



CREDIT RISK MEASUREMENT AND MANAGEMENT



LEARNING OUTCOMES

After going through the chapter student shall be able to understand

- ☐ Understanding the component of credit risk
- ☐ Evaluating credit risk
- ☐ Mitigating Credit risk
- ☐ Qualitative and Quantitative techniques to manage risk
- ☐ Credit scoring models



1. UNDERSTANDING CREDIT RISK

Credit is the basis of business though it is difficult to define but it can be termed as amount of money that will be paid later in exchange of some goods or services received earlier.

Since, it involves a commitment to pay in future period and future is uncertain it involves the risk. Hence, credit risk can be defined as refusal or inability of credit customer to pay the owed sum partially or in full or in time.

Credit Risk is also known as counterparty risk.

While in non-banking businesses the credit risk is related to promised payment for goods and services supplied, in the context of banking business it means failure or refusal to refund the loan account by the borrower in full or partially in time.

1.1 Two Way Risk

The definition of credit risk can also be viewed from other angle or other side i.e. receiver of goods or borrower in case of banking. This risk lies in not supplying the committed supply of goods by the seller leading to production halt or other results for the buyer.

Similarly in banking business the borrower faces the risk of withdrawing of lending facilities by the bank.

1.2 Risk – Return Trade Off

As discussed earlier credit is the basis of business and accordingly, while decision to give credit to be taken there should be a tradeoff between the risk and return (reward) for the supplier or lender. In case of banking business risk is greater when larger amount of credit is granted or when credit is granted for longer periods.

The optimal credit decision would maximize return. The trade-off between risk and return in the context of Credit Risk calls for following decisions:

- i) How much Credit Risk should be accepted in return of increase in sale or business in case of banking?
- ii) How much compensation should be added while pricing the product?
- iii) Placing of Credit Cap or limit for each customer.
- iv) Acceptance or rejection of customer's request.

1.3 Credit Risk in Capital Market

Credit Risk analysis from Bank's point of view will be an umbrella covering credit risk of other financial institutions. A bank acts as intermediate between provider of funds and seeker of funds. Bank accepts deposits from one group and provides funds to other group. Since bank grants credit it accepts the risk on regular basis. Hence, banks evaluate their experience and incorporate lessons from failure in a routine manner.

Banks caters both segments wholesale as well as retail segments. The main distinction between these two segments is complexities of financial products involved. For example, in case of retail segments the banking product may generally range from credit card to housing loans, in case of whole sale segment there are 'n' number of financial products. Main sources of seeker of bank's fund are corporates, ranging from small to large capitalization.



2. COMPONENTS OF CREDIT RISK

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Broadly, credit risk can be divided into following components:

- (i) **Default Risk** – This risk means the missing a payment obligation (of principal or interest or both). Default Risk can be measured by probability of default. It depends on credit worthiness of a borrower which in turn depends upon various factors such as management of organization, size of business, strength and reputation of promoters etc.

- (ii) **Exposure Risk** – This implies the uncertainty associated with future level or amount of risk. In other words, this risk is mainly associated with unexpected action of other party say prepayment of loan before due date or request for refund of deposit before due date.

In some cases, say for amortized credit such risks does not exists as period of receipt is known with greater certainty. Due to uncertainty generally off balance sheet items create such risks. However, in such cases, the exposure is not associated with client's behavior rather behaviors of market which keeps on changing constantly. In case value of derivative position turns out to be positive there is credit risk as it will lose money, if other party defaults. To overcome such risk normally derivative instrument are used.

- (iii) **Recovery Risk** – This risk is related to recoveries in the event of default, which in turn depends upon various factors such as quality of guarantee provided by borrower, and other surrounding circumstances. This risk can be minimized through Collateral and Third Party Guarantee. However, existence of these two risk management tool also carries risk.

(a) **Collateral Risk:** Although collateral reduces the credit risk but it happens only if collateral can be sold at a significant value. The quickness in realization of collateral depends upon its nature and prevailing market conditions. In normal course, fixed asset collateral normally carries low realizable value than cash collateral. However, if in buoyant market say in case of a property even a fixed asset in the form of a house property carries a higher value. With the use of collateral, the credit risk becomes twofold:

- (i) Uncertainty related to access it and disposing encumbrances which may be legal in some cases.
- (ii) Uncertainty related to the value realizable from the collateral which may be subject to various factors. To some extent the 2008 crisis was due to overvaluation of collateral against which borrowers were granted hefty loan and at the time of realisation the collateral value was very less.

(b) **Third Party Guarantee Risk:** This collateral is a kind of simple transfer of risk on Guarantor and in case guarantor defaults then risk again comes back to lender.



3. MEASUREMENT OF CREDIT RISK IN BANKING TRANSACTIONS AND FACTORS AFFECTING THE CREDIT RISK

3.1 Measurement of Credit Risk in Banking Transactions

To measure random loss, following formula can be used:

$$D \times A \times (1 - r) \quad \text{Random Loss} = \text{Default Probability} \times (1 - \text{Recovery Rate}) \times \text{Exposure Amount}$$

✓ D = Default %

✓ A = Amount of Exposure

✓ R = Recovery Rate %

This default % can also be computed through probability.

3.2 Factors Affecting the Credit Risk

The factors affecting the credit risk of a bank can be divided into following two categories:

(i) **Internal Factors:** These factors are internal to the bank, some of these are as follows:

- (a) Concentration of credit in particular geographical locations or business segments.
- (b) Excessive lending to particular industry is subject to cyclical fluctuations.
- (c) Ignoring the purpose for which loan was sought by the customer.
- (d) Poor Quality or Liberal Credit Appraisal while granting the loan.
- (e) Absence of efficient recovery mechanism.

(ii) **External Factors:** These factors are external to the bank and beyond its controls. These factors not only impact the profitability of borrower but also effects their repayment capability. Some of such external factors are as follows:

- ✓(a) Fluctuation in Exchange Rate.
- ✓(b) Change in Govt. Policies.
- ✓(c) Fluctuation in Interest Rates.
- ✓(d) Change in Political Environment of the own country.
- ✓(e) In case of Foreign project change in Country Risk profile.



4. TYPES OF CREDIT FACILITIES

Banks may offer different types of credit facilities / loans to an individual or companies / corporate depending on the purpose of taking the loan / end use. The tenor of the loan and the security offered would depend on the credit worthiness and nature of credit facility / loan. Loans are typically classified into two types:

(a) Retail Financing – refers to the consumer oriented services offered by banks to individuals rather than companies / institutions. These include mortgages, personal loans, debit cards, credit cards, small equipment loans like farm loans, commercial vehicle loan etc. This is usually called as the B2C type of funding – Business to Consumer.

(b) Wholesale Financing – this is offered by banks to organizations such as large corporate of various sectors, real estate developers, international trade finance businesses, institutions etc. These include term loans, project loans, demand loans, working capital loans etc. This is usually called as the B2B (business to business)

Retail & wholesale financing could either be fund based or non fund based. Different types of loans / credit facilities are enumerated below:

4.1 Fund Based Facilities

Fund based facilities are limits where the borrower gets the money in cash from banks / financial institutions. Few fund based facilities / loans are enumerated below

(a) **Personal Loan** – also called as consumer loans, these loans are unsecured in nature and are advanced on the basis of borrower's credit history and ability of repay the loan from personal income. Repayment is usually through fixed amount installments over a fixed term. These loans are generally unsecured in nature.

(b) **Mortgage loan / Home Loan** – a loan that is secured by property or real estate is called a mortgage loan. In exchange of funds received by the borrower to buy a home or property, a lender gets a promise from the borrower to repay the loan within a certain time frame for a certain cost.

(c) **Working Capital loans** – These loans are for the purpose of financing the everyday operations of a company. Working capital loans are not used to buy long term assets or investments and are instead used to cover short term needs of the business like funding the creditors, accounts payable, wages etc.

Maximum Permissible Banking finance (MPBF) – This is mainly a method of working capital assessment. As per the recommendations of Tandon Committee, the corporates are discouraged from accumulating too much of stocks of current assets and are recommended to move towards very lean inventories and receivable levels. There are 3 methods of working out the maximum amount that a company / borrower may expect from the bank:

- Method 1 – MPBF = 75% of (Current Assets – Current Liabilities other than bank borrowings). The borrower should provide the remaining 25% from long – term sources. The minimum current ratio under this method works out to 1:1
- Method 2 – MPBF = (75% of Current assets) – Current liabilities other than bank borrowings. The borrower should provide the raise finance to the extent of 25% of current assets from long term assets. The minimum current ratio under this method works out to 1.33:1.
- Method 3 – MPBF = 75% of (Current Assets – Core Current Assets) – Current Liabilities other than bank borrowings. The borrower should contribute 100% core current assets and 25% of balance current assets from long term sources. A minimum current ratio under this method works out to above 1.5:1

Various types of working capital loans include Bank Overdraft, Cash Credit, Factoring etc

- ✓(i) Overdraft - is a type of fund based lending. It occurs when money is withdrawn from a bank account and the available balance becomes nil. In this situation the account is said to be overdrawn. Thus under this facility, the account holder (individual or corporate) is allowed to withdraw in excess of the balance standing in bank account. Bank fixes a limit beyond which the

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account holder will not be able to overdraw the account. Legally, overdraft is a demand assistance given by the bank. It is given for a very short period of time, at the end of which the account holder is supposed to repay the amount. Interest is payable on the actual amount drawn.

(ii) *Cash Credit* - Cash credit is a short term cash loan to a company. It is just like overdraft facility except there is no need to open a formal current account. Also, this type of funding requires security deposit to secure the loan given by the bank. Legally, cash credit is a demand facility. Interest is payable on actual amount drawn.

(iii) *Bill Discounting*- Bills purchased / discounted facility - enables the company to get the immediate payment against credit invoices raised by the company. The bank holds the invoices till the customer has actually made the payment. While granting this facility, the bank first satisfies itself about the credit worthiness of the customer and the genuineness of the bill. A limit is fixed in case of the company beyond which the bills are not purchased or discounted by the bank.

(iv) *Packing Credit* – This is the type of assistance given by the bank to enable the company to buy the goods to be exported. This type of facility is included as short term loan and is in two forms:

(a) Pre shipment packing credit – loan / advance granted to an exporter for financing the purchase, processing, manufacturing or packing of goods prior to shipment.

(b) Post shipment packing credit – loan / advance granted to an exporter after shipment of goods to the date of realization of export proceeds.

(v) *Factoring* – This is a financial transaction and a type of debtor financing in which a company sells its accounts receivable to a third party (called a factor) at a discount. There are 3 parties involved; the factor who purchases the receivable, the one who sells the receivable and the debtor who has a financial liability that requires him / her to make the payment to the owner of the invoice.

(d) Demand Loan – A demand loan is a rare form of loan that can be called for complete / partial repayment by the lender without any prior notice to the borrower. In other words, when the lender demands the money, the borrower must pay it.

(e) Term Loans – A term loan is repaid in regular payments over a fixed tenor. They usually are of tenor between one to 10 years, but may last as long as 30 years in some cases. These loans are typically extended to mid and large corporate and usually have a unfixed (fixed / floating) rate of interest. They are usually secured in nature. The security could be in the form of movable or immovable assets like plant & machinery, land, building, shares, guarantees etc.

(f) Project / Infrastructure Loans – Project finance / loans are financing of long term infrastructure, industrial projects and public services in which project debt and equity used to finance the project are paid back from the cash flow generated from the project with the project's assets, rights and interests held as secondary security or collateral. These loans are long term in nature and usually have a tenor of 15-20 years. Usually, project financing structure involves a number of equity investors known as 'sponsors' and multiple banks / financial institutions / lenders

called a syndication or consortium of banks. Generally, a special purpose entity called a Special Purpose Vehicle (SPV) is created for each project, thereby shielding other assets owned by the project sponsor for the detrimental effects of a project failure. As a special purpose entity, the project company has no assets other than the project.

(g) Micro finance loans – These loans are extended to individuals / entrepreneurs having small businesses who lack access to banking and related services. The two main mechanisms for the delivery of financial services to such borrowers are (1) relationship – based banking for individuals entrepreneurs and small businesses, and (2) group based models where several entrepreneurs come together to apply for loans and other services as a group.

(h) Real Estate Construction Loans – These loans are extended to developers / builders for construction of residential / commercial buildings including and real estate development. These are large ticket loans and have a long tenor ~ 10 to 20 years.

(i) Agriculture and Allied Services Loans – These are advances given to farmers for purchasing farm equipment's like tractors, harvesters etc. These are small ticket retail loans where the underlying asset is hypothecated to the lender. The tenor of the loan usually matches the life of the underlying assets ~ 4-5 years. The repayment of these loans is aligned to the harvesting cycle usually bi annually.

4.2 Non Fund Facilities

Non fund facilities are where the banks / financial institutions do not commit any physical outflow of funds. It is a nature of promise made by a bank / financial institution in favour of a third party to provide monetary compensation on behalf of their clients. The fund position of the lending bank remains intact. Types of non-fund facilities are as given below:

(a) Bank Guarantee – a bank guarantee is a guarantee from a lending institution / bank ensuring the liabilities of a debtor will be met. In order words, if the debtor fails to settle a debt, the bank covers it. A bank guarantee enables the customer, or debtor, to acquire goods, buy equipment, or draw down loans.

(b) Letter of Credit - Letter of Credit is a non-fund based lending which is very regularly found in international trade.

This facility is given when the exporter and importer are unknown to each other. In this case, the importer applies to his bank (Issuing Bank) in his country to open a letter of credit in favour of exporter whereby the importers' bank undertakes to pay the exporter on fulfilling the terms and conditions specified in the letter of credit.



5. CLASSIFICATION OF ASSETS

Every bank / FI after taking into account the degree of well – defined credit weaknesses and extent of dependence on collateral security for realization, classify its loans & advances into various

classes. RBI in its Master Circular for Banks – Prudential Norms and asset classification have spelled out the following classes:

- Standard Assets – shall mean the asset in respect of which, no default in repayment of principal or payment of interest is perceived and which does not disclose any problem or carry more than normal risk attached to the business.
- Sub – standard assets – shall mean an asset which has been classified as non – performing asset for the period not exceeding 12 months.
- Doubtful assets – an asset which remains sub standard for a period not exceeding 12 months.
- Loss Assets – an asset which is adversely affected by a potential threat of non recoverability due to either erosion in the value of security or non availability of security or sue to fraudulent act or omission on the part of the borrower. Loss asset could be identified as such by the bank / FI or its internal or external auditor

Non Performing Asset (NPA) shall mean an asset, in respect of which, interest has remained overdue for a period of 3 months or more.

Banks write off assets which are non collectable removing it from their balance sheets. A reduction in the value of an asset or earnings by the amount of an expense or loss is called write off.



6. EVALUATING CREDIT RISK

Companies who are in lending business must understand the importance of the credit risk and they should take a note of what sort of credit risk its customers are exposed to. Especially during the hard time, customer or the lender can affect badly due to in accurate credit risk management. This is very important as we need to evaluate the credit risk associated with the customers. Companies and consumers alike who are hit by hard economic times will either try to stretch out their payments or, worse, fail to pay at all – something that can be disastrous for a small, growing business.

6 Grand Rules

In this section, let's understand what are the ground rules to assess credit risks of the customer.

- (1) **Understand the reality:** As a lender you need to ensure that you made your customer aware of all the charges and fees associated with the credit which you are planning to extend to the customer. This is critical as customer might be at negotiation stance to have maximum benefit from your line of credit. Longer time he takes to negotiate, there is high possibility that pay off will be late. So communicate the implicit and non-implicit costs that associated with it. Even administrative aspects are also important as they sometime drive the business decision to have line of credit or not.
- (2) **Check the credibility:** It may be possible that customer externally looks reliable to the organization, but that does not mean that the customer has full ability to pay off appropriately

and regularly. You need to understand the credibility that the customer possesses. And for that purpose, lender organization should rely on the reports which are available. Or they can consider going through the credit scoring agencies to ensure the customer has the paying ability. Even asking for the basic information will provide you a rough idea about the credit history of the customer. It's always better to take the help of professionals during this step. Engage the professional and rely on their expertise. During this stage, credit evaluation is very critical.

- (3) **Ask and Check the references:** It's absolutely ok to ask customer for the references, List of creditable clients are much more reliable source than anything else. It's important to ask for the lender organization to understand who all have been given trade credit from in the past and how old are the relationship with such counterparty. This will establish a pattern to understand if the customer has a tendency to maintain the business relation or it's just a pure business. Also, asking reference from the third party proves to be independent source to verify the commitment made by the customers.
- (4) **Due Diligence:** When a lender is convince to provide a line of credit to the customer, it is his duty to have proper due diligence in place to ensure the line of credit is being placed in safe pair of hands. Irrespective of the professionals involvement in due diligence process, lender still has the moral responsibility to perform the due diligence on its own. This can be achieved by simply visiting the website, assessing the market creditability etc. Basically, publically sourced information is pretty useful in such cases.
- (5) **Recovery:** Lender organization or its employee must understand that every single rupee invested in the customer has cost involved in it. An effort should be made to ensure that this minimal cost of capital should be recovered from the customer. This can be achieved by simply asking your prospect for a deposit or the collateral.
- (6) **Nature of business:** Once should not hesitate to ask for the nature of business in which borrower is dealing with. This will give a fair bit item on risk exposure and also provide adequate comfort to the lender.



7. MITIGATING CREDIT RISK

Credit Risk Management

7.1 Identification of Credit Risks

Identifying the credit risk is the first step in credit risk management. This is the step where the potential risks are identified for a business. All the risks identified may not have major impact on the organization. But this, broaden way helps to identify the realistic view and develop cost effective strategies for them. Financial institutions have the major credit risk in the form of loan, advances, debt given. Hence, it is necessary to study the borrower's profile to understand borrower's financial stability, regularity in payments (from CIBIL), default ting nature, if any, education, source of income.

Apart from this major risk other minor risks such as foreign exchange risk, inter-bank transactions, letter of credit, derivative transactions like future, options, swaps and likewise. Financial Institutions also need to resolve the following issues: Magnitude of risk arising from large complex organization structure, Geographical spread of the operations of the above organizations, and borrowing pattern of large organizations.

The historical method of risk identification involves the identification of types of risk credit, market, operational and liquidity. This approach is based on traditional method of measuring risk and capital adequacy. However, the new approach to risk identification involves testing of the organizations to stressful situations. This helps the institutions to test, develop their own vulnerability to stress.

7.2 How Credit risk is Mitigated

We all know that credit risk is inevitable. But - mitigating the credit risk is a way where one can lessen; reduce the impact of credit risk. This is one of the steps in credit risk management. There are different ways and means to mitigate the credit risk. Banks may use various techniques which reduce their exposure to individual customers and transactions. The taking of guarantees and security to support the obligations of the primary borrower pre-dates capital adequacy rules by many centuries. The desire to avoid loss is simply a feature of prudent banking and is by no means intimately associated with the lender's capital position.

Basel II has suggested the two broad categories of risk mitigation. These are funded and non – funded risk mitigation. As the name suggests, funded credit risk mitigation is that way of risk mitigation where a bank has recourse to cash or buyer's asset in order to money owing to it. The concept of funded credit protection refers to the nature of the asset which forms the available security.

As per Basel II norms, following are the different types of funded credit risk mitigation methods:

- (a) On Balance Sheet Netting. On balance sheet netting of mutual claims/reciprocal cash balances between the bank and the counterparty creates effective security and collaterals. This norm accordingly be recognised as an acceptable form of credit risk; in order to take in account a funded credit risk mitigation, the underlying arrangement has to go through the legal test.
- (b) Collateral: The assets/security which are retained or deposited with bank against grant of any loan advances, debt or credit lines. The typical examples are
 - ◆ Cash or cash equivalents – Cash or Hand loans
 - ◆ Gold Pledging
 - ◆ Corporal Debt Securities
 - ◆ Debt securities issued by banks, local authorities and certain other entities which meet stated credit quality criteria;

- ◆ Short term debt securities with an acceptable rating;
- ◆ Equities or convertible bonds listed on the various indices
- ◆ Units in a collective investment scheme such as mutual funds, provided that they have a daily price quotation and invest only in instruments which are themselves eligible for recognition under (i) - (vi) above or as specified under the by-laws.

On the other hand, Unfunded credit risk mitigation process, involves an unsecured obligation of a third party. It is implicit in this concept that the entity providing the credit protection is more creditworthy than the primary borrower, thus allowing a reduction in the capital which the bank must ascribe to the transaction at hand.

Since no specific asset is available by way of security in the context of unfunded credit protection, it follows that the rules focus on (i) the creditworthiness and reliability of the provider and (ii) the validity and enforceability of that party's obligations.

As a result, credit protection is only "eligible" for these purposes if it is provided by an appropriate counterparty. These include:

- National Governments/Central Banks;
- Regional Or Local Governments;
- Multilateral Development Banks;
- Certain International Organisations;
- Banks;
- Other corporate which meet stipulated credit requirements

BASEL II is the most recognized and modern norms in the financial market. Basel II was pillar model which provides the guidance and the recommendation on the banking rule and the regulations. The norms was initially published in year 2004. BASEL II has made the concision effort to ensure that a bank has adequate capital for the risk the bank exposes itself to through its lending, investment and trading activities. Out of three main pillars in Basel II norms, very first pillar is more focus on Credit risk. Per the Basel II norms, The credit risk component can be calculated in three different ways of varying degree of sophistication and as prescribed by Basel II.



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Basel II has forced financial institution to comply with the requirements including the stringent guidance and assessment by credit risk by private players. Detailed documentation is available at (<http://www.bis.org/publ/bcbsca.htm>)

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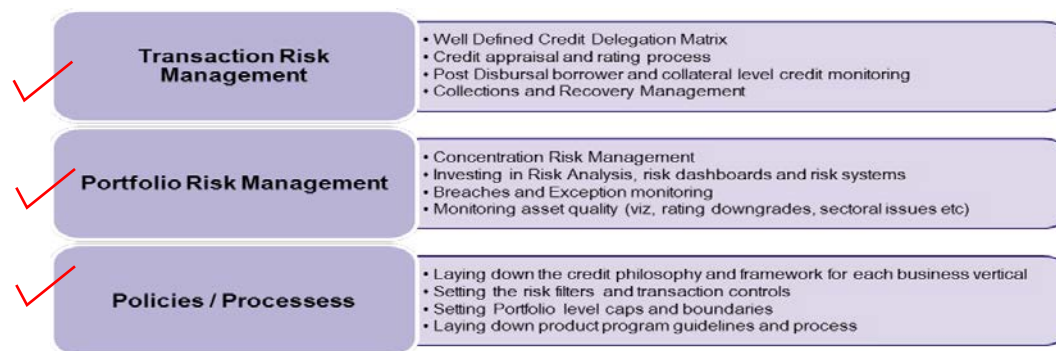
Other techniques or methods of credit risk mitigation include the following:

- (a) **Risk-based pricing**: Where the lender feels that borrower is more likely to do default, the lender may increase the interest rate. This is called as risk-based –pricing. In the method the probability of default is hedge with the incremental interest rate. This type of method may not provide good worth in today market considering the competitiveness.
- (b) **Credit insurance**: The lender may purchase the credit insurance under which the risk is transferred from lender to the issuer on payment of certain amount. The best example is the housing loan insurance. Where the lender asks the borrower to purchase the requisite insurance to ensure the mortgage is secured. This will ensure that the in case of borrower becomes as a default party, lender can re-coupe the loan by way such insurance
- (c) **Tightening**: Under this method, lender may tighten the norms of lending including the amount to be lend. For an example, the lender may mitigate the credit risk by reducing the payment period from 45 to 30 days. Reducing the credit period will provide the early warning indicators to the lender to analyse and act upon the situation.
- (d) **Diversification**: Lenders may lend to number of small borrowers instead (kinds of borrower) to diversify the lending pool. This approach will help lender to diversify the risk associated with each credit line extended. For example, high credit rating borrower ultimately funds the low credit risks.
- (e) **Covenants**: The lender may put some covenants like periodic review of financial position, repay the loan in full in case of certain events like debt coverage ratio shows improvement. Sometimes, lender also perform an independent audit on the business operation with the proper consent and according to the contractual agreements.



8. QUALITATIVE TECHNIQUES OF CREDIT RISK MANAGEMENT

Credit Risk is the most critical of all risk for a bank / financial institutions and the management of it is the most crucial for survival of any banks / FIs.



8.1 Borrower / Transaction specific risk management Important

Financial institutions / banks attempt to mitigate the risk of lending to unworthy borrowers by performing a credit analysis on individuals and businesses. This process is based on a review of borrowers five C's of Credit viz: Capacity, Capital, Character, Collateral and Conditions. Although each financial institution (FIs) / bank employs its own process of determining the credit worthiness, most FIs / banks pay greater emphasis on borrower's Capacity.

- ✓ (a) **Capacity** – This refers to the borrower's ability to repay the loan. The lenders / banks will consider the cash flows generated from the underlying business, timing of repayment and the probability of successful payment of the loan under various stressed scenarios.
- ✓ (b) **Capital** – It is the promoters / borrower money invested in the business and is an indicator of how much of promoters / borrowers money is at risk should the business fail. FIs / banks will generally consider the borrowers debt to equity ratio to understand how much money the lender is being asked to lend as against the money invested by the promoters / borrower in the business. High debt to equity ratio indicates that the promoters / borrower already have high levels of debt / loans and could be higher financial risk.
- ✓ (c) **Character** – Is the obligation that the borrower feels to repay the loan. Emphasis is given on the past loan repayment track record, credit history, credit bureau score. This analysis pertains to the softer aspect of the borrower's intent to pay rather emphasis on financials, ratios and cash flows.
- ✓ (d) **Collateral** – Is a form of security for the lender in case there is default on the loan. In case of default, the lender will take possession of the collateral in place of debt. Collateral can be in the form of tangible assets like land, building, plant, machinery, cash flows, receivables, project assets etc and also in the form of intangible assets like patents, trademarks etc. The loan agreement should be suitably drafted to include all the relevant details of the collateral. The lender would ideally want the term of the loan to match the useful life of the collateral.
- ✓ (e) **Conditions** – Additionally, apart from the borrower specific criteria's, lenders may also consider external factors which may affect borrower's financials, cash flows and its underlying ability to repay the loan obligations. End use of the loan / purpose for taking the loan / debt will also be carefully assessed and the transaction will be suitably structured.

Further, a well defined credit approval matrix / delegation need to be in place for approving transactions. For the sake of good order, the approval matrix / responsibility should be joint in nature. Each bank / financial institutions will have an internal credit rating / score card model factoring the parameters enumerated above. Once the loan is approved as per the credit criteria's defined and the same is disbursed, it needs to be monitored in terms of security, cover, repayment track, sector updates etc.

8.1.1 Credit Due Diligence for Retail Financing

Credit due diligence for a retail financing is different from the wholesale financing since the quantum of loan and the complexity of transaction is different. Retail finance credit due diligence is parameterised / score card driven wherein if the borrower fits into a pre defined credit matrix / parameters and gets a score which is above the threshold, loan is approved / sanctioned. The scorecard parameter would be suitably deliberated and considered based on historical experience and keeping in view the dynamic environment. The scorecard based approved portfolio is closely monitored at regular frequency and the parameters are suitably modified based on portfolio's performance.

For e.g: For Farm / tractor loan, parameters / factors like soil fertility, area under cultivation, produce per acre, rainfall / reservoirs levels, make model of the tractor, geography are pre defined and weightages are assigned to each parameter depending on the criticality which will throw up a score for each borrower. These models / score cards are embedded in the loan management system of the banks which result into auto approval of the loan. While the quantum of the loan is small, number of retail borrowers is significantly large and therefore it is time consuming for banks / FIs to evaluate credit for each borrower. Hence credit loan approval for retail financing is primarily score card driven. Parameters could be qualitative and quantitative in nature.

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8.1.2 Credit Due Diligence for Wholesale Financing

Credit risk management for wholesale financing is done on case to case basis with greater emphasis on each of the 5C's of credit and in –depth due diligence on account of large amounts and complexities. As part of due diligence process, a detailed appraisal note / information memorandum which captures all the key information of the borrower and the proposed facility / transaction is enumerated. Suitable appraisal / proposal formats are specified for different customer segments like small & mid corporate, large corporate, project finance etc.

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For wholesale credits, the detailed appraisal would inter alia cover the following aspects:

- Assessment of project sponsor(s)/ borrower and the group;
- Integrity and reputation of the borrower;
- Track record in the relevant sector, market position and its sensitivity to economic and market developments;
- Sector perspective;
- Technical feasibility evaluation including opinion of external experts if necessary;
- Commercial and economic viability evaluation;
- Debt servicing capability;
- Credit reference from the existing lenders/bankers
- Credit reference checks from credit bureaus;

- ✓ • Cash flows from the project and its adequacy
- ✓ • Nature of Security and its enforceability
- ✓ • Credit rating rationales (if rated by any external agency)
- ✓ • Whether name of any of the directors of the borrower appear in the list of defaulters by way of reference to DIN/PAN. In case of any doubt arising on account of identical names, business/ credit person will use independent source of confirmation of identity of the director. In no case, declaration to the effect from the borrower will suffice for the purpose
- ✓ • Adherence to Know Your Customer – Anti Money Laundering (KYC-AML) Policy and guidelines issued by RBI in this regard and review of promoter's status as Politically Exposed Persons (PEPs);
- ✓ • Interaction with the key management personnel & sponsors to understand their perspective about the project and sectoral business dynamics;
- ✓ • Site visits
- ✓ • Risk identification, risk allocation and risk mitigation;
- ✓ • Security requirements including adequacy and enforceability;
- ✓ • Put/call options, prepayment etc. backed by assessment of feasibility;
- ✓ • Ability to infuse capital by the promoters/ shareholders to be ascertained and noted, (Multiple leveraging may camouflage debt-equity ratio, leading to adverse selection of borrowers)
- ✓ • Adherence to standards, credit framework or guidelines
- ✓ • Covenants / conditions to be stipulated
- ✓ • Risk adjusted Returns and Yield management

8.2 Credit Rating Scales

Few leading credit rating agencies in India are as follows:

- Credit Rating Information Services of India Limited (CRISIL)
- Indian Credit Rating Agency (ICRA)
- Credit Analysis and Research Ltd (CARE)
- Fitch Ratings India Private Limited (Fitch)
- Equifax
- Credit Information Bureau India Limited (CIBIL)
- High Mark Credit Information Services
- SME Rating Agency of India Ltd (SMERA)

- Brickwork Rating India Private Limited (Brickwork)

Rating Scale for Long term instruments is as follows:

<u>AAA</u> (Highest Safety)	Instruments with this rating are considered to have the highest degree of safety regarding timely servicing of financial obligations. Such instruments carry lowest credit risk.
<u>AA</u> (High Safety)	Instruments with this rating are considered to have high degree of safety regarding timely servicing of financial obligations. Such instruments carry very low credit risk.
<u>A</u> (Adequate Safety)	Instruments with this rating are considered to have adequate degree of safety regarding timely servicing of financial obligations. Such instruments carry low credit risk.
<u>BBB</u> (Moderate Safety)	Instruments with this rating are considered to have moderate degree of safety regarding timely servicing of financial obligations. Such instruments carry moderate credit risk
<u>BB</u> (Moderate Risk)	Instruments with this rating are considered to have moderate risk of default regarding timely servicing of financial obligations
<u>B</u> (High Risk)	Instruments with this rating are considered to have high risk of default regarding timely servicing of financial obligations
<u>C</u> (Very High Risk)	Instruments with this rating are considered to have very high risk of default regarding timely servicing of financial obligations
<u>D</u> (Default)	Instruments with this rating are in default or are expected to be in default soon.

<u>A1</u>	Instruments with this rating are considered to have very strong degree of safety regarding timely payment of financial obligations. Such instruments carry lowest credit risk
<u>A2</u>	Instruments with this rating are considered to have strong degree of safety regarding timely payment of financial obligations. Such instruments carry low credit risk
<u>A3</u>	Instruments with this rating are considered to have moderate degree of safety regarding timely payment of financial obligations. Such instruments carry higher credit risk as compared to instruments rated in the two higher categories
<u>A4</u>	Instruments with this rating are considered to have minimal degree of safety regarding timely payment of financial obligations. Such instruments carry very high credit risk and are susceptible to default
<u>D</u>	Instruments with this rating are in default or expected to be in default on maturity.

- Additionally, the rating agencies may apply '+' (plus) or '-' (minus) signs for ratings from AA to C to reflect the comparative standing within the company

The rating agency may also assign outlooks for ratings from AAA to B. Ratings on rating watch will not carry outlooks. A rating outlook indicates the direction in which a rating may move over the medium term horizon on one to two years. A rating outlook can be 'Positive', 'Stable' or 'Negative'. A positive or negative rating outlook is not necessarily a precursor of a rating change.

8.3 Portfolio Risk Management

Once the funds are disbursed, periodic reviews on the portfolio/borrowers/assets are conducted by the relevant Business and Credit Departments. Notwithstanding sound appraisal processes and risk management, some portfolios / accounts may develop weakness on account of changes in internal or external conditions. Mechanisms for monitoring and identifying early warning signals (EWS) should be in place to review the portfolio and identify such weak accounts before they turn NPA. These monitoring mechanisms will help take remedial measures and limit losses. Such monitoring / review can be undertaken through a mix of portfolio and borrower level EWS matrix (indicative parameters and not exhaustive list):

Retail Financing

- Roll forward / roll back rates – (deterioration on days past due / improvement in days past due)
- Infant / Early delinquencies – non payment of first EMI / instalments.
- Performance review across at branch / scheme / program / Relationship Manager etc
- Scorecard parameter reviews

Wholesale Financing

- Early Default Alerts (EDA) in the form of adverse deviations in operational performance and cash inflows vis-a-vis projections.
- Site visit reports.
- Progress report of the project through internal / external agencies including Lenders Engineers vis-a-vis the envisaged / projected performance at the initial appraisal/previous review stage.
- Security margin cover.
- Movement in internal / external rating including suspension/ withdrawal, more specially downward revision in ratings.
- Covenant monitoring.
- Overdue monitoring.

- Credit concentration risk analysis.
- Stress Asset / Watchlist asset monitoring.
- Any other factors / MIS as deemed necessary for effective monitoring and control.
- Special Mention Account classification (SMA accounts) – As per the RBIs framework for “Revitalising Distressed Assets in the Economy” issued in January 2014 has outlined a corrective plan that will incentivize early identification of problem account, timely restructuring of accounts which are considered to be viable, and taking prompt steps by lenders for recovery or sale of unviable accounts. The Corrective action plan includes early recognition of stress and reporting the same to Central Repository of Information on Large Credits (CRILC). Before the loan turns non performing, banks / FIs will be required to identify incipient stress in the account by creating a sub – asset category viz: Special Mention Account with the three sub categories as given below

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<i>SMA sub categories</i>	<i>Basis of classification</i>
<u>SMA – 0</u>	Principal or interest payment not <u>overdue for more than 30 days</u> but account showing signs of incipient stress as illustrated in the annex to the framework of Jan 30, 2014
<u>SMA-1</u>	<u>Principal or interest payment overdue between 31-60 days</u>
<u>SMA-2</u>	Principal or interest payment overdue between <u>61-90 days</u>

Portfolio risk management emanates from a clearly spelled out risk appetite of the organization to meet its strategic objectives. Portfolio Risk Management is predominantly driven through “Concentration Risk Management”. Concentration risk in banking term denoting the overall spread of bank’s outstanding loan accounts over the number or variety of debtors to whom the bank has lent money. Concentration risk can be in terms of overexposure against a particular borrower / group of borrowers or being over exposed to a particular industry / sector / regions / geography etc. Concentration risk could be managed by setting limits on exposure per borrower or group of borrowers belonging to the same management or limits on industry / sector / geography.

8.4 Credit Risk Rating Process

Credit Risk Rating or Credit Rating is an important tool to manage large ticket exposures credit risk. The rating provides a consistent and common scale for measurement of credit risk of a loan asset in terms of Probability of Default (PD) across products and sectors. Coupled with estimation of Loss Given Default (LGD), it enables the organisation to make an estimate of credit cost for the loan assets and thus, helps to differentiate among loan assets as objectively as possible. PD is measured by the internal rating assigned to the Borrower and assesses the likelihood that the Borrower will default on its debt obligations. LGD is measured by the value of the security/ collateral / cash flow cover (project finance)/ DSRA/other credit enhancements for the particular

facility provided by the Borrower, after applying haircut to each assets sub class, which will form a cover for the outstanding facility, once a default has occurred.

Each Bank / FI would have an internal credit rating model which takes into account critical success parameters relevant for each industry, competitive forces within the industry, regulatory issues while capturing financial parameters, management strengths, project parameters, etc. and the LGD models take into consideration the cover expected to be available for recovery based on asset or cash flows that could be accessed after a default has happened. The LGD model also factors in the estimated time to invoke different types of securities for applying suitable discounting factors.

Each proposed debt commitment is rated before taking a sanction decision and all such ratings of assets in the portfolio are periodically reviewed by banks / FIs. Revised ratings are awarded for the borrower if there is deterioration in the financial parameters from the originally assessed and projected, adverse changes in industry / sector, changes in government regulations etc. Each corporate loan is then assessed for rating migration (upward or downward movement) through out the loan life cycle.

8.5 Credit Loss Estimation

Credit risk being the most prominent risk for banks and FIs and subject of strict regulatory oversight and policy debate needs to be carefully estimated / assessed.

Credit risk management is the practice of mitigating those losses by understanding the adequacy of both capital and loan loss reserves at any given time – a process that has long been a challenge for financial institutions. Various quantification and modelling techniques are being applied in practice for credit risk measurement and management. The estimation around credit risk management necessitates the following measures to be quantified for capital and provisioning purposes:

- **Expected Loss:** The average loss that the organisation expects from an exposure over a fixed time period, usually a year
- **Unexpected Loss:** The loss that the organisation incurs over and above the average loss expected from an exposure over a certain time period, usually a year. It is also known as the variation in Expected Loss and includes the possibility of large losses

There are 3 integral components (known as risk components) that are required to be estimated for credit risk quantification.

- I. **Probability of Default (PD):** It refers to the probability / risk / chance of a borrower defaulting* on the payment of the credit obligations, within a given time horizon, usually one year.
- II. **Loss Given Default (LGD):** It refers to the loss likely to be suffered in the event of a default occurring in an exposure. It takes into account the amount of recoveries likely to be made post default.

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- III. **Exposure at Default (EAD):** It refers to the amount that is exposed to the default risk. It is usually the amount outstanding as well as undrawn commitment that is expected to be drawn by the time of default.

A range of statistical or expert judgement techniques are used to estimate risk components (PD, LGD, EAD) for both funded and non-funded exposures.

*Default definition as per Bank for International Settlement (BIS) - A default is considered to have occurred with regard to a particular obligor when either or both of the two following events have taken place: (i) The bank considers that the obligor is unlikely to pay its credit obligations to the banking group in full, without recourse by the bank to actions such as realising security (if held). (ii) The obligor is past due more than 90 days on any material credit obligation to the banking group.

8.5.1 Estimation of Probability of Default (PD) Nov 2019 MTP CS - 5

Given the requirement or constraints, PD can be calculated for a single obligor or a group of obligors with similar credit risk features. The former method is more prevalent in corporate book and the latter in retail book.

Types of PD Estimation

1. **Pooling Method:** This method relies on the historical data and assumes that past defaults are a reasonable predictor for future likelihood of losses. Historical PD is calculated by taking the ratio of the facilities that have defaulted to the total facilities that existed in the concerned time frame, usually a year. In this method, the facilities are divided into different categories/pools based on their risk drivers.

2. **Statistical Method:** Data on characteristics of retail obligors and corporate obligors can be used to estimate their respective probability of defaults. Various statistical techniques can be employed on the data to estimate PD for defined time horizons. The statistical model specifies the relationship between the inputs and the outcome – PD. The parameters determined depend on the data used to develop the model.

One of the most recommended statistical techniques to estimate PD is logistic regression. This method of regression is applicable when the dependent variable is binary i.e. takes one of the two available values i.e. default & non default. This variable indicates whether or not the loan/debt has gone into default over a certain time horizon, usually a year. Some of the common variable sources used to estimate the PD of a corporate are financial statements, owner's data, type of loan, size of loan, and industry of the company. Similarly, for retail obligors, variable sources could be customer demographics, income statistics, age of loan, and number of late payments etc.

3. **Structural Method:** This method is generally applicable for listed corporate entities wherein structural models are used to calculate the probability of default for a corporate based on the value of its assets and liabilities. This technique is a sophisticated approach and requires valuation models to be applied for firm valuation.

Over a period of time, we propose to collate other statistical relevant inputs to explore possibilities of using statistical method for PD calculation as well as to improve portfolio quality.

8.5.2 Estimation of Loss Given Default

A bank / financial institution incur a loss when a company to which it has lent money, or entered into a contract with, defaults on its payments. Loss Given Default (LGD) is defined as the percentage loss rate on EAD, given the obligor defaults. It provides the loss that a bank is bound to incur when a default occurs. The components of the loss that will be incurred, given the obligor defaults are Loss of principal, Carrying costs and Workout expenses

Value of LGD varies with the economic cycle, so the following variations in LGD are defined:

- Cyclical LGD (Point-in-Time LGD) - Cyclical LGD is calculated based on the recent data and its value depends on the economic cycle
- Long-run LGD (Through-the-Cycle LGD) - Long-run LGD represents the average long-term LGD, corresponding to a non-cyclical scenario that is not dependent on the time the LGD is calculated
- Downturn LGD - Downturn LGD represents the LGD at the worst time of the economic cycle

The current document is based on cyclical LGD calculation for our portfolio. As the data gets enriched over time, the long run LGD would be gradually adopted.

8.6 Credit Default Swaps

A Credit Default Swap (CDS) is a financial swap agreement that the seller of the CDS will compensate the buyer (usually the creditor of the reference loan) in the event of a loan default (by the debtor) or other credit event. That is, the seller of the CDS insures the buyer against some reference loan defaulting. The buyer of the CDS makes a series of payments (the CDS "fee" or "spread") to the seller and, in exchange, receives a payoff if the loan defaults. It was invented by Blythe Masters from JP Morgan in 1994.

In the event of default, the buyer of the CDS receives compensation (usually the face value of the loan), and the seller of the CDS takes possession of the defaulted loan. However, anyone can purchase a CDS, even buyers who do not hold the loan instrument and who have no direct insurable interest in the loan (these are called "naked" CDSs). If there are more CDS contracts outstanding than bonds in existence, a protocol exists to hold a credit event auction; the payment received is usually substantially less than the face value of the loan.

Credit default swaps have existed since 1994, and increased in use in the early 2000s. CDSs are not traded on an exchange and there is no required reporting of transactions to a government agency. During the 2007–2010 financial crisis the lack of transparency in this large market became a concern to regulators as it could pose a systemic risk.

As an example, imagine that an investor buys a CDS from AAA-Bank, where the reference entity is Risky Corp. The investor—the buyer of protection—will make regular payments to AAA-Bank—the

seller of protection. If Risky Corp defaults on its debt, the investor receives a one-time payment from AAA-Bank, and the CDS contract is terminated.

If the investor actually owns Risky Corp's debt (i.e., is owed money by Risky Corp), a CDS can act as a hedge. But investors can also buy CDS contracts referencing Risky Corp debt without actually owning any Risky Corp debt. This may be done for speculative purposes, to bet against the solvency of Risky Corp in a gamble to make money, or to hedge investments in other companies whose fortunes are expected to be similar to those of Risky Corp.

If the reference entity (i.e., Risky Corp) defaults, one of two kinds of settlement can occur:

- ✓ the investor delivers a defaulted asset to Bank for payment of the par value, which is known as physical settlement;
- ✓ AAA-Bank pays the investor the difference between the par value and the market price of a specified debt obligation (even if Risky Corp defaults there is usually some recovery, i.e., not all the investor's money is lost), which is known as cash settlement.

The "spread" of a CDS is the annual amount the protection buyer must pay the protection seller over the length of the contract, expressed as a percentage of the notional amount. For example, if the CDS spread of Risky Corp is 50 basis points, or 0.5% (1 basis point = 0.01%), then an investor buying \$10 million worth of protection from AAA-Bank must pay the bank \$50,000. Payments are usually made on a quarterly basis, in arrears. These payments continue until either the CDS contract expires or Risky Corp defaults.

All things being equal, at any given time, if the maturity of two credit default swaps is the same, then the CDS associated with a company with a higher CDS spread is considered more likely to default by the market, since a higher fee is being charged to protect against this happening. However, factors such as liquidity and estimated loss given default can affect the comparison. Credit spread rates and credit ratings of the underlying or reference obligations are considered among money managers to be the best indicators of the likelihood of sellers of CDSs having to perform under these contracts.

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Key features of RBI guidelines on CDS + Difference between US law and Indian law

- Participants in the CDS market are classified as either users or market makers. User entities are permitted to buy credit protection (buy CDS contracts) only to hedge their underlying credit risk on corporate bonds. Such entities are not permitted to hold credit protection without having eligible underlying as a hedged item. The users cannot buy CDS for amounts higher than the face value of corporate bonds. This is the most important point of difference, as there was no such limitation in United States of America prior to 2008, and hence many Institutional players had taken huge long positions (in CDS) without having any exposure to reference asset.
- Since the users are envisaged to use the CDS only for hedging their credit risks, assumed due to their investment in corporate bonds, they shall not, at any point of time, maintain

naked CDS protection i.e. CDS purchase position without having an eligible underlying bonds held by them and for periods longer than the tenor of corporate bonds held by them.

- The eligible entities under user's category would be Commercial Banks, PDs, NBFCs, Mutual Funds, Insurance Companies, Housing Finance Companies, Provident Funds, Listed Corporates, Foreign Institutional Investors (FIIs) and any other institution specifically permitted by the Reserve Bank of India.
- CDS will be allowed only on listed corporate bonds as reference obligations. However, CDS can also be written on unlisted but rated bonds of infrastructure companies. This is another major area of difference between the US markets and RBI guidelines. In United States of America, the CDS were written on various pass through securities like Mortgage Backed Security (MBS), Collateralized Debt Obligation (CDO) etc, whereas as per the RBI guidelines, the CDS are specifically restricted for listed corporate bonds, the obvious reason being that there is no big market of pass through securities in India as it is in US.
- The credit events specified in the CDS contract may cover: Bankruptcy, Failure to pay, Repudiation/moratorium, Obligation acceleration, Obligation default, Restructuring approved under Board for Industrial and Financial Reconstruction (BIFR) and Corporate Debt Restructuring (CDR) mechanism and corporate bond restructuring.
- Since, CDS are traded mainly over-the-counter (OTC), the contracting parties therefore have to agree upon the terms and conditions of the CDS individually. In order to facilitate documentation, and to avoid disputes as to whether a credit event had actually occurred and how a contract should best be settled, CDS contracting parties (in the international and US market) generally refer to the International Swaps and Derivatives Association (ISDA) Master Agreement. In India, the RBI guidelines specifically states that Fixed Income Money Market and Derivatives Association of India (FIMMDA) shall devise a Master Agreement for Indian CDS
- Regarding the Settlement procedures, the RBI Guideline states that the parties to the CDS transaction shall determine upfront, the procedure and method of settlement (cash/physical/auction) to be followed in the event of occurrence of a credit event and document the same in the CDS documentation. However it further adds that for transactions involving users, physical settlement is mandatory. For all other transactions, market-makers have been permitted to opt for any of the three settlement methods (physical, cash and auction), provided the CDS documentation envisages such settlement
- Further, the guidelines specifically provide norms for Prevention of mis-selling and market abuse, wherein it requires protection sellers to ensure that CDS transactions shall be undertaken only on obtaining from the counterparty, a copy of a resolution passed by their Board of Directors, authorizing the counterparty to transact in CDS.
- RBI has also incorporated certain reporting requirements in the guidelines which would require market makers to report their CDS trades with both users and other market makers on

the reporting platform of CDS trade repository within 30 minutes from the deal time. The users would be required to affirm or reject their trade already reported by the market-maker by the end of the day. In addition to these reporting requirements the participants are also required to report to respective regulators (e.g. IRDA for Insurance companies) information as required by them such as risk positions of the participants vis-à-vis their net worth and adherence to risk limits, etc.

8.7 Credit Insurance

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Trade credit insurance, business credit insurance, export credit insurance, or credit insurance is an insurance policy and a risk management product offered by private insurance companies and governmental export credit agencies to business entities wishing to protect their accounts receivable from loss due to credit risks such as protracted default, insolvency or bankruptcy. This insurance product is a type of property and casualty insurance and should not be confused with such products as credit life or credit disability insurance, which individuals obtain to protect against the risk of loss of income needed to pay debts. Trade credit insurance can include a component of political risk insurance which is offered by the same insurers to insure the risk of non-payment by foreign buyers due to currency issues, political unrest, expropriation etc.

8.8 Difference between Credit Insurance and Credit Default Swaps

CDS contracts have obvious similarities with insurance, because the buyer pays a premium and, in return, receives a sum of money if an adverse event occurs.

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However, there are also many differences, the most important being that an insurance contract provides an indemnity against the losses actually suffered by the policy holder on an asset in which it holds an insurable interest. By contrast a CDS provides an equal payout to all holders, calculated using an agreed, market-wide method. The holder does not need to own the underlying security and does not even have to suffer a loss from the default event. The CDS can therefore be used to speculate on debt objects.

The other differences include:

2

Others

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- The seller might in principle not be a regulated entity (though in practice most are banks);

3

- The seller is not required to maintain reserves to cover the protection sold (this was a principal cause of AIG's financial distress in 2008; it had insufficient reserves to meet the "run" of expected payouts caused by the collapse of the housing bubble);

4

- Insurance requires the buyer to disclose all known risks, while CDSs do not (the CDS seller can in many cases still determine potential risk, as the debt instrument being "insured" is a market commodity available for inspection, but in the case of certain instruments like CDOs made up of "slices" of debt packages, it can be difficult to tell exactly what is being insured);

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- Insurers manage risk primarily by setting loss reserves based on the Law of large numbers and actuarial analysis. Dealers in CDSs manage risk primarily by means of hedging with

other CDS deals and in the underlying bond markets;

- CDS contracts are generally subject to mark-to-market accounting, introducing income statement and balance sheet volatility while insurance contracts are not;
- To cancel the insurance contract the buyer can typically stop paying premiums, while for CDS the contract needs to be unwound

8.9 Other Qualitative Techniques of Credit Risk Management

Some other qualitative techniques which are generally taken care of while managing the credit risk are discussed as below:

8.9.1 Stipulation of Covenants

Conditions imposed by the lender on the borrower that certain activities will or will not be carried out are called 'Covenants'. Covenants can be affirmative or negative in nature. Covenants are stipulated by the lenders to protect themselves from borrowers defaulting on their obligations due to financial actions detrimental to themselves or the business. Covenants are stipulated at the time of sanction / approval of limits or at the time of review of facilities. Covenants are most often represented in terms of financial ratios such a maximum debt – equity ratio, debt to EBITDA, minimum debt service coverage ratio etc. Banks / FIs periodically review the covenants to ensure that the same are adhered by the borrower and necessary actions taken in case of breach. Any breach in covenants stipulated could be an indication / early warning for stress in the borrower's repayment capacity.

8.9.2 Collateral / Security

Banks / FIs seek security / collateral for the transactions to adequately secure themselves should the borrower default. RBI has not stipulated any minimum cover for security except for listed shares where the cover should be minimum 2x. Various types of securities depending upon the nature of facilities are:

- Pledge of Shares (listed / unlisted)
- Hypothecation of Movable goods and Receivables
- Mortgage of Immovable assets
- Guarantees
- Lien on Deposits
- Assignment of Insurance policies, Book Debts etc.

8.9.3 Structuring of the transaction

Banks structure large ticket / complex transactions in such a way that complete recourse is available to the lender in case of default by the borrower. Some examples of good structuring are:

- ✓ Direct control over escrows / cashflows

- ✓ Ring fencing of cashflows
- ✓ Identified / cash flows carved out for banks loan repayment hence giving visibility to the repayments
- ✓ Board representation / voting rights to the lender
- ✓ Priority of repayments over other lenders / creditors
- ✓ Exclusive charge or Pari-passu charge on the security with other lenders

8.9.4 Sell Down / syndication / Co- participating / Securitization

All these risk mitigation techniques to prevent one lender from taking exponentially large exposure against a single borrower. Sell down is a technique wherein a large loan is underwritten by a single lender and then down-sold to other investors / banks / FIs for a fixed fee / income. Down-selling could be before or after the loan is disbursed to the borrower. A syndicated loan is a loan offered by a group of lenders that work together to provide funds to a single borrower. Securitization is a financial practice of pooling various types of contractual debt such as residential mortgages, commercial mortgages, auto loans or credit card debt obligations and selling their related cash flows to third party investors as securities.



9. QUANTITATIVE TECHNIQUES OF CREDIT RISK MANAGEMENT

9.1 Altman Z Score

The Z-score formula for predicting bankruptcy was published in 1968 by Edward I. Altman, who was, at the time, an Assistant Professor of Finance at New York University. The formula is used to predict the probability that a firm will go into bankruptcy within two years. Z-scores are used to predict corporate defaults and an easy-to-calculate control measure for the financial distress status of companies in academic studies. The Z-score uses multiple corporate income and balance sheet values to measure the financial health of a company.

The Z-score is a linear combination of four or five common business ratios, weighted by coefficients. The coefficients were estimated by identifying a set of firms which had declared bankruptcy and then collecting a matched sample of firms which had survived, with matching by industry and approximate size (assets).

Altman applied the statistical method of discriminant analysis to a dataset of publicly held manufacturers. The estimation was originally based on data from publicly held manufacturers, but has since been re-estimated based on other datasets for private manufacturing, non-manufacturing and service companies.

The original data sample consisted of 66 firms, half of which had filed for bankruptcy under Chapter 7. All businesses in the database were manufacturers, and small firms with assets of < \$1 million were eliminated.

The original Z-score formula was as follows:

$$Z = 1.2X1 + 1.4X2 + 3.3X3 + 0.6X4 + 1.0X5.$$

$X1 = \text{working capital} / \text{total assets}$. Measures liquid assets in relation to the size of the company.

$X2 = \text{retained earnings} / \text{total assets}$. Measures profitability that reflects the company's age and earning power.

$X3 = \text{earnings before interest and taxes} / \text{total assets}$. Measures operating efficiency apart from tax and leveraging factors. It recognizes operating earnings as being important to long-term viability.

$X4 = \text{market value of equity} / \text{book value of total liabilities}$. Adds market dimension that can show up security price fluctuation as a possible red flag.

$X5 = \text{sales} / \text{total assets}$. Standard measure for total asset turnover (varies greatly from industry to industry).

Altman found that the ratio profile for the bankrupt group fell at -0.25 avg, and for the non-bankrupt group at +4.48 avg.

In its initial test, the Altman Z-Score was found to be 72% accurate in predicting bankruptcy two years before the event, with a Type II error (false negatives) of 6% (Altman, 1968). In a series of subsequent tests covering three periods over the next 31 years (up until 1999), the model was found to be approximately 80%–90% accurate in predicting bankruptcy one year before the event, with a Type II error (classifying the firm as bankrupt when it does not go bankrupt) of approximately 15%–20% (Altman, 2000).

From about 1985 onwards, the Z-scores gained wide acceptance by auditors, management accountants, courts, and database systems used for loan evaluation (Eidleman). The formula's approach has been used in a variety of contexts and countries, although it was designed originally for publicly held manufacturing companies with assets of more than \$1 million. Later variations by Altman were designed to be applicable to privately held companies (the Altman Z'-Score) and non-manufacturing companies (the Altman Z''-Score).

Neither the Altman models nor other balance sheet-based models are recommended for use with financial companies. This is because of the opacity of financial companies' balance sheets and their frequent use of off-balance sheet items. There are market-based formulas used to predict the default of financial firms (such as the Merton Model), but these have limited predictive value because they rely on market data (fluctuations of share and options prices to imply fluctuations in asset values) to predict a market event (default, i.e., the decline in asset values below the value of a firm's liabilities).

9.2 Risk Adjusted Returns / Capital

Risk-adjusted return refines an investment's return by measuring how much risk is involved in producing that return, which is generally expressed as a number or rating. Risk-adjusted returns are applied to individual securities, investment funds and portfolios. Some common risk measures include alpha, beta, R-squared, standard deviation and the Sharpe ratio. When comparing two or more potential investments, an investor should always compare the same risk measures to each different investment to get a relative performance perspective.

Alpha, often considered the active return on an investment, gauges the performance of an investment against a market index used as a benchmark, since they are often considered to represent the market's movement as a whole. The excess returns of a fund relative to the return of a benchmark index is the fund's alpha. Alpha is most often used for mutual funds and other similar investment types. alpha is often known as the "Jensen index." Because of the intricacies of large funds and portfolios, as well as of these forms of investing in general, comparing alpha values is only useful when the investments contain assets in the same asset class. Additionally, since alpha is calculated relative to a benchmark deemed appropriate for the fund or portfolio, when calculating alpha it is imperative that an appropriate benchmark is chosen.

Beta, is a measure of the volatility or a systematic risk of security or a portfolio in comparison to the market as whole. A beta of 1 indicates that the security's price moves with the market. A beta of less than 1 means that the security is theoretically less volatile than the market. A beta of greater than 1 indicates that the security's price is theoretically more volatile than the market. For example, if a stock's beta is 1.2, it's theoretically 20% more volatile than the market. Conversely, if an ETF's beta is 0.65, it is theoretically 35% less volatile than the market. Therefore, the fund's excess return is expected to underperform the benchmark by 35% in up markets and outperform by 35% during down markets.

Sharpe Ratio, is a measure of an investment's excess return, above the risk free return, per unit of standard deviation. It is calculated by taking the return of the investment, subtracting the risk free rate, and dividing this result by the investment's standard deviation. All else equal, a higher Sharpe ratio is better. e.g: Mutual fund A returns 12% over the past year and had a standard deviation of 10%. Mutual Fund B returns 10% and had a standard deviation of 7%. The risk free return over the time period was 3%. The Sharpe ratio would be calculated as follows:

Mutual fund A $(12\% - 3\%) / 10\% = 0.9$

Mutual fund B $(10\% - 3\%) / 7\% = 1.$

Even though Mutual fund A had a higher return, Mutual fund B had a higher risk adjusted return, meaning that it gained more pre unit of total risk than Mutual fund A.

R Squared, is a statistical measurement that determines the proportion of a security's return, or the return on a specific portfolio of securities, that can be explained by variations in the stock market as measured by a benchmark index. R-squared values range from 0 to 1 and are

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commonly stated as percentages from 0 to 100%. An R-squared of 100% means all movements of a security are completely explained by movements in the index. A high R-squared, between 85% and 100%, indicates the fund's performance patterns have been in line with the index. A fund with a low R-squared, at 70% or less, indicates the security does not act much like the index. A higher R-squared value indicates a more useful beta figure. For example, if a fund has an R-squared value of close to 100% but has a beta below 1, it is most likely offering higher risk-adjusted returns.

9.2.1 Return on Risk Adjusted Capital (RORAC)

The return on risk-adjusted capital (RORAC) is a rate of return statistic commonly used in financial analysis, where varying projects, endeavours and investments are evaluated based on capital at risk. Projects with different risk profiles are easier to compare to each other once their individual RORAC values have been calculated.

$$\text{RORAC} = \text{Net income} / \text{Allocated Risk Capital}$$

Allocated risk capital is the firm's capital, adjusted for a maximum potential loss based on estimated future earnings distributions or the volatility of earnings. Companies use RORAC to place greater emphasis on firm-wide risk management. For example, different corporate divisions with unique managers can use RORAC to quantify and maintain acceptable risk-exposure levels. With RORAC, however, the capital is adjusted for risk, not the rate of return. RORAC is used when the risk varies depending on the capital asset being analyzed.

For example, assume a firm is evaluating two projects it has engaged in over the previous year and needs to decide which one to eliminate. Project A had total revenues of ₹ 100,000 and total expenses of ₹ 50,000. The total risk-weighted assets involved in the project are ₹ 400,000. Project B had total revenues of ₹ 200,000 and total expenses of ₹ 100,000. The total risk-weighted assets involved in Project B are ₹ 900,000. The RORACs are calculated as below:

$$\text{Project A RORAC} = ₹ 1,00,000 - ₹ 50,000 / ₹ 4,00,000 = 12.5\%$$

$$\text{Project B RAROC} = ₹ 2,00,000 - ₹ 100,000 / ₹ 9,00,000 = 11.1\%$$

Even though Project B had twice as much revenue as Project A, once the risk-weighted capital of the projects are taken into account, it is clear that Project A has a better RORAC.

9.2.2 Economic Capital

Economic capital is the amount of capital that a firm, usually in financial services, needs to ensure that the company stays solvent given its risk profile. Economic capital is calculated internally, sometimes using proprietary models, and is the amount of capital that the firm should have to support any risks that it takes

Calculations of economic capital and their use in risk/reward ratios reveal which business lines a bank should pursue that maximize the risk-reward trade-off. Performance measures that utilize economic capital include return on risk adjusted capital (RORAC), risk adjusted return on capital

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(RAROC) and economic value added (EVA). Business units that perform better on measures like these can receive more of the firm's capital in order to optimize risk. Value-at-risk (VaR) and similar measures are also based on economic capital and are used by financial institutions for risk management.

9.2.3 Value at Risk (VaR) Also see chapter 5 (risk model) page 5.1

Value at risk (VaR) is a statistical technique used to measure and quantify the level of financial risk within a firm or investment portfolio over a specific time frame. This metric is most commonly used by investment and commercial banks to determine the extent and occurrence ratio of potential losses in their institutional portfolios. VaR calculations can be applied to specific positions or portfolios as a whole or to measure firm-wide risk exposure. VaR modelling determines the potential for loss in the entity being assessed, as well as the probability of occurrence for the defined loss. VaR is measured by assessing the amount of potential loss, the probability of occurrence for the amount of loss and the time frame. For example, a financial firm may determine an asset has a 3% one-month VaR of 2%, representing a 3% chance of the asset declining in value by 2% during the one-month time frame. The conversion of the 3% chance of occurrence to a daily ratio places the odds of a 2% loss at one day per month.

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9.2.4 Risk – adjusted Return on Capital (RAROC)

Risk-adjusted return on capital (RAROC) is a risk-based profitability measurement framework for analysing risk-adjusted financial performance and providing a consistent view of profitability across businesses. The concept was developed by Bankers Trust and principal designer Dan Borge in the late 1970s. Note, however, that more and more return on risk adjusted capital (RORAC) is used as a measure, whereby the risk adjustment of Capital is based on the capital adequacy guidelines as outlined by the Basel Committee, currently Basel III.

$$\text{RAROC} = \text{Expected return} / \text{Economic Capital} \quad \text{OR} \quad \text{RAROC} = \text{Expected Return} / \text{Value at Risk}$$

Broadly speaking, in business enterprises, risk is traded off against benefit. RAROC is defined as the ratio of risk adjusted return to economic capital. The economic capital is the amount of money which is needed to secure the survival in a worst-case scenario, it is a buffer against unexpected shocks in market values. Economic capital is a function of market risk, credit risk, and operational risk, and is often calculated by VaR. This use of capital based on risk improves the capital allocation across different functional areas of banks, insurance companies, or any business in which capital is placed at risk for an expected return above the risk-free rate.

RAROC system allocates capital for two basic reasons:

- (a) Risk management
- (b) Performance evaluation

For risk management purposes, the main goal of allocating capital to individual business units is to determine the bank's optimal capital structure—that is economic capital allocation is closely

correlated with individual business risk. As a performance evaluation tool, it allows banks to assign capital to business units based on the economic value added of each unit.

9.3 Ratios and Financial Assessment See may 2018 Exam Q-1 (30 Marks)

For any Credit or Finance professional, it is critical to examine and analyze the Audited Financials of the past 5 years of the company / borrower, in detail. They should additionally require to seek and assess the latest audited or provisional quarterly / semi-annual financial data of the company. Once the financial information has been gathered, the analysis should include the following critical ratios:

9.3.1 Financial Statement analysis

- ✓(a) Sales Growth Rate – This ratio gives us a trend whether the growth / decline in topline is consistent and hence sustainable over the projected period or it's a spurt in one of the years. The ratio is : $((Yr2\ Sales - Yr1\ Sales) / Yr1\ Sales) * 100$
- ✓(b) EBITDA% - EBITDA refers to Earnings before interest, depreciation and tax. This gives us a fair idea how much profit the borrower is making from its business at operating level. This eliminates the effects of financing and accounting decisions thus giving profitability purely from operations. Ratio is $(EBITDA / Net\ Sales) * 100$
- ✓(c) PAT% - This is the net earnings after all the expenses before appropriation to reserves and distribution to shareholders in the form of dividend. Ratio is $(PAT / Net\ Sales) * 100$
- ✓(d) EBITDA / Interest – This ratio gives us the measure of company's ability to meet its interest expenses through operating profits.
- ✓(e) Net Fixed asset turnover ratio – This ratio indicates how well the borrower is using its fixed assets to generate sales. If a company has a higher fixed asset turnover ratio than its competitors it is using its assets well to generate the topline.
- ✓(f) Total Debt / TNW – Tangible Network (TNW) is most commonly a calculation of the network of a company that excludes any value derived from intangible assets such as copyrights, patents, intellectual property etc.

$$\text{Tangible Network} = \text{Total Assets} - \text{Total Liabilities} - \text{Intangible Assets}$$

- ✓The ratio Total Debt / TNW – this measures the proportions of company's borrowed funds to equity. The ratio indicates the financial risk to which a business is subjected, since excessive debt can lead to financial difficulties. A high gearing ratio is indicative of high debt, which in business downturn may pose trouble on the borrower in meeting its debt repayment schedules.
- ✓(g) Debt Service Coverage ratio (DSCR) – is a measure of the cash flow available to pay current debt obligations. The ratio states net operating income as a multiple of debt obligations due within one year, including interest, principal. Ratio is $(PAT + Dep + Interest) / (\text{Current portion})$

of long term debt + Interest).

(h) ROCE / ROE / ROA

- ✓ (i) Return on Capital employed (ROCE) - is a financial ratio that measures a company's profitability and the efficiency with which its capital is employed. ROCE is calculated as:

$$\text{ROCE} = \text{Earnings before Interest and Tax (EBIT)} / \text{Capital Employed}.$$
- ✓ (ii) Return on Equity (ROE) - is the amount of net income returned as a percentage of shareholders equity. Return on equity measures a corporation's profitability by revealing how much profit a company generates with the money shareholders have invested. $\text{ROE} = \text{PAT} / \text{Shareholders Equity}$
- ✓ (iii) Return on Assets (ROA) - Return on assets (ROA) is an indicator of how profitable a company is relative to its total assets. ROA gives an idea as to how efficient management is at using its assets to generate earnings. Calculated by dividing a company's annual earnings by its total assets, ROA is displayed as a percentage. Sometimes this is referred to as "return on investment". $\text{ROA} = \text{Net Income} / \text{Total Assets}.$

9.3.2 Cash Flow analysis

- (a) Operating Cash flow - The first set of cash flow transactions is from operational business activities. Cash flows from operations starts with net income and then reconciles all noncash items to cash items within business operations. For example, accounts receivable is a noncash account. If accounts receivables go up, it means sales are up, but no cash was received at the time of sale. The cash flow statement deducts receivables from net income because it is not cash. Also included in cash flows from operations are accounts payable, depreciation, amortization and numerous prepaid items booked as revenue or expenses but with no associated cash flow
- (b) Investment cash flow - Cash flows from investing activities includes cash spent on property, plant and equipment. This is where analysts look to find changes in capital expenditures (CAPEX). While positive cash flows from investing activities is a good thing, investors prefer companies that generate cash flows primarily from business operations, not investing and financing activities.
- (c) Financing cash flow - Cash flows from financing is the last business activity detailed on the cash flow statement. The section provides an overview of cash used in business financing. Analysts use the cash flows from financing section to find the amount paid out in dividends or share buybacks. Cash obtained or paid back from capital fundraising efforts, such as equity or debt, is also listed.

9.3.3 Working capital analysis

- ✓ (a) Account receivable days - Accounts receivable days is the number of days that a customer invoice is outstanding before it is collected. The point of the measurement is to determine the

effectiveness of a company's credit and collection efforts in allowing credit to reputable customers, as well as its ability to collect cash from them in a timely manner.

Formula : Account receivable turnover (days) = (Debtors / Sales)*365

✓(b) Inventory days - The inventory turnover ratio is an efficiency ratio that shows how effectively inventory is managed by comparing cost of goods sold with average inventory for a period. This measures how many times average inventory is "turned" or sold during a period. Formula: (Inventory / Sales) * 365

✓(c) Payable days - The accounts payable turnover ratio is a short-term liquidity measure used to quantify the rate at which a company pays off its suppliers. Accounts payable turnover ratio is calculated by taking the total purchases made from suppliers, or cost of sales, and dividing it by the average accounts payable amount during the same period.

Formula: (Creditors / Purchases) * 365

✓(d) Current Ratio and Quick ratio - The current ratio is a liquidity ratio that measures a company's ability to pay short-term and long-term obligations. To gauge this ability, the current ratio considers the current total assets of a company (both liquid and illiquid) relative to that company's current total liabilities. Quick Ratio is a measure of how well a company can meet its short-term financial liabilities. Also known as the acid-test ratio, it can be calculated as follows: (Cash + Marketable Securities + Accounts Receivable) / Current Liabilities. (CA-Stock)/CL

While conducting credit risk due diligence on a borrower, it is also important to formulate suitable assumptions for projections basis the business model / historical experience and industry / sector the borrower belongs to. Ideally, the projections should cover the tenor of the loan. This will indicate whether the borrower has the ability / capacity to pay the lenders debt as per the terms & conditions of the loan. All the ratios indicated above should be suitably calculated to understand the financial viability of the borrower under consideration. Further, the projections should also be assessed basis two or three stressed scenarios by modifying the assumptions. Eg: Drop in turnover by 5%. No Growth in EBIDTA margins or drop in volumes etc. The proof of the pudding lies in the fact that Debt service coverage ratio should be above 1 in all the projected years which indicates the borrower's ability. This is a very important exercise in the wholesale financing including project finance wherein the loan tenor is usually long ~ 15-20 yrs.



10. CREDIT SCORING MODELS

10.1 What is a Credit Scoring Model?

As per "Investopedia", credit score is a statistical analysis performed by lenders and financial institutions to access a person's credit worthiness. Lenders use credit scoring, among other things, to arrive at a decision on whether to extend credit. A person's credit score is a number between 300 and 850, 850 being the highest credit rating possible. The methods which are used in understanding this credit related with the customer are called credit scoring models.

Credit scoring models which are alternatively called as scorecards are primarily used to inform management for decision making and to provide predictive analysis or the information on the potential delinquency of the loan approved or credit line extended. Adoption of the credit scoring model is vital for the organization as it's a base to determine the credit management policy. Erroneous, misused, misunderstood, or poorly developed and managed scoring models may lead to lost revenues through poor customer selection (credit risk) or collections management.

The usage of credit models are as follows but not limited to:

- ✓• Controlling risk selection
- ✓• Translating the risk of default into appropriate pricing
- ✓• Managing credit losses
- ✓• Evaluating new loan programs.
- ✓• Reducing loan approval processing time

Most likely, scoring and modeling will increasingly guide risk management program in an organization through end to end. The increasing regulatory requirements are the guide to use scoring and modeling to be embedded in management's lending decisions and risk management processes which accentuates the importance of understanding scoring model concepts and underlying risks.

10.2 Types of Credit Scoring Model Important

Credit scoring models are mainly used by the credit rating agency to determine the credit worthiness of an individual. The degree of creditworthiness is denoted by the credit scores for each individual. Now a days, many financial institutions are using credit scores to evaluate the potential risks exposure by lending the money to consumers and to mitigate the losses organization may suffer by the default risk. To determine the credit score various credit scoring models are available through the agencies or credit bureaus.

In this section lets understand the different models predominantly used across the world. These are mix of statistical or behavioral scoring models.

FICO Score

It imperative to have knowledge about the credit. Bad credit history has the impact on borrower's future. If you want to be better versed about your credit, resorting to FICO Score could be a great place to start.

A FICO Score is a powerful measure of the creditworthiness as a lender might refer. FICO Scores are used in 90% of credit decisions, so they're a very good barometer of how your credit can look to potential lenders. Credit score ranges between 300 – 850 points

Scoring ranges are just one of the tools lenders can use to link ranges of values with associated characteristics and metrics at-a-glance, allowing

them to make more informed lending decisions quickly and fairly.

Under this credit scoring model following ranges and associated credit ratings are as follows:

- 1) 800 & + → Very Well above average : 1% chance of default
- ✓ 2) 740 – 799 → Very good : 2% chance of default
- 3) 670 – 639 → Median Credit Score : 8% chance of default
- 4) 580 – 669 → Below average : 28% chance of default
- 5) 570 & - → Poor : 61% chance of default

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Under FICO model credit scores are calculated based on following

35% - Payment History

30% - Debt or Credit

15% - Length of the Credit History

10% - New Credit

10% - Type of Credit Used

Vantage Score

Vantage score are based on the credit reporting agencies. Vantage calculate the credit scores based on the three credit reporting agencies that are Equifax, Experian and TransUnion. As per the latest Vantage Score model the credit scores are being rated between 300 – 850

The level of credits scores follows similar brackets as that of FICO. However the rating is based on A to F alphabets. A being the best and F being the poor.

The credit score range was redefined with new version of Vantage score model due to the credit behavior as well as change in economy. Accurate results will lead to appropriate level of credits to the borrowers.

Vantage score is being calculated based on the one month's credit history of the consumer. This is useful for those consumer who are new to the credit market. Further negative vantage discourages the late mortgage payments etc. and this will have direct impact on the credit rating. Vantage score disregards the payment collection accounts if any maintained by the consumer. This means no credits being given against any line of credit.

PLUS Score

Plus score is developed by Experian credit reporting agency. The scoring model is based on the mathematical calculation and represents in the range of 330 – 830 points.

The most important and noteworthy point is that the PLUS score is very much consumer focussed. That means the credit score depends upon the

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consumer behavior. Like FICO, PLUS score is also calculated based on the payment history, debt used and nature of credit history.

As referred above, the PLUS Score range runs from 330 to 830. Consumers with a low PLUS Score are considered to be "high risk", while those with higher scores are considered to be "low risk".

The score under this model is compared with the other consumer in the similar lines and across the segment. This will ensure that the credit score will be ranked based on the percentile.

For instance, your score may be noted as in the "87th percentile" the "56th percentile" or the "67th" percentile. This simply means that your score is better than 87%, 56% or 67% of the public, respectively.

**Experian National
Equivalency Score**

ENES

Experian's National Equivalency Score (ENES) is also called as FAKO credit score. This scoring model aims at to estimate the credit worthiness of an individual customer. The score range is 360-840. It has been claimed by the Experian, institution who owns the ENES system, that it is quite similar to the FICO scoring model. The exact basis of the mathematical calculation is not publicized by the model owners. But considering the facts that the it's a replica of FICO model, one cannot expect drastic dissimilarity between these two models.

The model has a lower range with marginal reduction of 10 point on either ends.

However, since this score is free of cost to the individual this may not be considered by the lending organization. It's up to the organization to use the scoring model. The usage is typically based on the user risk profile.

Equifax

Like Experian, Equifax is one of the major credit-reporting bureau and produces credit reports similar to those from Experian.

Equifax offers numerical credit scores that range from 280 to 850. The criteria used by the Equifax is similar to the FICO. A high Equifax credit score typically indicates a high FICO score.

The advantages of Equifax

- ✓1. Detailed Reported as compared to other reports.
- ✓2. Establishes and presents the consumers borrowing pattern.
- ✓3. Borrower need a real good credit history to ensure line of credit is being extended appropriately.