Infrastructure Finance
Prof. A. Thillai Rajan
Department of Management Studies
Indian Institute of Technology, Madras

Lecture - 16
Project Financing - Attributes and Motivations

Hello, welcome back to this course on Infrastructure Finance, we will continue with what we have been discussing in the last class, so we have been talking about Project Financing in the last class. And this class we will continue to talk about some elements of project financing. Specifically we will focus our discussion on the Attributes and motivations of project financing, but first let us have a recap on project financing.

(Refer Slide Time: 00:52)

So, if you really look at some of the structural attributes of project finance, they can be broadly summarized as follows. First is organizational structure. So, project finance companies are involved separate legal incorporations, so that is each and every project is structured as separate company. And they do not really have let us say a structure, where they have more than one project that are put together. So, each and every project is an independent company, and they have separate legal incorporation.

Next is we look at the capital structure; the capital structure has a structure where there is a substantially high amount of debt, on an average if you look at generally the company's debt to capital ratio is about 33.1 percent. But, if you look at companies that are funded

on project finance basis, the debt to total capitalization is of the order of about 70 percent. So, therefore, we look at project finance companies having debt almost twice or more than twice as that of similar sized companies that are not project financed.

So, this is something that we will have to bear in mind and this is a very, very important feature of project finance companies. And then if you look the capital structure itself, let us look at the debt, debt ownership is largely, at least in the initial years of project formation is largely in terms of syndicated bank loans and not bonds. So, if you look at debt, debt can be categorized into two categories one is actually you get debt capital from banks, and second is you actually get debt capital from bonds.

Bonds are actually public sale of debt, and they are actually sold in the capital market for different investors, and the banks normally comprise what is called as your private debt market. And there is no secondary transaction of debt securities, when the loan is being sold in the bank market. So, if you look at the project finance companies in the initial years of a project finance company, bulk of the debt is by way of bank loans and not really bonds. So, there are differences both advantages as well as shortcomings of the sources.

So, we will probably look at some more detailed discussion on this two sources, in a little bit later, but for the time being it is important for us to kind of quickly understand that bank loans play or provide majority of a debt capital for project finance companies. And in terms of equity shareholders, there are about 1 to 3 equity partners, who are largely called as sponsors, and most of the equity is privately held. So, again companies can be classified as publicly held, and privately held, and if you look at project finance companies, most of the equity is privately held, they have about 1 to 3 equity sponsors.

And then the majority shareholder controls project, so we actually also have a situation where, the shareholding is not diffused among our several shareholders. So, if you look at very large project finance companies, in many cases it is very difficult to find majority shareholder. Let us take the example of a company like Infosys, Infosys is a very, very large public company in the information technology sector, it is going to be very difficult to find majority shareholder, who is having substantial shareholding of the company.

But, on the other hand, if you look at project finance companies, who 2 or 3 equally sponsors have much of the equally shareholding. And then they majority shareholders

always controls most projects, there is a very, very strong controlling mechanism that exists, for the majority shareholders. Next we will look at the board structure, board is essentially comprised of individuals who represent the shareholders. So, in essence the board is responsible, the board of the company is responsible for directing the management, it is responsible for, setting the goals and objectives of the organization and so on.

And the members of the board are representatives of the equity shareholders of the company, and in project finance companies you actually have board structure where, the directors are from the sponsoring companies. So, you have a project financing company which actually sponsored by a few companies, so they are actually the equity shareholders called as the sponsor companies. So, the board of directors of the project finance company or essentially from these sponsoring companies, and they are called as the affiliated directors form the sponsoring companies.

And let us also look at the contractual structure very typical feature of the finance company is we have actually several hundreds and sometimes even thousands of contracts. So, these contracts are fairly comprehensive, and in many instances these contracts run into hundreds of pages, so it is a very, very it is a structure that actually has very tightly bound contractual agreements. And it actually has to summarize, we look at organizational structure having separate legal incorporation that is a capital structure, which actually has a very high amount of debt. And then there is an ownership structure, which is characterized by high amount of debt form the banks, and we are also talking about very, very strong concentration of ownership among shareholders. And if we look at the board structure, we are having very, very little participation by external board members, most of the members board are actually members or represented by the sponsoring companies.

(Refer Slide Time: 06:40)

So, today what we will try and do is, we will try and look at, why do people go ahead and incorporate project finance companies, what are the motivations of starting or setting up a project on a project finance basis. The first motivation is a project finance helps to reduce costly agency conflict, so let us try and understand what is agency conflict, when let us say for example, there are two individuals. And if these two individuals have their own objectives, and if these two individuals function in a way that they are going to maximize, their own utility then there is bound to be a conflict between them.

So, let us look at and illustrative principal agent relationship form our day to day life, and see how there can be conflict between these two individuals, a common example could be let us say you are hiring a taxi to go to a particular destination. So, when you actually hire a taxi, you are actually the principal and then you are taking the service of an agent, which is let us say the taxi driver to take you to the particular destination. So, there is essentially what is called as your principal agent relationship involved here.

And as a person who has actually hired a taxi, you want to actually do two things, you probably want to minimize the cost involved, in terms of making your travel, you may probably also want to actually minimize the time it takes for the travel. On the other hand they agents has it is own way of maximizing it is utility, so the agent would like to actually maximize the fare that he receives from the trip. So, therefore, he may want to actually take you on a route which is longer than what you might want it to be.

So, there is a conflict here, one is your way of making the trip at a very low cost, and on the other hand the agent wants to actually increase the trip cost, so that it benefits more, so there is a principal agent conflict here. So, there are several ways in which you can look at principal agent conflict another example, could be let us say a ticket booking agent. You are actually going to take the services of a ticket booking agent, to book a ticket for you journey let us say between point a and point b.

And you would actually want to book a ticket from that operator who actually going to give you least price ticket all things being equal. On the other hand, the agent would actually try and book a ticket from that operator, which actually gives him the highest commission. Now, the operator that actually gives the highest commission, may not really be the operator who provides the lowest cost trip between these two points, so again there is potential agency conflict that could come up here.

So, we can really see several instances where, there are potential principal agency conflict, even in our day to day life and the same thing applies to the organizational structure as well. So, in an organization there are different people with different interest, and when people are trying to maximize their own welfare, there are bound to be potential conflicts. And one motivation for using project finance format is, it helps us to reduce some of agency conflict.

So, in an organization what are the different ways in which we can reduce the agency conflict, before we actually realize that, we need to first understand what are the situations in which agency conflicts can occur in an organization. So, let us broadly say there are two relationships there is a principal who are actually the owners, and then there the managers who actually are the agents. So, the principal appoint the managers to run the operations of the company, and to take care of their investments.

So, as the investor in the company the principals would want to actually get a very high return on their investments as possible. But, the managers would want to actually maximize their own interest for example, the managers would want to reward themselves a higher salary. The managers would want to actually be making their operations much larger, which actually goes back to what is called as your the interest in empire building and so on. So, when you have situations where the managers would try and maximize their own utility.

And then you have the investors or the principal who want to actually have higher return on capital, there is actually the possibility of a potential conflict. So, managers are the one who are responsible for the operations of the company, and they actually control the investment decisions and cash flows. And they may actually deploy the investment in such a way that, it could actually benefit them, at the cost of investors or principals. So, if we actually try and have project financial structure, we can probably resolve some of these agency conflicts.

The next conflict that can occur specifically in infrastructure sector is the conflict between the related parties mainly because of the fact that the assets that are created in the infrastructure sector are very, very specific. So, this asset specificity can lead to substantial amount of exposed opportunistic behavior. So, what is this opportunistic behavior, so let us take an example, so we have let us say refinery, and the refinery gets a crude oil from the petroleum wells. And it refines the crude oil and then it supplies the refined products to the various markets.

Now, for the refined products to reach the various markets, there is a pipeline and this pipeline takes away the refined products from the refinery, and distributes it to the various consumer markets. So, the refinery is dependent on the pipeline for supply of the refined products for the various markets. So, therefore when the refinery starts operation, the person who actually put the pipeline and who is the investor in the pipeline can take advantage of the fact that, the refinery is completely dependent on the pipeline, for it is survival to supply the refined products to various markets and so on.

So, this is basically an opportunistic behavior on the part of the pipeline owner, because the assets are the refinery are very specific, it can only be used to refine crude oil, it cannot be used for any other purpose. And because of the fact that the refinery owner is entirely dependent on the pipeline operator, to off take the refined products and supply to end markets. The pipeline operator can indulge in behavior that can harm the refinery operator, so this is you are opportunistic behavior.

So, the pipeline operator can refuse to off take the refined crude products, or the pipeline operator can consistently keep charging more for off taking the refined products from the refinery. So, there are several ways in which the pipeline operator can actually extract surplus rents from the refinery operator or the refinery owner, so this kind of situations

can be avoided, if you are able to structure the project as a project finance company. So, how is it possible to come to it a little bit later, but now there are some of these potential conflicts can be addressed, when we try and use a project finance framework.

(Refer Slide Time: 15:12)

So, let us try and see this one by one, the first is how do we actually address the conflict between ownership and control by using a project finance structure. So, ownership here is your principals and control is your managers, so the conflict between ownership and control how do we actually address it in a project finance framework. So, if you look at the infrastructure project, particularly project finance, so the traditional ways of control might not work. So, traditionally what happens, if the manager is not performing well then the company is taken over by potential acquisition partners.

And the managers are not being able to perform well, then they will not be able to find alternative employment in the job market. So, therefore, there is a lot of compulsion on the part of managers to ensure that, the act or they keep in mind the welfare of the principals or the investors. Second the reputation, so if the managers do not perform well then they lose the reputation. So, reputation is also not a very major factor in the case of project finance simply because project finance is largely structured around the cash flows of the project.

So, the reputation of the past performance does not play any significant role in the current project, because the lenders and the investors are largely looking at the cash

flows to the project, more than anything else. Third is the technique of using the stage commitment, so instead of giving all the capital upfront to the managers, managers are given capital based on the progress that they have achieved. So, in the sense that there is stage investments, only if the managers are able to show adequate progress, their mangers are able to achieve milestones, will the next level of investment is going to come in.

So, whenever we have the stage commitments, it is possible to enforce discipline on the part of the managers, because managers would realize that the next round of investments will not come in, if they do not show performance on the previous investments. So, this conventional disciplinary mechanism of stage commitment, might not actually work in the case of infrastructure sector. Simply because of the fact that it is very difficult to estimate, the economic value of a project that is not fully complete.

It is very difficult to estimate the performance in a project that is not fully complete in case of infrastructure sector, so this is not the case for the conventional projects. The conventional projects one may be able to show or evaluate performance based on fractional investment as well. But, in the case of infrastructural project, it is very difficult to determine the economic value of let us say a bridge that is not fully complete a road that is not fully laid. So, the commitment in stage manner is not really going to be as powerful a disciplinary mechanism, as we see in the conventional projects.

So, because of these features that exist in the infrastructure sector, we turn to project finance as a way to mitigate some of these potential conflict choices. So, in the case of project finance there are several features, which kinds of ensures that the conflicts between the investors and the owners are minimized. The first is what is called as your concentrated ownership, so there are very few owners, and all the owners have substantial interest in the company. And they actually monitor in a lot more active way the functioning of the managers.

So, whenever we are having an ownership that is very diffused, then the monitoring might not be as effective, because of what is called as a free rider problem. So, every shareholder would think the other shareholder will be responsible for monitoring, and therefore, there is a lot of free ridership. So, this kind of free ridership might not exist, if the shareholding is concentrated and the shareholders have substantial amount of

shareholding. So, that it is very difficult for them to rely on other monitoring sources, because the stake of the investment is very large to be to relay on other monitoring sources. So, it is in the very own interest of the shareholders to monitor their investment and therefore, this leads to a lot more active monitoring, and this actually acts as a way of disciplining the managers. Then you have a high leverage, what is the impact of high leverage, the impact of high leverage is that the company needs to pay a very high amount of interest.

So, when the company pays a high amount of interest, so there is very little cash flow that are left in the hands of managers to make discretionary investments. So, managers are to compulsorily pay of the debt obligations because any delay in interest or principal payments will push the firm towards bankruptcy. And when the firm gets into bankruptcy, the value of the employees in the labor market is drastically reduced, they will be unable to find alternative employment sources in an easy way.

So, that it is in the interest of the managers to ensure that the firm does not get into bankruptcy. So, for the firm should not get into bankruptcy, the interest and the principal payment on the debt has to be paid promptly, so; that means, the cash flows that come from the operations of the infrastructure project, will have to be managed properly. So, that the debt holders are paid, and since the debt is very high a substantial amount with the cash flows that is generated from the operations are used to pay the debt holders.

So, there is very little of discretionary cash flows on the part of the managers, and therefore, mangers are prevented from making investments that are not in the interest of the shareholders. Only if the managers have cash flows in their hands will they be able to make investments, will they be able to do some discretionary spends, if the managers do not have any cash. Because, the cash is forcibly taken away from the operations and paid to debt holders, they will have very limited opportunities to indulge in investments that do not value add for the investors.

The structure of the project finance itself, prevents managers form making some of these investments that may not provide value to some of the shareholders. So, traditionally most of the surplus cash flows are used to buy companies, make acquisitions you know expand the size of the company sometimes the acquisitions can be related, sometimes

they can be unrelated. But, since the project finance entity cannot go ahead and acquire another company, it is an entity which is structured around a single project.

Because, of the various reasons, the mangers will not be able to go ahead and acquire other companies. So, the need for additional cash flow is also not, so high as in the case of conventional companies, so the cash flows will have to be returned back to the investors, and substantial part of it is returned back to the debt holders. And then the remaining cash is given to the equity holders because there are very limited alternate opportunities for the managers to spend the cash that is generated from the operations. So, this gives us an understanding has to how a project finance helps to address, the conflicts that could arise between the owners and the managers, the structure of the project finance itself enables us to address some of the conflicts between owners and managers.

(Refer Slide Time: 25:10)

So, now let us try and understand how project finance helps to address the conflict between ownership and related parties. So, who are the related parties, so related parties are those that either supply critical inputs or buy primary outputs from the projects, host government is also considered to be a related party. So, there could be potential conflict between the project, and any of these related parties.

Say for example, the conflict between the project investor, and the host government could be that after the investment has been made. Then the government can suddenly

revoke the license or the concession that has been provided, so the investment has been made by the investor, based on the strength of the license or the concession agreement provided by the government. If the government goes back, the government indulges in opportunistic behavior after the investment has been made, then the investor would have to rely on costly mitigation measures to recover his investment.

So, it actually going to the investor is actually going incur a lot of loss because of this action on the part of the government. Because, of the fact that the assets are very specific, once the assets are installed it cannot be taken away, they cannot be used for any other purpose. Let us say for example, once a pipeline has been laid under the ground it is going to be very difficult to dig and take the pipeline out of the ground, and install it in a different location for a different purpose.

So, similarly there are conflicts between people who supply input, so for a power generating plant, reliable supply of fuel is very, very important factor. So, the fuel supply provider has to provide guarantees for regular supply of quality fuel, so after the power plant has been set up. If the fuel supplier, expresses the inability to supply fuel on a regular basis, then the viability of the power plant is threatened, the power plant will not be able to generate revenue a fuel supply is not available.

So, again there is a possibility of fuel supplier threatening the project investment because he can take advantage of his bargaining position in the entire process, same goes with the person who is actually buying the primary output. So, in this case the power that is being generated, the power that is being generated has to be transmitted to the load centers, to the different places which demand power. So, the transmission entity the transmission network refuses to off take power that has been generated, then again the viability of power project is being threatened.

So, because of the fact that some of the people who provide the critical inputs can actually bargain with the project company with the project investor, after the assets have been in place. We need to evolve a structure, which will reduce the possibility between the project investor and other parties, let us say before the investment is being made there exists a bidding situation. The host government would want to actually have as many bidders as possible to bid for the project.

The host government wants to provide as many facilities as possible to attract investors to the project, but after the investment has been made, the situation has been completely reversed, it becomes a bargaining situation. Because, of the fact that the assets are placed the government tends to bargain, the government tends to put in additional taxes, the government tends to use, so many other measures, to put the project investors in a tight corner. So, one way to avoid this kind of potential conflicts is to have what is called as your joint ownership structures.

So, we create a project finance company, which has joined ownership from all the related parties, so a project finance entity can actually have a fuel supplier, as a part of equity supplier holding it can actually have power purchaser, as a part of the equity share holding, it can actually have the host government as a part of the equity shareholding. So, when you have all the related parties together as equity shareholders, then such conflicts can be minimized because they also have interest in the investment.

So, if they actually undertake actions that can benefit the investment, it is also going to harm them as well because they are also equity shareholders of the project. So, this ability to actually have joint ownership structures, aligns the interest of the owners as well as the related parties. So, there are several instances where we have this kind of joint ownership arrangements, let us take the example of Bangalore international airport.

So, in the case Bangalore international airport there are also private investors, but we also have joint ownership from the government. The government actually is a part of the equity shareholding of the Bangalore international airport, we also have other people who are part of the project. Say for example, you have the equipment supplier which is a company called Siemens, Siemens is actually a shareholder in the project, and then we have the airport operator which is unique Zurich.

So, they are part of the equity shareholding of the Bangalore international airport project, then you have the construction contractor which is Larson and Toubro they are part of the equity shareholding. So, you have and equity shareholding structure, which has the construction contractor, the equipment supplier, the airport operator as well as the government.

So, any conflict that can arise between the different parties can be easily resolved because any harmful action that one partner undertakes will also harm the financial

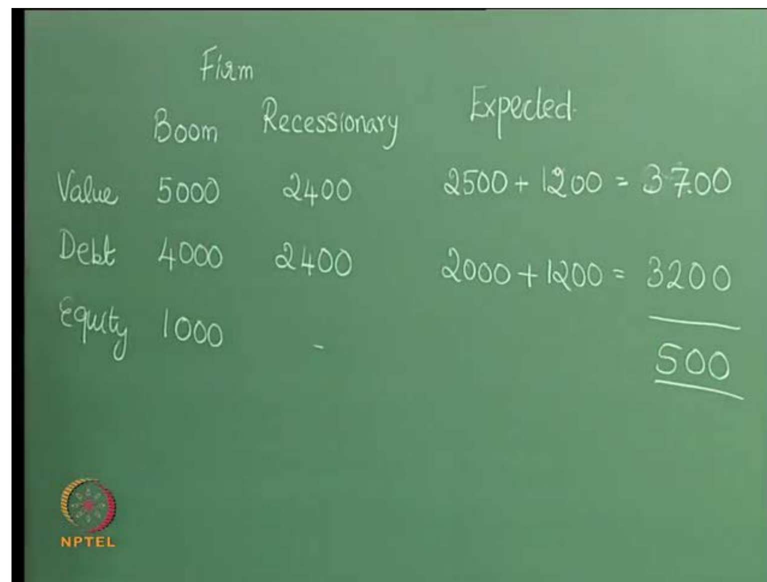
interest in the project because he has also made an equity investment in the project. Now, project finance facilitates creation of joint ownership structures, in a lot more simpler, smoother convenient manner, as compared to the traditional corporate finance structure.

So, if it is a traditional corporate finance structure, it might be difficult for Larson and Toubro to have another external partner, take shareholding in the parent company for implementing the Bangalore international airport project. It is very difficult for a government to acquire ownership in a private company at a corporate level. So, a project finance structure helps to facilitate creation of this joint ownership structures, and this joint ownership structures helps to reduce the conflict that occur between the project owners and the related parties. We also find that in many cases that there is a substantial amount of foreign capital investment in these projects. And whenever we have these international investors specifically these international lenders, they can also provide a deterrent for any possible expropriation acts.

(Refer Slide Time: 34:59)

Let us now look at some of the other issues that can be addressed in a project finance structure, one of the major advantage is that the project finance helps to counter what is known as your under investment problem. So, what is this under investment problem let me start this with an example.

(Refer Slide Time: 35:30)



So, let us say you have a company and there is a firm and the firm value depends on let us say the economic conditions. So, there are let us say for example, for the forth coming year the economic and existing any of the two conditions, the economic conditions can be boomed or it can be recessionary. So, we have two economic conditions the forthcoming year, the boom period and then there is a recessionary.

So, the value of the firm during the boom period is 5000, and the value of the firm during the recessionary period it is a same as it is 2400. So, this form is funded by both equity and debt, so the amount or the value of debt the company is 4000, so the value of debt is 4000, the company has to pay back 4000 to debt holders. Now, in the boom period after paying the debt of 4000, the remaining 1000 will be equity value.

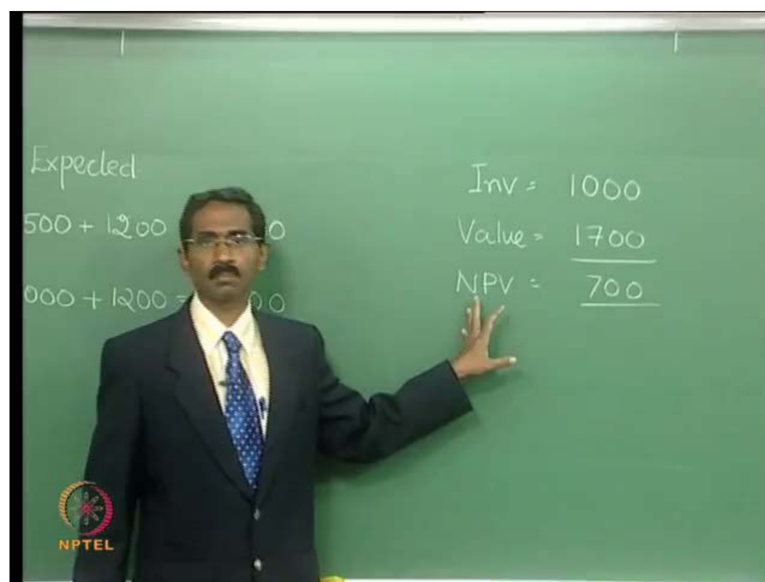
But, in the recessionary period debt holders need to be paid 4000, but the firm actually has a value of only 2400. So, the firm can actually pay 2400 because of the fact that the firm is not able to pay 4000 the firm gets into bankruptcy, and equity holders get nothing right. The debt holders get only 2400, because firm actually has a value of only 2400; obviously, cannot pay 4000 which is more than the value of the firm.

So, this is what is going to be the situation of the firm for the next year as we see today, so we can also look at the expected value. So, the expected value the expected value of the firm if we assume that, the probability of the boom condition as well as the recessionary conditions are equal. Then the expected value of the firm is going to be 0.5

into 5000 and 0.5 into 2400, so this will be 2500 plus 2700, so this will be 4200 sorry this is 1200.

Now, the expected value of debt is again going to be half of 4000 and half of 2400, so this will be 2000 plus 1200, 3200. Now, the expected value of equity will be expected value of the firm minus the expected value of the debt, so this will be 500. So, now the question is there is an investment opportunity that is available for the company, the opportunity involves the investment of 1000. And if the investment of 1000 is made, the firm value increases by 1700 irrespective of the economic conditions that is the firm value will increase by 1700, both in the boom period, as well as the recessionary period. So, the question is will the firm undertake this investment, so the investment itself is having a positive net present value, why is it positive net present value.

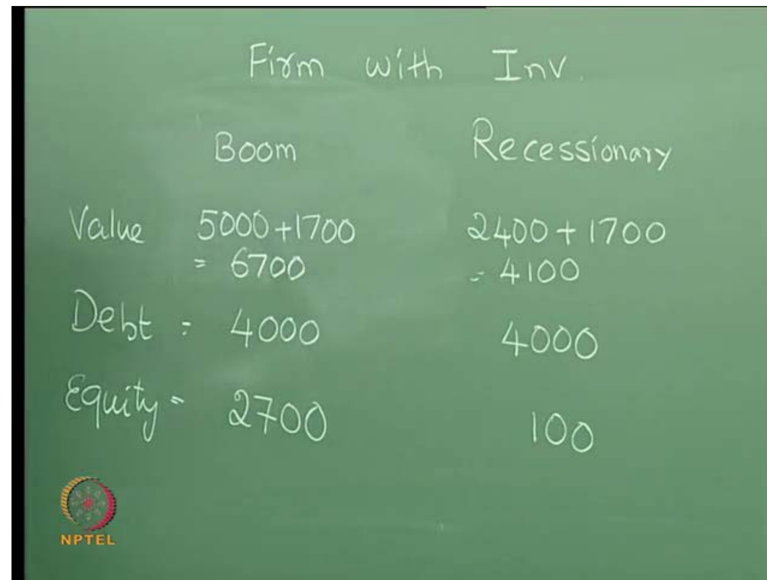
(Refer Slide Time: 40:51)



Because, the investment cost is 1000 the investment generates the value of 1700, so you have a net present value that is 700, you invest 1000 and you actually get a value of 1700. So, therefore, this is a positive net present value project, and if you go by the rule that we have to implement positive net present value projects, this project should be implemented.

But, the question is will the firm that is facing this kind of an economic situation, undertake this particular project will the firm make an additional investment of 1000. So, that it can potentially avoid the bankruptcy, so now let us try and understand this.

(Refer Slide Time: 41:52)



So, this is a firm with investment, so there is your boom and then there is your recessionary condition. Now, if the firm undertakes this projects, the value of the firm during the boom period will be loc 5000 plus 1700, so this will be 6700, in the recessionary period it will be 2400 plus 1700 which will be 4100. So, debt if you assume that the entire 1000 is funded by equity, there is no debt component involved in the investment of 1000 that is being made.

So, the value of debt in the company continues to remain at 4000, so during the boom period the firm value is 6700. So, the firm will be able to pay a debt of 4000, in the recessionary period the firm value is 1100, so the firm would be able to pay the debt of 4000, as the debt holders get paid 4000 either the company is in a boom period or in the recessionary period. So, the residual value goes to the equity holders, so in the boom period the residual value is 2700 to the equity holders. And in the recessionary period the residual value is 100 for the equity holders, so 100 is nothing but 4100 minus 4000 that gives a value of 100.

(Refer Slide Time: 44:04)

So, now let us look at the expected value, so the expected value of the firm if it under takes the investment is 5000, it is 5400 that is half of this plus half of this gives is 5400. The expected value of debt is 4000 because the debt is completely paid, expected value of equity will therefore, be expected value of the firm minus expected value of the debt, so this would be 1400. So, the question is when the firm makes the investment of 1000, the firm does not get bankruptcy in the recessionary phase.

Because, the debt holders are completely paid the value of the debt, so the question is will the firm undertake this investment, conventionally one would think that the firm would undertake this investment. Because, it is a positive net present value project, but in this case will the firm undertake this investment, the firm will not undertake this investment for the following reason, why. The equity holders expected value before the investment was 500, and after the investment the expected value increases to 1400.

So, there is a change of 900 after the investment has been made, so the difference between the expected value of equity without the investment and after the investment is 900. But, if you look at it the equity investors have invested 1000, but their investment has increased only by 900, right the value of the investment has only increased by 900. So, the equity holders invest 1000, but the gain is only 900, so as far as the equity holders are concerned, this is not going to be the positive net present value investment for them.

So, therefore, the equity holders are unlikely to undertake this investment simply because the positive value of the investment accrues to the debt holders. Debt holders appropriate a larger share of the positive value that generates out of this investment, and therefore, the equity holders will feel that the debt holders are getting benefitted out of the investment made by the equity investors. So, because of this reason and investment that I have just mentioned is unlikely to happen in the same company.

So, this is called as your typical under investment problem, whenever the firm has the debt that is outstanding, and the firm is face with a risky situation firms would tend to overlook positive net present value project. So, whenever such positive net present value projects are overlooked that leads to an economic loss or a loss in value, so to prevent that from happening, a project finance structure is most appropriate, because in a project finance structure, we look at cash flow only from that particular project.

And a project such as this can be implemented as a separate project and because of the fact that it actually gives a positive net represent value, it can be easily justified for implementation. So, project finance by enabling projects to be implemented on a standalone basis, helps to avoid costly under investment problem that can arise in the traditional corporate structure.

(Refer Slide Time: 49:06)

There are other ways in which project finance helps for example, it helps to allocate free cash flows in a much efficient way, substantial amount of debt in the project gives this

investors more control on the free cash flow. For example, if there is no debt that needs to be repaid, then the cash flow that are to be generated from the operations are in the controlled of the managers.

But, if the firm has a contractual obligation to pay the debt holders, then the project cash flows are the management of the project cash flows are better with in the hands of the investors. So, the issue of managing free cash flows is much more efficiently addressed in the case of a project finance.

(Refer Slide Time: 50:12)

So, project finance also gives a lot of other benefits to third parties who are associated with the project. So, what are these benefits, how could we actually explain these benefits in the project finance structures, so these are questions that we will try and discuss in the next lecture.