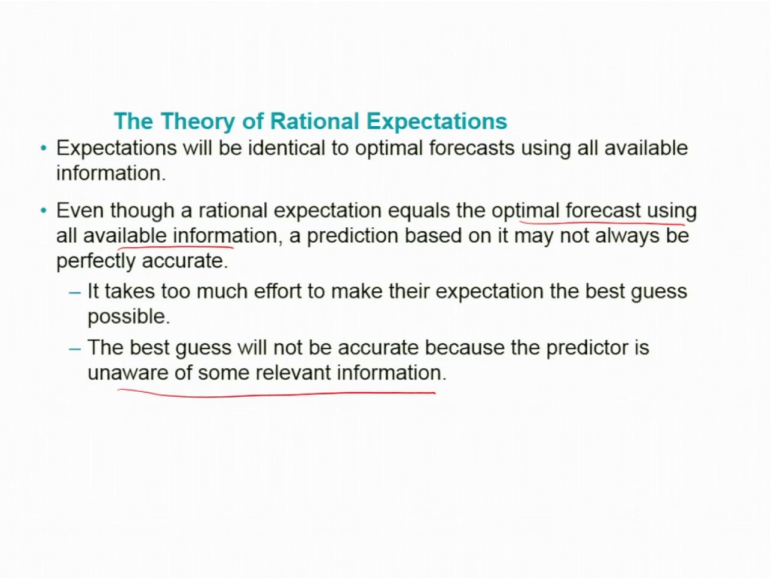


The theory of rational expectations contrasts with the theory of adaptive expectations. According to the theory of adaptive expectation, expectations are formed from experience only, this is one of the Keynesian propositions. And changes in expectations will occur slowly over time as data changes.

However, according to theory of rational expectation, people use more than just past data to form their expectations, and sometimes change their expectations quickly.

In other words, expectations are not just based on the extrapolation of this historical data but based on all available information will be inputted while forming expectation, and translating this expectation in determining the prices of assets.

(Refer Slide Time: 01:57)

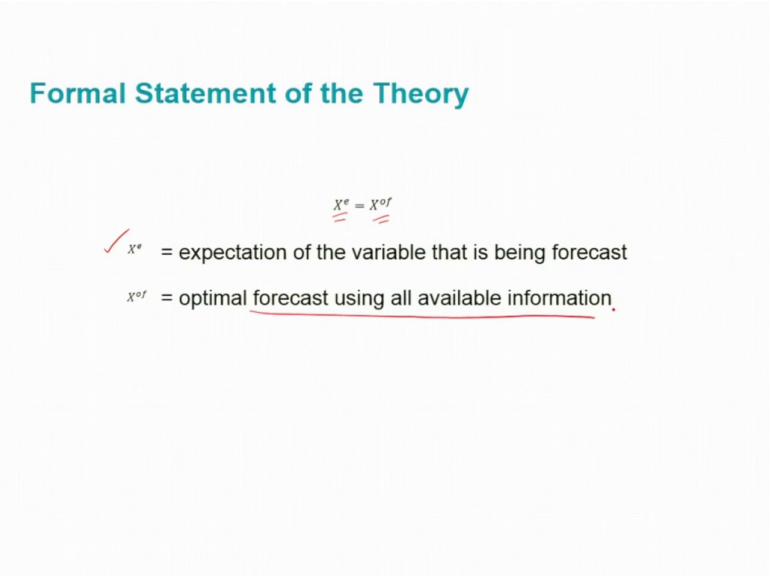


According to the theory of rational expectation, the expectation will be identical to optimal forecast using all available information. Even though a rational expectation equals the optimal forecast using all available information, a prediction based on it may not always be perfectly accurate. It takes too much effort to make their expectations, the best guess possible. And the best guess will not be accurate because the predictor is unaware of some relevant information.

One of the things we need to remember here that the theory of rational expectation is based on the proposition that the market participants consider all available information. They will make an optimal forecast using all the available information. But it is not necessary that the prediction based on it is going to be perfectly accurate.

Then again, as an economy is very dynamic, it includes several socio-economic political factors. All these will keep on changing. So, what are the new information coming that also will be feeding to the optimal forecast; that means, this will be keep on updating, and this is the one of the proposition of rational expectation.

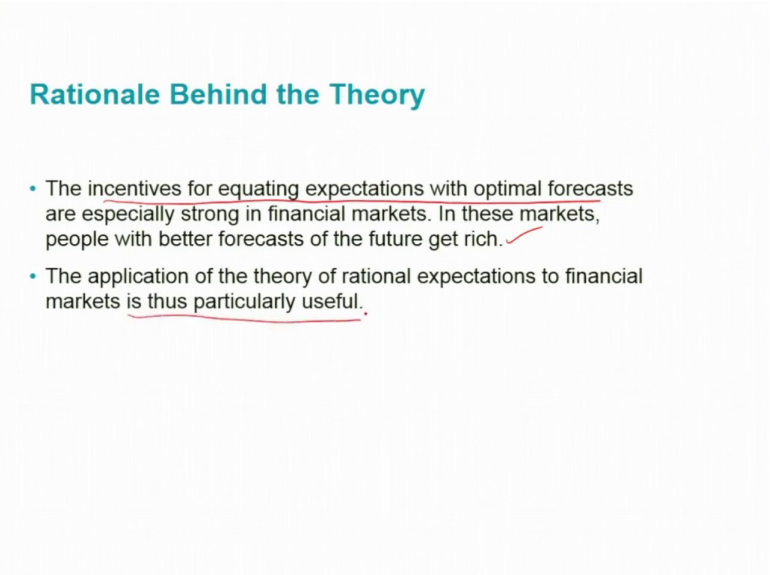
(Refer Slide Time: 03:20)



Based on this, let us make a formal statement, so that means here X^e is the expectation of the variable that is being forecast- may be stock price- this is stock price. The X^{of} is going to be the optimal forecast using all available information.

In this case, the rational expectation theory says that the expectation of the variable- the stock price- will be based on the optimal forecast using all available information, not just historical information.

(Refer Slide Time: 04:03)

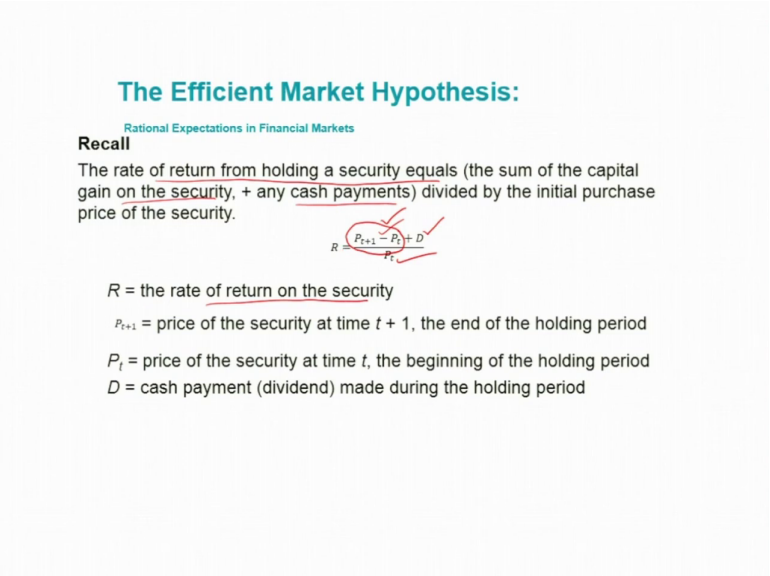


The incentives for equating expectation with the optimal forecasts are especially strong in financial markets. We know that these people, people with a better forecast of the future, get rich, they make more profit or more capital gain when they make use of all the available information.

It is not only individual, but also different the participant including financial institutions, for example, banks, insurance companies, pension funds whoever is participating in the market, all of them have incentives for equating expectation to optimal forecast. This is because it involves lots of their stakes, means investment in the market.

As you know, to get the maximum capital gain or profit, they must make the best use of all the available information. So, the application of the theory of rational expectation in this way is very important to financial market.

(Refer Slide Time: 05:11)

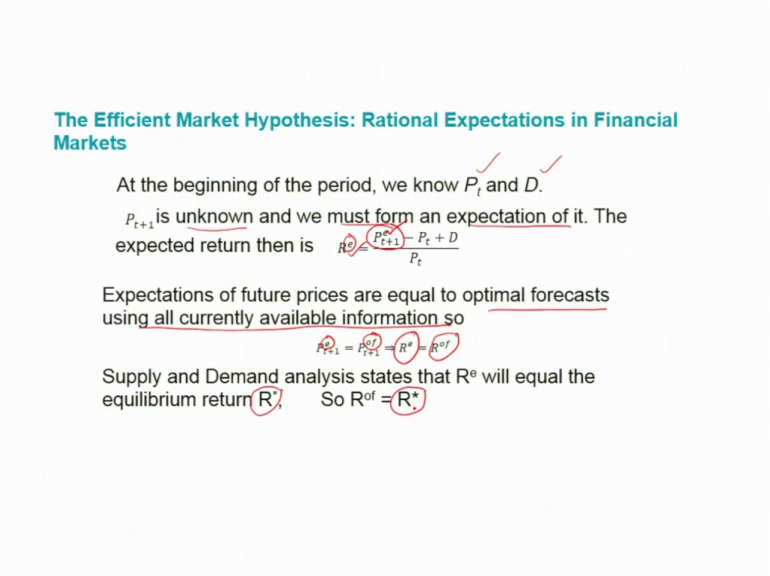


Let us apply the rational expectation in a financial market, for example, in the stock market. So, we have seen in the previous session that the rate of return from holding a security equals the sum of capital gain on the security plus any cash payment.

In the case of bonds, we have seen that the interest income plus the capital gain or in the case of return in stock price, we can see that the price difference that the Pt+1 minus Pt+D. So, this is the capital gain, and this is the dividend, and this is the current stock price.

This is the R, which is the rate of return on the security. This is a function of the difference in capital gain: Pt+1 minus Pt+D divided by Pt. In this case, let us apply how rational expectation plays a role.

(Refer Slide Time: 06:21)



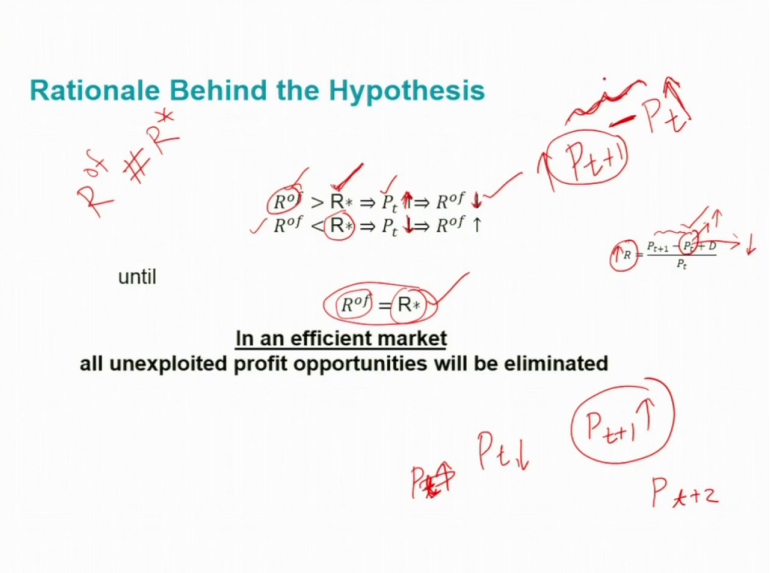
So, we can see that at the beginning of the period, we know Pt and D, we know both the P and D. And P t+1, what is going to be the price of stock in the next year; you know that this is unknown, and we must form an expectation about it.

In this case, the expected return, we need to make an expectation. What you can see here is that expectation of future prices is equal to the optimal forecast using all currently available information.

So, this 'e' component we need to equate with the optimal forecast, not just the expectation of next year based on the historical data but using all available information, we need to make an optimal forecast. In that case, we are going to get this R^e, the R^e is going to be the return based on the expectation, that is, the return based on the optimal forecast.

The supply and demand analysis states that R^e equal to the equilibrium rate of return R*. In this case, we see that, if we apply the rational expectation, the return based on the optimal forecast is going to be the return that is determined by supply and demand factors that the R*. Let us see how they explain it.

(Refer Slide Time: 08:17)



Let us start with a scenario. They are going to say that this part in the slide. Suppose the current condition in the market is that the return based on the optimal forecast is greater than the return determined by demand and supply condition.

In that scenario what is going to happen? The market participants who are having more information, having lots of information about various aspects about the market- about the present and future. Based on this information, suppose they calculate that the return from this stock is going to be greater than what is determined by the market: demand and supply.

So, in this case you know that those who are having this superior information about the market. they are going to demand this stock. And obviously, you know that when the demand for this stock increases, the rate of return is declined.

How come? We have seen in this formula that when the price of stock, this Pt, keep on increasing because of the huge demand from those who are having superior information. Those who think that the rate of return based on the optimal forecast (Pt+1) is greater than the current rate of return (Pt) determined by the market forces, then their demand for stocks is going to increase, that is, the Pt will increase. As a result, the capital gain the gain that is from this holding the stock is going to decrease as the difference between Pt and Pt+1 will narrow down.

That is because the price of stock in the period t will increase and net difference between the stock price next year minus the stock price this year, this gap will narrow down, as a result the R going to decline.

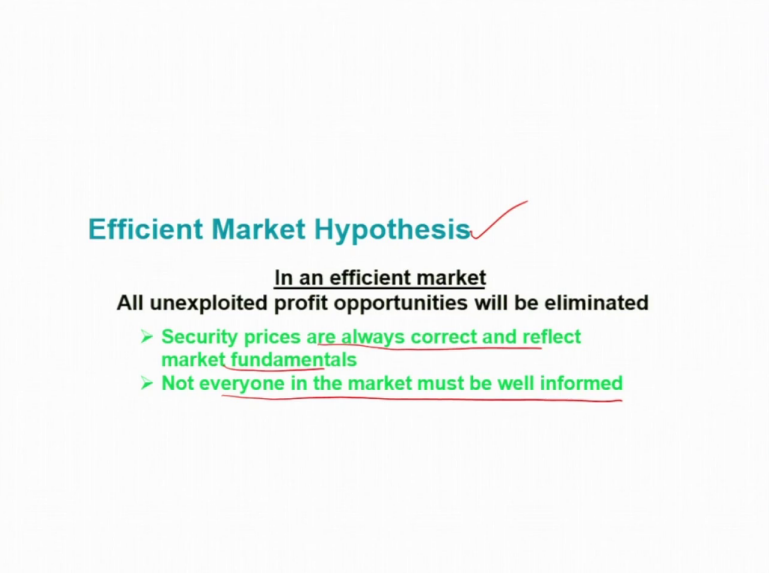
So, when the R^{of} is greater than R*, you can see that the return of optimal forecast, this one is going to decline. Then their demand for the stock decline, the Pt will also decline. Thus, you can see that, here, when the Pt declines, then obviously you know that the capital gain, that is the difference between Pt and Pt+1 is going to increase.

In this way, if R is not equal to R*, then due to these forces, you can see that there is a tendency to reach to the final equilibrium at this point. That means, R of is going to be equal to the R*.

In an efficient market, all unexploited profit opportunities will be eliminated. The proponents of this hypothesis argue that in the market, there would not be any unexploited profit opportunities. Market participants always try to get all the information and will make the best use of all available information.

Then, accordingly, the rate of return based on the optimal forecast is going to be equal to the return determined by demand and supply conditions.

(Refer Slide Time: 12:24)

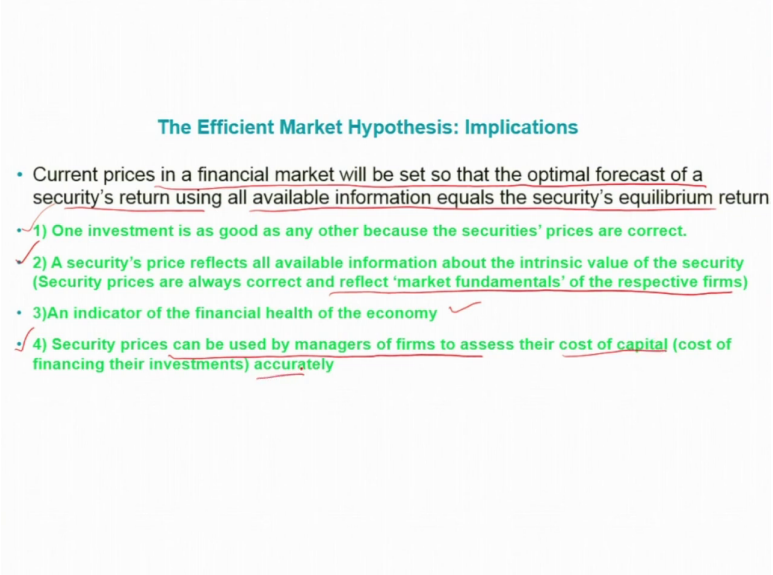


So, the efficient market hypothesis is also another version of rational expectation hypothesis, what they say that in an efficient market all unexploited profit opportunities will be eliminate.

According to them security prices are always correct and reflect market fundamentals, not only about the present but also the future.

All these aspects will be feeding into the rational expectation, and accordingly security prices are always correct and reflect market fundamentals of present and future. They also argue that not everyone in the market must be well informed. Even some participants have more information, then it will be reflecting in the market, as a result this R^{of} is going to be equal to R*.

(Refer Slide Time: 13:17)



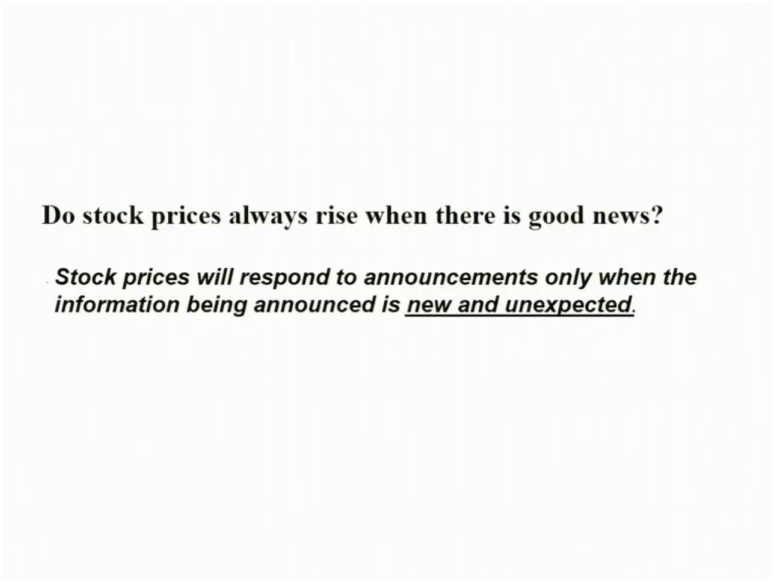
What are the implications of efficient market hypothesis? According to this hypothesis efficient, the market hypothesis, we can see that current prices in a financial market will be set where the optimal forecast using all available information equal securities equilibrium price. One of the implications of this hypothesis is going to be that one investment is as good as other because the securities prices as correct.

A second implication is that a securities price reflects all available information about intrinsic value of the security. That means, security prices are always correct and reflect market fundamentals of respective firms. So, when I say marker fundamentals; it means, not only about the present of the market fundamentals, but also of the future as well. So, all these will be fully getting reflected in the current security prices.

The stock prices can also be considered as an indicator of financial health of an economy. We can see that, based on the security price, sometime the managers of the firm also take knowledge about its management aspects from the market valuation of its own security price, which is determined by demand and supply forces in the market.

Security prices can be used by managers or firms to assess their cost of capital accurately, these are the major implications.

(Refer Slide Time: 15:04)

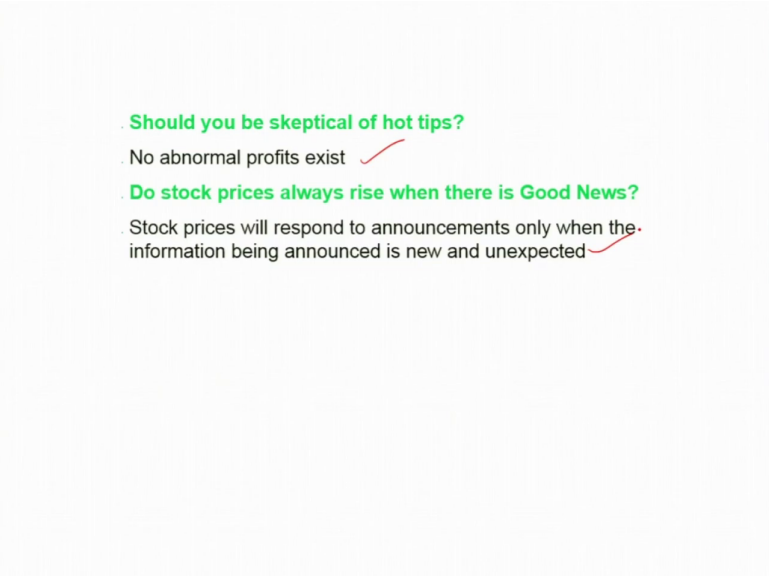


Let us ask do stock prices always rise when there is good news? When we come to know that the economy is going to perform well in next year, that is the overall political and economic conditions of the economy is going to improve, which is good news.

My question here is that do stock prices always rise when there is good news. So, the answer is that stock prices will respond to announcement only when the information being announced is new and unexpected.

But if this news is new and unexpected, then only we can say the stock price will change. If the market participants already made an expectation about it this information is already, that is, they anticipated this news, then this is not going to make any impact on the stock prices.

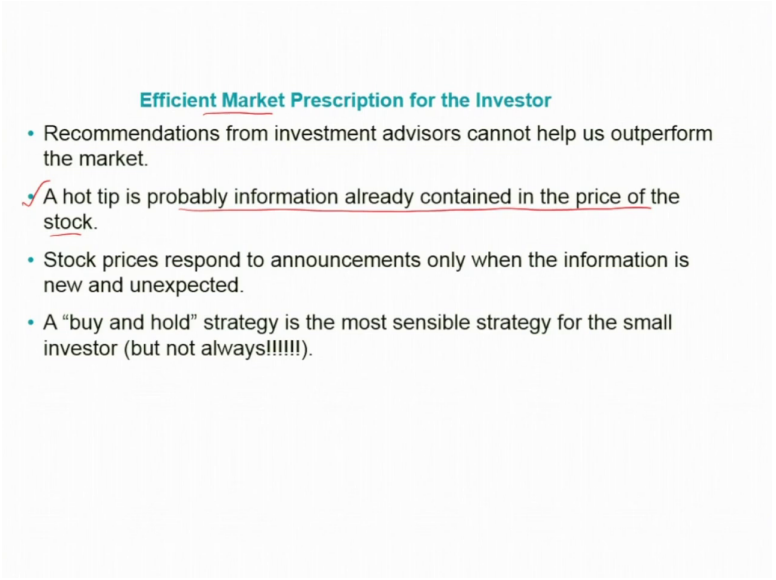
(Refer Slide Time: 16:23)



Should you be skeptical of hot tips; somebody say that this stock is going to outperform in the next year. So, should you be skeptical about hot tips? So, my answer here is that no abnormal profit exists; that means, according to this hypothesis the rational expectation theory there is no unexploited profit opportunities in the market. So, there is no scope for any abnormal profit in the market.

So, in this case, do stock prices, let us revisit this question: do stock prices always rise when there is good news? Our answer is that stock prices will respond to announcement only when the information being announced is new and unexpected.

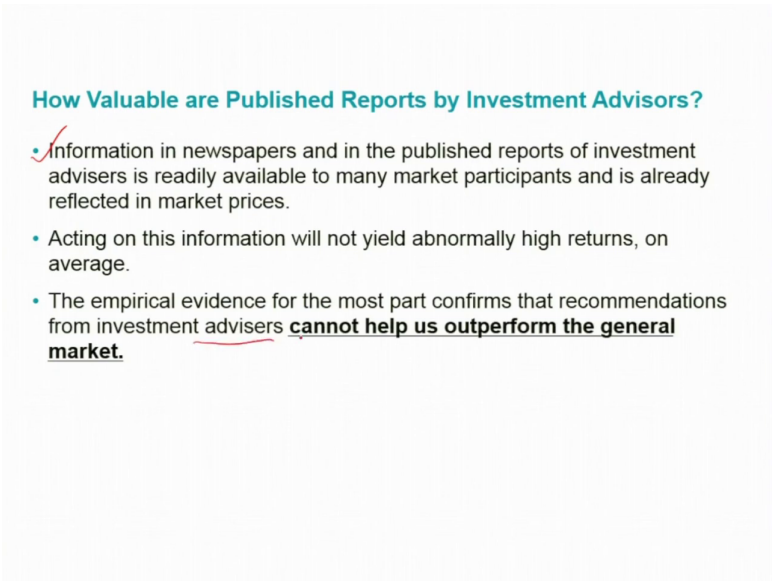
(Refer Slide Time: 17:14)



What are the main the main prescriptions given by efficient market hypothesis to the investors? According to this hypothesis, cannot help us outperform in the market right.

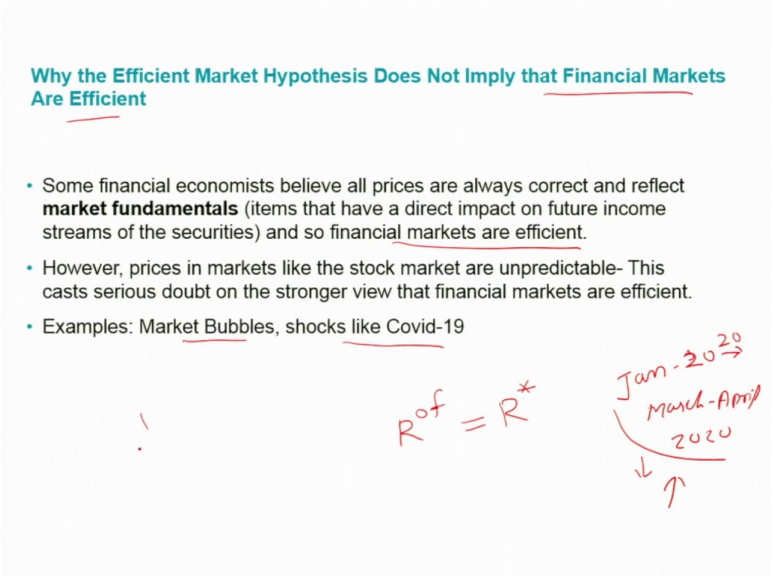
And a hot tip is, probably, information already contained in the price of stocks. So, stock prices respond to announcement only when the information is new and unexpected. So, one more prescription by this hypothesis is that a buy and hold strategy is going to be the most sensible strategy for the small investors, but not always.

(Refer Slide Time: 18:01)



Let us also look for example, how valuable are published reports by investment advisors. The information in newspapers and in the published reports of investment dailies are readily available to many participants and is already reflected in the market prices. So, acting on this information will not yield abnormally high returns. So, according to the empirical evidence, recommendation from investment advisors cannot help us outperform the finance market.

(Refer Slide Time: 18:41)



And however, the efficient market hypothesis does not imply that financial markets are efficient. Some financial economists believe that all prices are always correct and reflect market fundamentals. However, prices in finance markets, like stock market, are unpredictable, it poses doubt on the stronger view of that financial markets are efficient. For example, market bubbles and shocks like Covid-19 had make stock market prices unpredictable.

Before moving to this let me also state that one of the points, we need to more discussion. What this hypothesis also says that there is no unexploited profit opportunities in the market. For example, taking the case of stock price during the Covid period. Immediately after the onset of Covid, in the month of March April 2020, we know that the Indian market Indian stock might almost crashed. But, after 5- 6 months of the onset of Covid, you can see that India's Stock Market began to perform well. That is, after a couple of months, still Covid pandemic was continuing, the India stock market began to outperform right. why?

Because, by that time, the invention of vaccines and increasing understanding about the Covid, and it became a new normal, people began to expect that within a couple of months the pandemic will be over, and then the economy will bounce back. So, then you can see that because of this the stock price, for example, here in this formula, we can see that the stock price in the next year is going to increase.

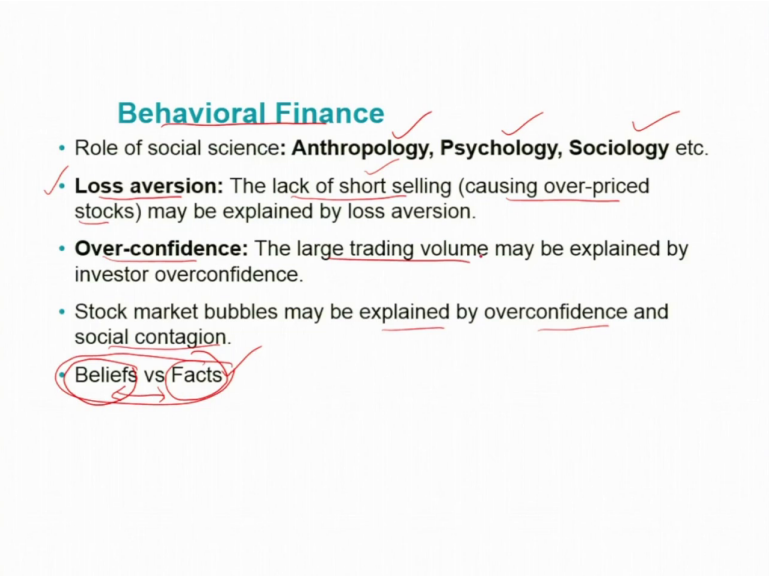
When they see that the stock price in the next year is going to increase, because the economy is going to do well after year 1, 2, 3 or maybe after a couple of years. As a result, there is going to be an increase in the stocks now itself. So, as a result the stock the Pt, this is going to increase. So, this difference, so as a result, the capital gain; that means, the difference between Pt plus1 minus Pt going to decline.

In the future, when the economy is going to perform well or the future of the firm is going to be bright, when you see that, the future of this firm is going to be good, then, as a result, the demand for this stock is going to increase now itself. So, because of that the difference between this decrease.

That means, if this firm is going to perform well, that is what our forecast optimal forecast. Because of that the demand for these firms' stocks increases in the present itself. As a result, the stock price of the stock increases in the current period itself.

As a result, the difference between, this difference, between Pt plus 1 minus Pt reduces. In contrast, if you see that the economy is going to perform badly in the future, you know that the Pt, this, is going to be reduced because the reason is that the demand for that stock is going to decline. So, in that way the gap is going to increase.

(Refer Slide Time: 23:21)



In order to understand how security markets, the finance markets, work these days, another area of finance is well discussed, that is called behavioral finance. That means, the role of social science also required in understanding how stock prices or the security prices are determined.

So, in this case, the role of social science like anthropology, psychology, sociology etcetera is being incorporated. So, in this case, one psychological aspect is called the loss aversion; that means, the lack of short selling.

If they are more people with a loss aversion, in this case you can see, that this is causing overpriced stocks because lack of short selling, and this will be explained by loss aversion. Another is over confidence. A large trading volume may be explained by investors over confidence.

So, the stock markets bubbles may be explained by over confidence and social contagion as well. And, there is a difference between beliefs and facts, so what we studied in the rational expectation that actually the facts the people take into account all the available information and then they make an optimal forecast. And because of that the markets fundamentals will be reflected in the stock price or the prices of security, but the beliefs also matter.

Not always the beliefs are going to be a true reflection of the facts. Most people have their own kind of over confidence or beliefs about the markets. One example, we can give, somebody is driving and anther one is sitting just in the car.

So, when someone is driving, then he or she will be thinking that he has more confidence on his driving and he or she thinks that no accident is going to happen, that is just a belief. But when the same person sitting on a taxi and the taxi driver is driving, then the passenger may be afraid of accident.

When you look at the probability in both scenarios, when he himself drives the car and when he is just sitting in the car when someone else is driving. There will be some differences in the perception of the probability of accident because he himself think that he is more confident about his driving and because of that you can see that he thinks that there is less probability of accident.

So, this kind of behavior will reflect in the market as well. In the markets, most people think that they have more information about market conditions and future security prices.

So, all of them having this kind of psychological, these aspects, this will be reflecting in their behavior. Then this will be also affecting the market bubbles, the fluctuations in the markets.

(Refer Slide Time: 26:42)

Accordingly, we can see that there is psychology of trading. So, here you can see 14 stages of investor's emotion. All these will be affecting one way or other way in the market behavior.

So, look at for example, optimism. So, if individuals are overrepresented with optimism, even if something like Covid kind of shocks happen, they think that, oh, we will overcome this within a couple of months, so no need of panic sealing right.

If market is represented with optimistic behavior, then the market would not be clashing. Similarly, people with the excitement some hot news and they respond, similarly all this psychology, all this aspect, anxiety, denial, all this going to reflect in the market behavior.

So, what we see that the stock market performs sometimes like bear, sometime like bulls, that is, in addition to the rational expectation, all the psychological aspects also work into context.

So, thank you.

Keywords: rational expectation, optimal forecast, return, hot news, expected and unexpected news, behavioral finance