

**Management of Commercial Banking**  
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**Lecture 40**  
**Management of Lending Activities - 10**

After discussing about the different type of consumer loans and the different factors consider for evaluation of the consumer loans.

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And today's session, we will be discussing about certain concepts like whenever the consumer loans are evaluated, mostly all the commercial banks follow a credit scoring system that every consumer assessment will be made through a particular scoring or particular scoring system and the commercial banks can use that particular score to understand or to evaluate that the whether the loans will be given to them or not, that is number 1.

And on the basis of this particular score, the pricing also can be made and there is a pricing differences can be also always or resolved or can be considered depending upon the creditworthiness. So, because of that in today's discussion, we will be discussing about what are those different type of credit scores, the commercial banks use and what are those different techniques are used to construct this particular credit score for the different individuals and as well as the different models which are used for the pricing of the loans.

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**Credit Scoring**

- Used by lenders to evaluate loan applications they receive from consumers
- Major credit card systems such as master cards and VISA use these systems routinely to evaluate their credit card applications
- It is based on discriminant models or related techniques, such as logit or probit analysis or neural networks, in which several variables are jointly used to establish a numerical score for each credit applicant
  - If score exceeds critical cutoff level, approved for credit in the absence of other damaging information
  - If below cutoff, credit likely to be denied in the absence of mitigating factors

Handwritten notes: Data used, Model Output,  $y$ ,  $P(a)$ ,  $y = \text{categorical}$ ,  $1 \rightarrow \text{Rep}$ ,  $0 \rightarrow \text{miss}$

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Coming to this, whenever you talk about the credit scoring that already we have discussed that the credit scoring basically used by the lender to evaluate the loan applications they receive from the consumers. And once this loan applications have come, there are different assessments have to be made by the commercial banks for this disbursement of or maybe sanction of this particular loan.

So, in this context, they have to evaluate the loan applications through different methods. And one of the methods is basically the credit scoring method. So, major credit card systems such as master cards, VISA, they use these systems routinely to evaluate their credit card applications. So, looking at the past history about this particular consumer, particularly the credit history of the consumer, and the pattern of the repayment of this particular loan, what the consumer has made and as well as the financial condition of that particular consumer.

The mostly the credit card companies can go for evaluation that whether the particular person has the credit worthiness and how much limits should be given to this particular consumer against that particular credit card. How much loan, the consumer can take. So, all kinds of systems routinely all those bigger companies worldwide existing companies like VISA and master cards they always use before they go for providing credit card to any kind of individuals.

So, generally the credit score models, credit scoring is based upon the different kind of discriminant models or different kind of mathematical or the statistical models or statistical techniques are used to analyze that how this particular credit scoring is made or what kind of,

the credit scores can be analyzed. So, the techniques can be logit, can be a probit, can be neural networks, where they consider different variables jointly to establish a numerical factor for each credit applicant.

I hope, you might have idea, I can give one example, for example, whenever you talk about the logit analysis. So, here our, it is just like a function that if whenever you go for  $y$  is a function of  $x$ , that here  $x$  is the independent variable and  $y$  is the dependent variable. So, here what we are trying to find out, whenever you go for the logit or the probit analysis, we use  $y$  as a categorical variable.

Categorical variable in the sense,  $y$  is not observable or not quantifiable directly. We are putting like 1 and 0 kind of variable for the  $y$  and 1 is says that the particular consumer will repay or consumer will not repay, for example. So, here the consumer's credit worthiness is their credit worthiness is not there. So, like that if you categorize then there are many factors will be considered.

So, if your dependent variable is either 1, 1, 1, 0, 1, 0, 0, 1 like this thing, then we can have the independent variable like your income, your credit history, your previous defaults, all kinds of factors will be considered. Then all those factors will we considered into that and then after that we can re-estimate that model. And whenever you go for estimating that model, what we are trying to find out that what is if your income level is increased by 1 percent or income level will decrease by 1 percent.

What is the probability that or what is the probability of that particular consumer will not repay the loan? Or if there is a credit history says that this particular consumer has already a huge amount of loan against this account, then still what is the probability that the consumer will again repay that particular loan? So, in this particular fashion, different probabilistic models are always we formulate.

And on the basis of the formulation of the probability models, we decide that whether this particular consumer what is the probability that consumer will repay the loan in the future and his or her creditworthiness is there for this particular loan which has to be repaired back with both principles and interest forms in the future time period. So, because of that, we have the logit or probit analysis, you can go for a little bit further the dynamic or the nonlinear models like neural network.

So, all kinds of models can be used to find out a numerical value of that particular consumer which a representation of his creditworthiness, which is considered to understand to analyze, whether the loan should be repaid or not. So, here in this context, what the lender specifically do, if the score exceeds a particular critical level, then the loan can be approved. So, if the particular cutoff level is not reached by this consumer or the score is not basically up to that particular cutoff level or below the cutoff level, then the particular loan request can be denied.

So, in this context, what we can say, that credit score is a quantifiable measure of understanding or quantifiable measure which can gives the idea that what kind of creditworthiness, the consumer has and the consumer is really able to repay the loan in the future or not. And accordingly, the commercial banks or the lenders can decide whether the loan should be given to this particular individual or not.

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**Credit Scoring**

Advantages	Drawbacks
<ul style="list-style-type: none"> <li>•Ability to handle a large number of credit applications quickly with minimal labor thus reducing operating costs</li> <li>•Maybe an effective substitute for the use of judgment among inexperienced loan officers, thus helping control of bad-debt</li> <li>•Removes personal judgment from the lending process and reduces the lender's decision time from hours to minutes</li> </ul>	<ul style="list-style-type: none"> <li>•Scoring system uses financial, economic and motivational factors that separate good loans from bad based on observations from past data. It assumes that the same factors will hold in future, with an acceptable risk of error. This underlying assumption is wrong if the economy or other factors change abruptly</li> <li>•Danger of being sued by customer under antidiscrimination laws if race, gender, marital status or other discriminating factors are used in scoring system</li> </ul>

Frequent verification and revision of credit-scoring system are not only wise from a legal and regulatory point of view but also mitigate the biggest potential weakness of such lifestyles

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So, whenever you are using this credit scoring techniques for assessing the loans, whether the loan should be given or not. This particular technique has certain advantages and certain disadvantages or certain drawbacks. So, whenever you talk about the advantages, it has the ability to handle a large number of credit applications at a time in a short span of time with minimal labor.

Which is basically always helpful to reduce the operating cost of the lenders, because if the machines always responsible for deciding or maybe is useful for getting the score and accordingly we have to decide yes or no, that whether the loan should be given or loans

should not be given. Then there is no such kind of assessment by the individual level is required to provide that particular loan or to assess that particular loan.

So, maybe an effective substitute for the use of judgment among inexperienced loan officers. If loan officer's abilities not very high or exceeds that much experienced, then the quantifiable measure of this credit score will be helpful for them. It also removes the personal judgment from the lending process and reduces the lender's decision from time from hours to the minutes.

Obviously, it is because there is no such kind of personal or behavioral issues involved in that. Although in today's context, you have the artificial intelligence and all these things people are trying to use, which is able to capture some of the behavioral factors. But still in a traditional credit scoring system, here we do not have to consider those psychological or behavioral issues or your biases what the loan officer has or personal judgment is not going to play a role whenever the loans request are basically assessed.

So, if we talk about the drawbacks, the scoring system uses the financial, economic or factors for the different type of loans from the observations of the past data. The most important thing is we are using the past data. But if you think of in a very practical sense, past may not be repeated again and again. But depending upon the past data, we are predicting something. So, as per our market efficient hypothesis means the market is inefficient in that sense.

But it assumes that the same factors will hold in the future that may not hold good always with an acceptable risk or the error. If there is some changes happens in the market abruptly or some kind of incident, some kind of happening have taken place which is very much random in nature. Then that cannot be controlled by the credit scoring models which is completely based upon the available historical data about this particular consumer.

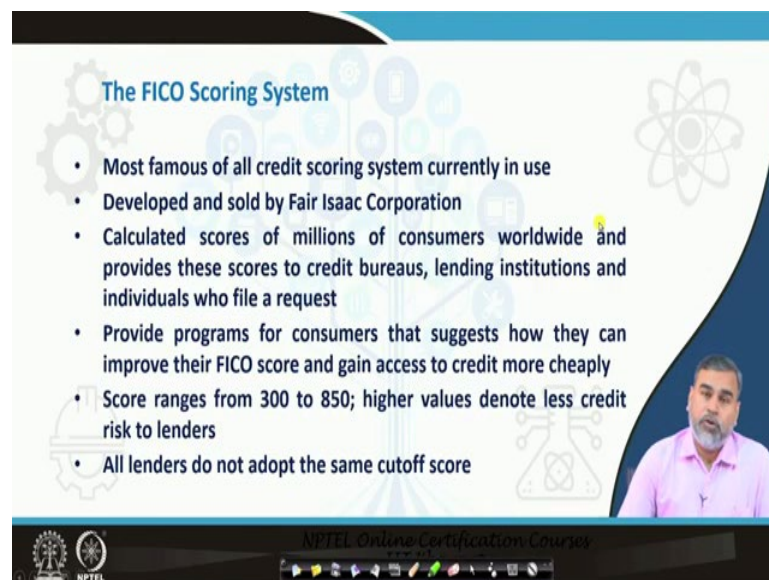
So, there is a danger that whenever the discrimination is made according to the gender, this race, this marital status and all these things, these are also the factors where it is considered while assessing loans, then there is a probability that somebody can take some legal action on these things. But anyway that is not the case in this particular context is not much factor, but mostly they reliance upon or dependence on high dependence on the past data is very important limitations of this particular module.

And, as well as it also does not consider the behavioral issues related to the consumer and as well as the loan officer, while assessing this particular loan. Frequent verification or revision

of credit scoring system are not only wise from a legal and regulatory point of view. But also it mitigates the biggest potential weakness of such lifestyle. So, these are generally the common things always we observe, but that does not necessary that always this as totally error free judgment, what does the particular commercial banks do, whenever they assess this particular loans using the credit score.

So, because of that, although this gives a kind of threshold value or to give you a kind of idea that whether the particular person or individual is able to repay the loan in the future or not, but still it is not a foolproof or complete kind of modeling which can give you the idea. Obviously, we have we should have some kind of behavioral or the personal judgment analysis is required whenever the loan will be disbursed to this particular consumer.

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**The FICO Scoring System**

- Most famous of all credit scoring system currently in use
- Developed and sold by Fair Isaac Corporation
- Calculated scores of millions of consumers worldwide and provides these scores to credit bureaus, lending institutions and individuals who file a request
- Provide programs for consumers that suggests how they can improve their FICO score and gain access to credit more cheaply
- Score ranges from 300 to 850; higher values denote less credit risk to lenders
- All lenders do not adopt the same cutoff score

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So, whenever you talk about the credit scoring system, we have many types of scoring system which works in the market. We have a FICO scoring system, which mostly used worldwide maybe mostly in the US and other countries. So, this is developed by the Fair Isaac Corporation. And it basically calculated the scores of millions of consumers worldwide and provide these scores of credit bureaus, lending institutions and individuals who file a request.

So, they basically gather the information about the consumer and using certain models they calculate that how this, what is the credit score of this model and what is the probability that the consumer is going to repay the loan in the future or not. And other lenders can use that particular information which is developed by this particular corporations and which is basically a scoring system.

It also provide this program for consumers that suggest how they can improve their FICO score. So, that also they here in this context, not only this gives the rating, they also provide the idea that what the consumers should do by that their credit score basically can improve or they can assess the credit more cheaply.

Because if the credit score is higher, quite high then the probability of getting low interest rate against your loan is very high. And the banks are ready to provide the loans in lower rates in comparison to the other customers who are very low FICO score. So, the FICO score varies from 300 to 850.

So, higher values denote less credit rates to the lenders. So, higher the value, it is good for the lenders. So, depending upon the values, the loan rates can be fixed and as well as the consumer also can get the idea from this particular context that what are the things they should look at this would consider to improve their credit score by that the cost of credit for them will be less.

So, all the lenders do not add up the same cutoff score. The cutoff score can sense because at the range from 300 to 850. But some banks can make their cut off 600, some banks may 550, some banks may be 700. So, depends upon the banks basically what kind of cutoff they will decide whenever they use this particular FICO score for assessing their consumer loans.

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The slide is titled "The FICO Scoring System Cont.." and features a list of factors. The background is light blue with faint icons of gears and a person. A small video inset shows a man in a pink shirt. The NPTEL logo is in the bottom left corner, and a navigation bar is at the bottom.

- FICO is based on 5 different types of information (from most important to least important ranked)
  1. The borrower's payment history
  2. The amount of money owed
  3. The length of a prospective borrower's credit history
  4. The nature of new credit being requested
  5. The types of credit the borrower has already used
- Elements of a borrower's background-especially age, gender, residential localities – are not included in establishing FICO score
- Confines list of factors available in each consumer's credit bureau report
- Scores are recalculated as new information comes in

So, then the next thing is that whenever you want to talk about the FICO scoring system, the FICO scoring system basically is based upon the 5 different types of information from most important to least important ranked. So, all those information's are what? The borrower's

payment history, they always gather. The money whatever they have own means whatever money the particular consumer own.

And the length of the prospective borrowers credit history, up to how much years the credit history of this borrower exist in the market. And the nature of credit, new credit being requested, whatever new credit, new loan the particular consumer is requesting and what is the nature of this for what purpose the loan is requested or how this particular money is going to be used in the system, used in the market.

And the type of credit the borrower has already used. Whatever loans already the borrower has taken, then how they have used it or what kind of loan it was and whether the borrower has really used this loan in adequate or maybe useful manner and as well as what kind of loan it was. So, if whether the borrower has the experience of utilizing that particular loan in improper way in the market whatever loans they have taken in the past.

So, because of that, they always gather the information about the borrower's background specifically age, gender, residential localities. Whenever we talk about this, although these 5 points they have considered. The FICO score basically do not include these kind of personal characteristics like what is the age of this consumer, what is the gender of this consumer and the residential localities where the consumer is staying.

So, these elements are not considered by the FICO score, whenever the FICO score as measured. So, those factors are not there in the part of this particular scoring system. So, this particular score confines the list of factors which are available for each consumer's credit information bureau or credit bureau report.

So, whatever report the information they get from this credit bureau report on credit information bureau, this same information can be utilized by these in this particular development of this particular score. So, that is why this personal background or personal characteristics are not assess, are not considered whenever you go for making this particular score. And scores are recalculated as the new information comes in.

So, it is not a static measure. So, periodically the scores are revised again and again. And this course will be revised whenever any kind of new events or new occurring or new kind of information comes to the market and that is reflected through the credit informations what the consumer has. And accordingly, the score of that particular consumer can be revised.



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**Credit Scoring in India**

- There are four credit companies licensed by Reserve Bank of India to operate as Credit Information Companies in India.
  1. The Credit Information Bureau (India) Limited (CIBIL)
  2. Experian
  3. Equifax
  4. CRIF High Mark
- Each company has developed their individual credit scores
- Most popular is CIBIL credit score: ranges from 300 – 900

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Coming to the credit scoring in India that whenever you talk about the credit score system in India, how the credit scoring is made? There are 4 credit companies basically which is licensed by the Reserve Bank of India to operate as credit information companies. And they have the license to gather this information about the consumer and making this scores which can be used by the lenders whenever they can provide the loan to the different individuals. The most important one is the Credit Information Bureau that is Limited that is CIBIL.

And we have Experian, we have Equifax, we have CRIF Highmark, there are different kind of companies which provide this credit scoring system. But you might have heard this CIBIL score, this Credit Information Bureau Limited that particular score is popular way of or popular kind of scoring system, which prevails in the Indian market. And the lenders always use that particular score whenever they provide the loan or they assess the loan to the different type of consumers.

So, each company has developed their individual credit scores, but most popular is the CIBIL credit score which range from 300 to 900. So, the minimum value will be 300 and the maximum value will be 900. So, depending upon that every bank can decide their cutoff that up to what score they can sanction this loan or the loan can be disbursed and up to what level the loan will not be disbursed or the loan request will be denied. So, depending upon that the scoring system always paid by the CIBIL and all the lenders, like commercial banks use it whenever they assess this consumer loans in the market.

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The slide is titled "Laws and Regulations Applying to Consumer Loans". It features a background with a blue and white color scheme, including icons of gears, a lightbulb, and a molecular structure. The text is as follows:

- **Disclosure Rules:**  
Mandates telling the customer about the costs and other terms or lease agreements
- **Antidiscrimination law:**  
Prevents categorizing loan customers according to their age, gender, race, or other irrelevant factors and denying membership to anyone solely based on these criteria

At the bottom of the slide, there is a small video inset of a man in a pink shirt and the NPTEL logo.

There are some factors related to the consumer loans which is based upon the laws and regulations. They are also influenced by the regulations. The regulations are basically related to disclosure rules and the anti-discrimination law. So, according to the disclosure rules, the mandates telling the consumer about the cost and other terms of lease agreements and about the anti-discrimination law, we have which prevents the categorizing loan customers according to their age, gender, race and other relevant factors, irrelevant factors and denying the membership to anyone, which is based on the criteria.

The depending upon this mostly this system works quite strict in the US market, that where the classifications of the consumers cannot be made on the basis of the age, gender or the race or any other irrelevant criteria, if anything is interesting there. But mostly all those kind of assessment or the rating of the consumers can be made on the basis of the credit score what the consumer get. And on the basis of the credit score, it will be decided, whether the loan should be given or should be sanctioned to that particular consumer or not.

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The slide is titled "KYC India" and features a background with various icons related to banking and technology. It contains the following text:

- Reserve Bank of India (RBI) has advised banks to follow the (KYC) 'Know Your Customer guidelines', wherein certain personal information of account-opening prospect or the customer is obtained
- Objective of the KYC guidelines is to prevent banks being used, intentionally or unintentionally by criminal elements for money laundering
- Banks should keep in mind that the information collected from the customer for the purpose of opening of account is to be treated as confidential and details thereof are not to be divulged for cross selling or any other like purposes

A small video inset in the bottom right corner shows a man in a pink shirt speaking. The slide also includes the NPTEL logo and the text "NPTEL Online Certification Courses" at the bottom.

If we talk about India, in India, we have very popular KYC that know your customer, that particular thing, the bank always strictly follow whenever they gather the information about the consumer and as well as that can be used always for assessing the different kind of banking activities for the consumers always do, including the loan activities always they' ae supposed to do within the system.

So, the Reserve Bank of India in this context has advised all the banks to follow the KYC, Know Your Customer guidelines were in certain proposal information of account opening prospect or the customer is obtained. What is the objective of the KYC? The objective of KYC is it to prevent the banks being used intentionally or unintentionally by criminal elements of the money laundering.

So, any kind of activities which should not take place, which is related to any kind of anti-terrorist, any kind of activities is related to kind of uneven or maybe it is related to terrorism or it is related to money laundering or anything. Those kind of activities should not be there or those kind of money would not be utilized for that kind of purpose. So, that basically has to be very much strict, the government is very much strict about this.

And banks should keep in mind that the information which is collected from the customer for the purpose of opening the account, it will be treated as a confidential and the details are not to be disclosed for cross selling or an any other use in this particular system or a particular market. So, the informations what is gathered that basically should be accurate and should be always, we can say that authentic by that this particular information should not be shared with

anybody, whatever information the customer provide to the commercial banks for their safety and as well as the other type of reasons.

And but the bank also should have all type of information about the consumer that whether the consumers information which is provided that is accurate and as well as the particular money which is deposited by the consumer is not going to be utilized for any kind of activities, which is against the rules or the law and order institution of that particular country.

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The slide is titled "KYC India" and features a background with various icons representing technology and finance. It contains two bullet points:

- Banks should ensure that any remittance of funds by way of demand draft, mail/telegraphic transfer or any other mode and issue of travellers' cheques for value of Rupees fifty thousand and above is effected by debit to the customer's account or against cheques and not against cash payment
- Banks should ensure that the provisions of Foreign Contribution (Regulation) Act, 1976, as amended from time to time, wherever applicable are strictly adhered to

A small video inset in the bottom right corner shows a man in a pink shirt speaking. The slide also includes the NPTEL logo and the text "NPTEL Online Certification Courses" at the bottom.

So, then we have other things also which is related to KYC, the banks should ensure that the remittances of funds by way of demand draft or the mail transport or any other mode and issue of travelers' cheques for value of rupees 50,000 above is affected by the debit to the customer's account or against cheques, not against the cash payment. So, any kind of payment which has made that basically if is above this 50,000, it should be against the cheques and it should not be against the cash payment.

And the banks also should ensure that the provisions of the Foreign Contribution Act 1976 as amended from time to time wherever applicable or strictly followed by the particular agencies or particular customers or particular stakeholders which are existing in this particular system.

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**Pricing Consumer Loans: The Cost Plus Model**

- Many consumer loans are priced off some base or cost rate, with a profit margin and compensation for risk added
- The rate on a consumer installment loan may be figured from the cost-plus model:

$$\begin{array}{rcl} \text{Loan rate} & = & \text{Lender's cost} + \text{Non-funds operating} + \text{Premium for} \\ \text{paid by the} & & \text{of raising} + \text{cost (including wages and} + \text{risk of} \\ \text{consumer} & & \text{loanable} + \text{salaries of lender} + \text{customer} \\ & & \text{funds} + \text{personnel)} + \text{default} \\ & & + \text{Premium for} + \text{Desired} \\ & & \text{term risk with a} + \text{profit} \\ & & \text{longer-term loan} + \text{margin} \end{array}$$

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Then we are coming to the pricing of this particular loans that if you remember in whenever we are pricing this business loan, we have discussed about the different 2, 3 models. We have cost plus model, we have the cost leadership model, there are different types of models prime, low, prime lending rate models and all these things. But like that whenever we talk about the consumer loan, mostly the consumer loans are assets to the cost plus models.

Although within the cost plus models, the calculations of the interest rate or the prices are different. So, many consumer loans are priced off some base rate or the cost rate already you know that the base rate is nothing but or the Indian context it is marginal cost of lending rate, MCLR. And these particular loan rate should be more than the say MCLR with the profit margin and as well as the risk what this particular risk premium, what this particular loan should have to overcome any kind of risk whatever they are going to face in the market.

So, because of that whenever you talk about this loan rate fed by the consumer, we have to obviously the lender cost of raising the loanable funds. How much this lender cost is encoding to raise that particular loan, this is number one. The non-funds operating cost which includes the wages, salaries of the lender personnel and servicing cost plus the premium for the risk of the default, the credit risk whatever the lender is going to face against that they charge some premium.

And premium for the torn breaks, torn breaks means if the particular consumer is asking for a long term loan, then the long term is more riskier than the short term then the long term rate for that one particular premium has to be added and plus the desired profit margin and from

that how much profit margin the consumer going to always have. So, in this context, what we can see that these are the 5 component has to be added. Whenever we go for the cost plus model and accordingly the loan rate can be calculated.

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**Pricing Consumer Loans: The Cost Plus Model Cont..**

- Variety of methods are used to calculate the actual loan rates banks offer to their customers
- Among the more familiar methods are:
  1. Annual Percentage Rate
  2. Simple Interest
  3. The Discount Rate
  4. Add-on Rate

The slide features a background with gears and a tree-like diagram. A small video inset shows a man in a pink shirt. The NPTEL logo is visible in the bottom left corner.

But little bit if you expand it, there are various methods are used to calculate the actual loan rates, the banks offer to their customers. So, the loan rates can be based upon the annual percentage rate, it can be based upon the simple interest, it can be also represented through discount rate or it can be also presented like a method called the add on rate. So, these are the different ways, the different methods for calculation of the loan rates for the banks and where the charge to the different customers in the system.

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**Pricing Consumer Loans: The Cost Plus Model Cont..**

**Annual Percentage Rate (APR)**

- APR is the internal rate of return (annualized) that equates expected total payments with the amount of the loan
- Takes into account how much of loan is repaid and how much credit the customer will actually have use during the life of loan
- Example:**
  - Consumer borrows \$5000 for a year, paying off the loan in 12 equal installments, including 12% as interest per annum
  - Per month interest = 1%
  - Each month borrower pays \$444.25 in principal and interest
  - Total Payment:  $444.25 \times 12 = \$5331$
  - Total Finance charge: \$331

Handwritten annotations include circles around '12%' and '12', and a circle around '12' in the example text. The slide features a background with gears and a tree-like diagram. A small video inset shows a man in a pink shirt. The NPTEL logo is visible in the bottom left corner.

So, here if you see that how basically these things work or these methods are basically used. For example, their annual percentage rate, if you talk about it is annual rate of return that equates the expected total payments with the amount of the loan. It is the internal rate of return which is annualized that equates the expected total payments with the amount of the loan. So, it basically takes into account that how much a loan is repaid and how much credit the customer will actually have used using this end of the life.

If you see this example that customer has borrowed 5,000 dollar for a year, paying this 12 equal installments let you assume that 12 percent as the interest per annum, then per month interest is 1 percent. Then each one, the borrower pays is how much that 5,000 and where 12 percent interest we have 5600 then effectively per month he has to pay 444.25 dollar. Then actually how much total payment this customer is making, then  $444.25 \times 12$  that is 5331.

So, end of the day what basically we are getting that the total charges what they are paying against that particular loan that is 331 dollar. So, the borrowed amount is 5,000 dollar, and they are paying in the 12 equal installments and then this is annual interest rate we are charging 12 percent per annum, then this is the finance, total finance are the consumer is able to, has to pay to this particular bank.

So, if this 444.25 will be given accordingly, you can find out the interest rate from there. So, that means, you know that how much loan you have taken, then how much the money you have to pay per month as installments, then if you can find out that how much extra preventive are going to make, then you can also find out that how much interest rate, the bank is charging against that.

So, that is also another way you can represent or you can use it for the calculation of your annual percentage rate. So, here are the annual percentage rate is given. But if it is not given, if you are trying to calculate that, so in that case your principal amount will be given to you that is your PV which is 5,000 dollar, your installment will be given to you. Then your installment money per month will be given to you.

So, if this will be given to you, then per month your interest rate you can calculate that is nothing but  $I / Y$ . So, if the per month interest rate can be calculated, then you can calculate your annual interest rate, this one multiplied by the 12. So, end of the day, you can find out that how much interest rate this particular loan has charged. So, that is basically consider as the annual percentage rate.

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**Pricing Consumer Loans: The Cost Plus Model Cont..**

**Simple Interest**

- Adjusts for the length of time a borrower has used the credit
- If a customer is paying off loan gradually, the simple interest approach determines the declining loan balance, and that reduced loan balance is then used to determine the amount of interest owed
- **Example:**  
Loan amount=5000 for a year, simple interest = 12%  
If none of the principal is to be paid off before 12 months, interest owned by customer is:  
$$\text{Principal} * \text{Rate} * \text{Time} = 5000 * 0.12 * 1 = 600$$
  
At maturity customer will pay \$5600

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Then we can go for the, another a way of simple interest rate. What is simple interest rate? It adjusts the length of the time of a borrower which have use this particular credit. So, if a customer is paying off loan gradually, the simple interest approach determines the declining loan balance and thus reduce this loan balance and then used to determine the amount of interest rate owed.

So, for example, if you see the loan amount is let 5,000 dollar and loan is taken for a year, the simple interest rate is 12 percent. So, if none of the principal is to be paid before 12 months, then how much interest to this particular consumer has to pay that is  $5000 \times 12$  percent, time period is 1, 1 one year only then the 600 dollar.

Then there are the maturity the costumer will pay 5,600 dollar. So, you have to remember this is important, none of the principal is to be paid off before 12 months. But now, for you assume that some of the principles are repaid, if some of the principles are repaid, then how this thing will work?



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**Simple Interest Example cont...**

- Now assume that loan principal is to be paid off in four quarterly installments of \$1250 each. Total payment due will be:
- First quarter:  $\$1250 + \$5000 \times 0.12 \times 1/4 = \$1400$
- Second quarter:  $\$1250 + \$3750 \times 0.12 \times 1/4 = \$1362.5$
- Third quarter:  $\$1250 + \$2500 \times 0.12 \times 1/4 = \$1325$
- Fourth quarter:  $\$1250 + \$1250 \times 0.12 \times 1/4 = \$1287.5$
- Total payment due:  $\$5375$

Handwritten notes on the slide:

- $5000 - 1250 = 3750$
- $3750 - 1250 = 2500$
- $2500 - 1250 = 1250$
- $5000 \times 0.12 \times \frac{1}{4} + 1250$
- $3750 \times 0.12 \times \frac{1}{4} + 1250$
- $2500 \times 0.12 \times \frac{1}{4} + 1250$
- $1250 \times 0.12 \times \frac{1}{4} + 1250$

Now assume that the loan principal is to be paid off in four quarter installments, then you have taken 5,000 dollar then four quarter divided by 4, 1250 each, then the total payment basically how they will make? The first quarter, they will first pay 1250 dollar plus the interest they have to pay  $5000 \times 0.12 \times 1 / 4$  and period is one quarter that is  $1 / 4$ , then it is you have 1400 dollar.

Second quarter, 1250 then how much remaining principle is there? The remaining principle is 3750 multiplied by, previously it was 5000, now it is  $5000 - 1250$  that is 3750,  $3750 \times 0.12 \times 1 / 4$  that will give you 1362.5. Third quarter, again 1250 has been paid then 2500 is remaining. Then again, we are paying that sorry it is a there is a double dollar here, we can remove this 1325 dollar.

Then the fourth quarter, we have again 1250 dollar  $\times 0.12 \times 1 / 4$ , that is 1287. So first year it is  $500 \times 0.12 \times 1 / 4$ , second year  $5000 \times 0.12 + 1 / 4$  and  $+ 1250$  but basically you are paying, second  $3750 \times 0.12 \times 1 / 4 + 1250$ . Second,  $2500 \times 0.12 \times 1 / 4 + 1250$  and 3 or 4 quarter you have again remaining is  $1250 \times 0.12 \times 1 / 4 + 1250$ .

This much you are paying, so that basically this much is your principal and this was your interest. So, here there is a double dollar, you keep in the mind and here there is extra 0, you can remove that one, 1287. Then total basically if you add up, then you are basically paying 5375. 5375 basically, you are paying if your principal amount are paid in the quarterly basis. So, previously whenever your principal amount is paid in the end, you are paying 5600.

That means, there is no installment payment of the principal in between before this 12 months. So, now if your principal is also taken away from this in the periodical basis, then your interest amount has come down, then that basically you are instead of 5600, you are paying 5375. So, this is what basically we can consider in terms of simple interest, and whether the principal amount will be paid in the end and the principal amount will be paid in the periodical basis. So, that is the way basically the difference works.

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**Pricing Consumer Loans: The Cost Plus Model Cont..**

**The Discount Rate Method**

- Requires customers to pay interest rate upfront
- Interest rate is deducted first, the customer receives the loan amount less any interest owed
- Example:  
Loan amount=5000 for a year, loan rate= 12% ✓  
Interest amount of \$600 to be paid upfront  
Borrower receives \$4400 i.e. \$5000- \$600  
When loan matured, customer will payback \$5000  
Borrower's effective loan rate =  $\frac{\$600}{\$4400}$  or 13.63%

The slide includes a small video inset of a man in a pink shirt in the bottom right corner. The background features a blue and white color scheme with gear and atom icons.

Then your discount rate method that is nothing but records customer to pay interest rate of front, the interest rate is reduced first and the customer receives the loan amount less interest owed. The loan amount let 5000, loan rate is 12 percent then how much the interest amount basically will be 600 then the 12 percent of the 5000.

First this 600 will be paid, then the borrower basically receives 4,400 dollar then the when the loan will match out, the customer will pay back that 5000. Then effective loan rate will be your  $600 / 4400$  which is nothing worthy 13.63 percent. So, this is another way of calculating this loan pricing.

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**Pricing Consumer Loans: The Cost Plus Model Cont..**

**Add-on Rate**

- One of the oldest loan calculation methods
- Any interest owed is added to the principal amount before calculating the required installment payments
- Example:  
Loan amount=\$2000 for a year, add-on interest rate = 12%  
Repayment plan: 12 equal installment  
Total payment will be:  $\$2000 + \$240 = \$2240$   
Each month payment:  $\$2240/12 = \$186.67$   
Installment principal =  $(\$2000/12) = \$166.67$  and loan installment: \$20

Then we have the Add-on rate, it is one of the oldest method. So, here it is very simple in that sense, loan amount let you assume that 2000 for a year, the add-on rate is 12 percent then the repayment plan, you have is 12 equal installments. Then total payment will be your total amount will be 240 then total payment will be there 2000 + 240 that is 2240 and each one they have to pay 186.67.

The, your installment principal will be how much? 166.67, which is 2000 / 12 and loan installment will be 20 dollar per day. So, which was traditionally used in the market but sometimes also we may not use it in the practical sense in the system. So, these are the different methods for calculation of the loan pricing. But all are based upon the cost plus loan pricing models.

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**CONCLUSION**

- Various credit scoring models are used to evaluate the consumer loans
- FICO in USA and CIBIL score in India are most used credit scores
- Consumer loans are subject to regulations and laws
- Cost plus model is used to price the consumer loans

**REFERENCES**

- Bank management & financial services by Rose, P. S., & Hudgins, S. C., McGraw-Hill Education, 2008.
- Commercial banking: The management of risk by Gup, Benton E., and Kolari, James W., John Wiley & Sons Incorporated, 2005.
- Management of Banking, 6e. by MacDonald, Scott. S., & Koch, Timothy. W, Thomson, 2007

So, in the conclusion, we can say that various credit scoring models are used to evaluate the consumer loans. FICO in US and CIBIL score in India are most used credit scores models. And consumer loans are subject to the regulations and the laws imposed in the respective countries.

And the cost plus model or loan pricing model is always used to price the consumer loans. And there are different methods for pricing it and this methods includes either simple interest rate or add-on or it is discount rate and all kinds of thing. So, these are the different ways the price of the loans are basically made. These are the references you can go through for the detailed analysis. Thank you.