Appendix 10A

Credit Analysis

This appendix discusses credit analysis for real estate lending, consumer and small-business lending, and mid-market commercial and industrial lending. It also provides insights into the credit risk evaluation process from the perspective of a credit officer (or an FI manager) evaluating a loan application.

Real Estate Lending

Because of the importance of residential mortgages to banks, savings institutions, credit unions, and finance companies, residential mortgage loan applications are among the most standardized of all credit applications. (In the body of the chapter, we outlined the different types of characteristics of real estate loans, e.g, adjustable-rate versus fixed-rate mortgages, interest rate payments versus fee payments, and down payments). In this appendix, we look at the evaluation process that FIs use to determine whether a real estate loan application should be approved. Two considerations dominate an FI's decision to approve a mortgage loan application: (1) the applicant's ability and willingness to make timely interest and principal repayments and (2) the value of the borrower's collateral.

Ability and willingness of the borrower to repay debt outstanding is usually established by application of qualitative and quantitative models. The character of the applicant is also extremely important. Stability of residence, occupation, family status (e.g., married, single), previous history of savings, and credit (or bill payment) history are frequently used in assessing character. The loan officer must also establish whether the applicant has sufficient income. In particular, the loan amortization (i.e., principal payments) should be reasonable when compared with the applicant's income and age. The loan officer should also consider the applicant's monthly expenditures. Family responsibilities and marital stability are also important. Monthly financial obligations relating to auto, personal, and credit card loans should be ascertained, and an applicant's personal balance sheet and income statement should be constructed.

GDS (gross debt service) ratio
Total accommodation expenses (mortgage, lease, condominium, management, fees, real estate taxes, etc.) divided by gross income.

TDS (total debt service) ratio
Total accommodation expenses plus all other debt service payments divided by gross income.

Two ratios are very useful in determining a customer's ability to maintain mortgage payments: the **GDS (gross debt service)** and the **TDS (total debt service) ratios.** Gross debt service ratio is the customer's total annual accommodation expenses (mortgage, lease, condominium, management fees, real estate taxes, etc.) divided by annual gross income. Total debt service ratio is the customer's total annual accommodation expenses plus all other debt service payments divided by annual gross income. These can be represented as follows:

$$\text{GDS} = \frac{\text{Annual mortgage payments} + \text{Property taxes}}{\text{Annual gross income}}$$

$$\text{TDS} = \frac{\text{Annual total debt payments}}{\text{Annual gross income}}$$

As a general rule, for an FI to consider an applicant, the GDS and TDS ratios must be less than an acceptable threshold. The threshold is commonly 25 to 30 percent for the GDS and 35 to 40 percent for the TDS ratios.[1]

[1] The numerator of the GDS is often increased to include home heating and property taxes. When the GDS ratio is used for consumer credit, rent is substituted for mortgage payments.

EXAMPLE 10A–1
Calculation of the GDS and TDS Ratios

Consider two customers who have applied for a mortgage from an FI with a GDS threshold of 25 percent and a TDS threshold of 40 percent.

Customer	Gross Annual Income	Monthly Mortgage Payments	Annual Property Taxes	Monthly Other Debt Payments
1	$150,000	$3,000	$3,500	$2,000
2	60,000	500	1,500	200

The GDS and TDS ratios for the mortgage applicants are as follows:

Customer	GDS	TDS
1	$\frac{3{,}000(12) + 3{,}500}{150{,}000} = 26.33\%$	$\frac{3{,}000(12) + 3{,}500 + 2{,}000(12)}{150{,}000} = 42.33\%$
2	$\frac{500(12) + 1{,}500}{60{,}000} = 12.50\%$	$\frac{500(12) + 1{,}500 + 200(12)}{60{,}000} = 16.50\%$

Despite a higher level of gross income, Customer 1 does not meet the GDS or TDS thresholds because of relatively high mortgage, tax, and other debt payments. Customer 2, while earning less, has fewer required payments and meets both the FI's GDS and TDS thresholds.

credit-scoring system
A mathematical model that uses observed loan applicant's characteristics to calculate a score that represents the applicant's probability of default.

FIs often combine the various factors affecting the ability and willingness to make loan repayments into a single credit score. A **credit-scoring system** (illustrated below) is a quantitative model that uses observed characteristics of the applicant to calculate a "score" representing the applicant's probability of default (versus repayment). Credit-scoring systems are developed by using borrower characteristics (e.g., income, age, loan payment history) for some past period. The credit-scoring model weights each characteristic to identify a boundary number (score) or range such that if past loan customers had an overall credit score (derived from the weighted characteristics) greater than the boundary number (score) they did not default on the loan, whereas if they had a credit score less than the boundary number they defaulted on the loan. The boundary number or range is derived by statistical analysis, such as logit or discriminant analysis.[2] Assuming new loan customers act like past customers, the credit-scoring system can then be used to calculate a credit score for new loan applicants and assign them to a high or low default risk group. The applicant's total score must be above the boundary score or range to be considered acceptable for a loan.

The theory behind credit scoring is that by selecting and combining different economic and financial characteristics, an FI manager may be able to separate good from bad loan customers based on the characteristics of borrowers who have defaulted in the past. One advantage of a credit-scoring system is that a loan

[2] For example, those credit scoring systems based on a statistical technique called discriminant analysis are also referred to as discriminant analysis models. Discriminant analysis places borrowers into two groups (defaulting and nondefaulting) and, by seeking to maximize the difference in the variance of the characteristics (e.g., income) between these groups while minimizing the variance within each group, seeks to derive appropriate weights for the characteristics that discriminate between the defaulting and nondefaulting groups. This is the discriminant function that results from discriminant analysis.

applicant's credit quality is expressed as a single numerical value, rather than as a judgmental assessment of several separate factors. This is beneficial for FIs that must evaluate small loan applicants quickly, at low cost, and consistently and who would otherwise have to employ many more credit analysts (each of whom might well apply inconsistent standards across different loan applicants as well as adding to the FI's labor costs).

If the FI uses a scoring system, the loan officer can give an immediate answer—yes, maybe, or no—and the reasons for that answer. A maybe occurs in borderline cases or when the loan officer is uncertain of the classification of certain input information. A credit-scoring system allows an FI to reduce the ambiguity and turnaround time and increase the transparency of the credit approval process.

EXAMPLE 10A–2
Credit Scoring of a Real Estate Loan

An FI uses the following credit-scoring model to evaluate real estate loan applications:

Characteristic	Characteristic Values and Weights				
Annual gross income	< $10,000	$10,000–$25,000	$25,001–$50,000	$50,001–$100,000	> $100,000
Score	0	15	35	50	75
TDS	< 50%	35%–50%	15%–35%	5%–15%	> 5%
Score	0	10	20	35	50
Relations with FI	None	Checking account	Savings account	Both	
Score	0	30	30	60	
Major credit cards	None	1 or more			
Score	0	20			
Age	< 25	25–60	> 60		
Score	5	30	35		
Residence	Rent	Own with mortgage	Own outright		
Score	5	20	50		
Length of residence	< 1 year	1–5 years	> 5 years		
Score	0	20	45		
Job stability	< 1 year	1–5 years	> 5 years		
Score	0	25	50		
Credit history	No record	Missed a payment in last 5 years	Met all payments		
Score	0	−15	50		

The loan is automatically rejected if the applicant's total score is less than 120 (i.e., applicants with a score of 120 or less have, in the past, mainly defaulted on their loan). The loan is automatically approved if the total score is greater than 190 (i.e., applicants with a score of 190 or more have, in the past, mainly paid their loan in complete accordance with the loan agreement). A score between 120 and 190 is reviewed by a loan committee for a final decision.

A loan customer listing the following information on the loan application receives the following points:

Characteristic	Value	Score
Annual gross income	$67,000	50
TDS	12%	35
Relations with FI	None	0
Major credit cards	4	20
Age	37	30
Residence	Own/mortgage	20
Length of residence	2½ years	20
Job stability	2½ years	25
Credit history	Met all payments	50
Total score		250

The real estate loan for this customer would be automatically approved.

Verification of the borrower's financial statements is essential. If the answer is yes to a loan application, the loan officer states that the FI is prepared to grant the loan subject to a verification of his or her creditworthiness and obtains the applicant's permission to make all necessary inquiries. The collateral provided by the mortgage is normally considered only after the loan officer has established that the applicant can service the loan. If collateral secures a loan, the FI must make sure that its claim, should the borrower default, is free and clear from other claims. This process is referred to as **perfecting** a security interest in the **collateral.** Even if collateral secures the loan, no FI should become involved in a loan that is likely to go into default. In such a case, the FI would at best seize the property in a **foreclosure** (where the FI takes possession of the mortgaged property in satisfaction of the defaulting borrower's indebtedness, forgoing claim to any deficiency) or **power of sale** (where the FI takes the proceedings of the forced sale of a mortgaged property in satisfaction of the indebtedness and returns to the mortgagor the excess over the indebtedness or claims any shortfall as an unsecured creditor).

perfecting collateral
The process of ensuring that collateral used to secure a loan is free and clear to the lender should the borrower default on the loan.

foreclosure
The process of taking possession of the mortgaged property in satisfaction of a defaulting borrower's indebtedness and forgoing claim to any deficiency.

power of sale
The process of taking the proceedings of the forced sale of a mortgaged property in satisfaction of the indebtedness and returning to the mortgagor the excess over the indebtedness or claiming any shortfall as an unsecured creditor.

Before an FI accepts a mortgage, it must satisfy itself regarding the property involved in the loan by doing the following:

- Confirming the title and legal description of the property.
- Obtaining a surveyor's certificate confirming that the house is within the property boundaries.
- Checking with the tax office to confirm that no property taxes are unpaid.
- Requesting a land title search to determine that there are no other claims against the property.
- Obtaining an independent appraisal to confirm that the purchase price is in line with the market value.

Consumer [Individual] and Small-Business Lending

The techniques used for mortgage loan credit analysis are very similar to those applied to individual and small-business loans. Individual consumer loans are scored like mortgages, often without the borrower ever meeting the loan officer.

Unlike mortgage loans for which the focus is on a property, however, nonmortgage consumer loans focus on the individual's ability to repay. Thus, credit-scoring models for such loans would put more weight on personal characteristics such as annual gross income, the TDS score, and so on.

Small-business loans are more complicated because the FI is frequently asked to assume the credit risk of an individual whose business cash flows require considerable analysis, often with incomplete accounting information available to the credit officer. The payoff for this analysis is also small, by definition, because loan principal amounts are usually small. A $50,000 loan with a 3 percent interest spread over the cost of funds provides only $1,500 of gross revenues before loan loss provisions, monitoring costs, and allocation of overheads. This low profitability has caused many FIs to build small business scoring models similar to, but more sophisticated than, those used for mortgages and consumer credit. These models often combine computer-based financial analysis of borrower financial statements with behavioral analysis of the owner of the small business.

Mid-Market Commercial and Industrial Lending

In recent years, mid-market commercial and industrial lending has offered some of the most profitable opportunities for credit-granting FIs. Although definitions of mid-market corporates vary, they typically have sales revenues from $5 million to $100 million a year, have a recognizable corporate structure (unlike many small businesses), but do not have ready access to deep and liquid capital markets (as do large corporations).

Credit analysis of a mid-market corporate customer differs from that of a small business because, while still assessing the character of the firm's management, its main focus is on the business itself. The credit process begins with an account officer gathering information by meeting existing customers, checking referrals, and meeting with new business prospects. Having gathered information about the credit applicant, an account officer decides whether it is worthwhile to pursue the new business, given the applicant's needs, the FI's credit policies, the current economy, and the competitive lending environment. If it is, the account officer structures and prices the credit agreement with reference to the FI's credit granting policy. This includes several areas of analysis, including the five Cs of credit, cash flow analysis, ratio analysis, and financial statement comparisons (described below). At any time in this process, conditions could change or new information could be revealed, significantly changing the borrower's situation and forcing the account officer to begin the process again.

Once the applicant and an account officer tentatively agree on a loan, the account officer must obtain internal approval from the FI's credit risk management team. Generally, even for the smallest mid-market credit, at least two officers must approve a new loan customer. Larger credit requests must be presented formally (either in hard copy or through a computer network) to a credit approval officer and/or committee before they can be signed. This means that, during the negotiations, the account officer must be very well acquainted with the FI's overall credit philosophy and current strategy.

Five Cs of Credit

To analyze the loan applicant's credit risk, the account officer must understand the customer's character, capacity, collateral, conditions, and capital (sometimes referred to as the *five Cs of credit*). Character refers to the probability that the loan

applicant will try to honor the loan obligations. Capacity is a subjective judgment regarding the applicant's ability to pay the FI according to the terms of the loan. Collateral is represented by assets that the loan applicant offers as security backing the loan. Conditions refer to any general economic trends or special developments in certain geographic regions or sectors of the economy that might affect the applicant's ability to meet the loan obligations. Capital is measured by the general financial condition of the applicant as indicated by an analysis of the applicant's financial statements and his or her leverage. Some important questions that provide information on the five Cs follow.

Production (measures of capacity and conditions)

- On what production inputs does the applicant depend?
- To what extent does this cause supply risk?
- How do input price risks affect the applicant?
- How do costs of production compare with those of the competition?
- How does the quality of goods and services produced compare with those of the competition?

Management (measures of character and conditions)

- Is management trustworthy?
- Is management skilled at production? Marketing? Finance? Building an effective organization?
- To what extent does the company depend on one or a few key players?
- Is there a successful plan?
- Are credible and sensible accounting, budgeting, and control systems in place?

Marketing (measures of conditions)

- How are the changing needs of the applicant's customers likely to affect the applicant?
- How creditworthy are the applicant's customers?
- At what stage of their life cycles are the applicant's products and services?
- What are the market share and share growth of the applicant's products and services?
- What is the applicant's marketing policy?
- Who are the applicant's competitors? What policies are they pursuing? Why are they able to remain in business?
- How is the applicant meeting changing market needs?

Capital (measures of capital and collateral)

- How much equity is currently funding the firm's assets?
- How much access does the firm have to equity and debt markets?
- Will the company back the loan with the firm's assets?

Cash Flow Analysis

As an initial step of the loan analysis, FIs require corporate loan applicants to provide cash flow information, which provides the FI with relevant information about how the applicant's cash receipts and disbursements compare with the principal

and interest payments on the loan. *Cash receipts* include any transaction that results in an increase in cash assets (i.e., receipt of income, decrease in a noncash asset, increase in a liability, and increase in an equity account). *Cash disbursements* include any transaction that results in a decrease in cash assets (i.e., cash expenses, increase in a noncash asset, decrease in a liability, and decrease in equity).[3] The cash flow statement (or cash-based income statement) reconciles changes in the cash account over some period according to three cash flow activities: operating, investing, and financing activities. Operating activities include net income, depreciation, and changes in current assets and current liabilities other than cash and short-term debt. Investing activities include investments in or sales of fixed assets. Financing activities include cash raised by issuing short-term debt, long-term debt, or stock. Also, since dividends paid or cash used to buy back outstanding stock or bonds reduces the applicant's cash, such transactions are included as financing activities.

When evaluating the cash flow statement, FIs want to see that the loan applicant can pay back the loan with cash flows produced from the applicant's operations. FIs do not (except as a last resort) want the loan applicant to pay back the loan by selling fixed assets or issuing additional debt. Thus, the cash flows from the operating activities section of the cash flow statement are most critical to the FI in evaluating the loan applicant.

EXAMPLE 10A–3
Computation of Cash Flow Statement

Consider the financial statement for the loan applicant presented in Table 10A–1. The cash flow statement reconciles the change in the firm's cash assets account from 2014 to 2015 as equal to −$61 (see the first row of Panel A). Construction of the cash flow statement begins with all cash flow items associated with the operating activities of the applicant. Panel A of Table 10A–2 shows that the cash flows from operations total −$78. Next, cash flows from investment activities (i.e., fixed-asset investments and other nonoperating investments of the firm) are calculated in Table 10A–2, Panel B as −$168. Finally, cash flows from financing activities are shown in Panel C as $185. The sum of these cash flow activities, reported in Panel D, −$61, equals the change in the cash account from 2014 to 2015 (Table 10A–1, Panel A, first row). Given that the loan should be repaid from cash flows from operations, which are negative, i.e., −$78, this loan applicant will likely be rejected.

Importantly, cash flows generated from operations, as in the preceding example, are the source of cash used to repay the loan to the FI, and thus they play a key role in the credit decision process.

Ratio Analysis

In addition to cash flow information, an applicant requesting specific levels of credit substantiates these business needs by presenting historical audited financial statements and projections of future needs. Historical financial statement analysis can be useful in determining whether cash flow and profit projections are plausible on the basis of the history of the applicant and in highlighting the applicant's risks.

[3] For example, if a firm issues new bonds (increasing liabilities), it will have a(n) (increased) cash flow from the purchasers of the newly issued bonds. Similarly, a sale of new equity (such as common stock) will create a positive cash inflow to the firm from purchasers of the equity.

Calculation of financial ratios is useful when performing financial statement analysis on a mid-market corporate applicant. Although stand-alone accounting ratios are used for determining the size of the credit facility, the analyst may find relative ratios more informative when determining how the applicant's business is changing over time (i.e., time series analysis) or how the applicant's ratios compare to those of its competitors (i.e., cross-sectional analysis). Ratios are particularly informative when they differ either from an industry average (or FI-determined standard of what is appropriate) or from the applicant's own past history. An optimal value is seldom given for any ratio because no two companies are identical. A ratio that differs from an industry average or an FI-determined standard, however, normally raises a "flag" and causes the account officer to investigate further. For example, a ratio that shifts radically from accounting period to accounting period may reveal a company weakness.

Hundreds of ratios could be calculated from any set of accounting statements. The following are a few that most credit analysts find useful. Values of the ratios using the 2015 financial statements in Table 10A–1 are also presented.

TABLE 10A–1 Financial Statements Used to Construct a Cash Flow Statement (in thousands of dollars)

Panel A: Balance Sheets

Assets	2014	2015	Change from (2014 to 2015)	Liabilities/Equity	2014	2015	Change from (2014 to 2015)
Cash	$ 133	$ 72	$ (**61**)	Notes payable	$ 657	$ 967	$ 310
Accounts receivable	1,399	1,846	447	Accounts payable	908	1,282	374
Inventory	1,255	1,779	524	Accruals	320	427	107
Current assets	2,787	3,697	910	Current liabilities	1,885	2,676	791
Gross fixed assets	876	1,033	157	Long-term debt	375	300	(75)
Less: depreciation	(277)	(350)	(73)	Common stock	700	700	0
Net fixed assets	599	683	84	Retained earnings	465	754	298
Temporary investments	39	50	11	Total	$3,425	$4,430	$1,005
Total assets	$3,425	$4,430	$1,005				

Panel B: Income Statement

	2015
Net sales (all on credit)	$12,430
Cost of goods sold	(8,255)
Gross profit	4,175
Cash operating expenses	(3,418)
Depreciation	(73)
Operating profit (EBIT)	684
Interest expense	(157)
Taxes	(188)
Net income	339
Dividends	(50)
Change in retained earnings	$ 289

TABLE 10A–2
Cash Flow Statement (in thousands of dollars)

		Cash Flow Impact
Panel A: Cash Flow from Operating Activities		
Net sales	$12,430	↑
Change in accounts receivable	(447)	↓
Cash receipts from sales	11,983	
Cost of goods sold	(8,255)	↓
Change in inventory	(524)	↓
Change in accounts payable	374	↑
Cash margin	3,578	
Cash operating expenses	(3,418)	↓
Change in accruals	107	↑
Cash before interest and taxes	267	
Interest expense	(157)	↓
Taxes	(188)	↓
Cash flows from operations	(78)	
Panel B: Cash Flow from Investing Activities		
Change in gross fixed assets	(157)	↓
Change in temporary investments	(11)	↓
Cash flows from investing activities	(168)	
Panel C: Cash Flows from Financing Activities		
Retirement of long-term debt	(75)	↓
Change in notes payable	310	↑
Change in common stock	0	—
Dividends paid	(50)	↓
Cash flow from financing activities	185	
Panel D: Net Increase (Decrease) in Cash		
	(61)*	

* This is equal to the change in cash for 2014–2015 reported in Panel A of Table 10A–1.

Liquidity Ratios

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}} = \frac{3{,}697}{2{,}676} = 1.38 \text{ times}$$

$$\text{Quick ratio (acid-test ratio)} = \frac{\text{Current assets} - \text{Inventory}}{\text{Current liabilities}} = \frac{3{,}679 - 1{,}779}{2{,}676} = 0.72 \text{ times}$$

Liquidity provides the defensive cash and near-cash resources for firms to meet claims for payment. Liquidity ratios express the variability of liquid resources relative to potential claims. When considering the liquidity of a loan applicant, high levels of liquidity effectively guard against liquidity crises but at the cost of lower returns on investment. Note that a company with very predictable cash flows can maintain low levels of liquidity without much liquidity risk. Account officers frequently request detailed cash flows from an applicant that specify exactly when cash inflows and outflows are anticipated.

Asset Management Ratios

$$\text{Number of days sales in receivables} = \frac{\text{Accounts receivable} \times 365}{\text{Credit sales}}$$
$$= \frac{1,846 \times 365}{12,430} = 54.21 \text{ days}$$
$$\text{Number of days in inventory} = \frac{\text{Inventory} \times 365}{\text{Cost of goods sold}} = \frac{1,779 \times 365}{8,255}$$
$$= 78.66 \text{ days}$$
$$\text{Sales to working capital} = \frac{\text{Sales}}{\text{Net working capital}} = \frac{12,430}{3,697 - 2,676}$$
$$= 12.17 \text{ times}$$
$$\text{Sales to fixed assets} = \frac{\text{Sales}}{\text{Fixed assets}} = \frac{12,430}{683} = 18.20 \text{ times}$$
$$\text{Sales to total assets (assets turnover)} = \frac{\text{Sales}}{\text{Total assets}} = \frac{12,430}{4,430} = 2.81 \text{ times}$$

The asset management ratios give the account officer clues to how well the applicant uses its assets relative to its past performance and the performance of the industry. For example, ratio analysis may reveal that the number of days that finished goods are in inventory is increasing. This suggests that finished goods inventories, relative to the sales they support, are not being used as well as in the past. If this increase is the result of a deliberate policy to increase inventories to offer customers a wider choice and if it results in higher future sales volumes or increased margins that more than compensate for increased capital tied up in inventory, the increased relative size of finished goods inventories is good for the applicant and, thus, the FI. An FI should be concerned, on the other hand, if increased finished goods inventories are the result of declining sales but steady purchases of supplies and production. Inventory aging schedules give more information than single ratios and should be requested by the account officer concerned about deteriorating ratios.

What a loan applicant often describes in words differs substantially from what the ratio analysis reveals. For example, a company that claims to be a high-volume producer but has low sales-to-assets ratios relative to the industry bears further investigation. In discussing the analysis with the applicant, the account officer not only gains a better appreciation of the applicant's strategy and needs but also may help the applicant better understand the company relative to financial and industry norms.

Debt and Solvency Ratios

$$\text{Debt-to-asset ratio} = \frac{\text{Short-term liabilities} + \text{Long-term liabilities}}{\text{Total assets}}$$
$$= \frac{2,676 + 300}{4,430} = 67.18\%$$
$$\text{Times interest earned ratio} = \frac{\text{Earnings available to meet interest charges}}{\text{Interest charges}}$$
$$= \frac{684}{157} = 4.36 \text{ times}$$

$$\text{Cash-flow-to-debt ratio} = \frac{\text{EBIT} + \text{Depreciation}}{\text{Debt}} = \frac{684 + 73}{2{,}676 + 300} = 25.44\%$$

EBIT
Earnings before interest and taxes.

where **EBIT** represents earnings before interest and taxes.

Debt and solvency ratios give the account manager an idea of the extent to which the applicant finances its assets with debt versus equity. Specifically, the lower the debt-to-asset ratio, the less debt and more equity the applicant uses to finance its assets (i.e., the bigger the applicant's equity cushion). Similarly, the higher the times interest earned ratio and the cash-flow-to-debt ratio, the more equity and less debt the applicant uses to finance its assets.

Adequate levels of equity capital are as critical to the health of a credit applicant as they are to the health of FIs. The account officer analyzing a credit application or renewal wishes to know whether a sufficient equity cushion exists to absorb fluctuations in the loan applicant's earnings and asset values and sufficient cash flow exists to make debt service payments. Clearly, the larger the fluctuations or variability of cash flows, the larger is the need for an equity cushion. Note that from a secured debtor's point of view (e.g., a bank lender), the unsecured creditors and subordinate lenders (such as subordinate bond holders) form part of the quasi-equity cushion in liquidation. The secured creditor must make sure, however, that it enjoys true seniority in cash payment so that the firm's assets are not liquidated in paying down the claims of the subordinate (junior) creditors and equity holders.

Whether a debt burden is too large can be analyzed with the help of a fixed-charge coverage ratio. This ratio measures the dollars available to meet fixed-charge obligations (earnings available to meet fixed charges). A value of 1 for this ratio means that $1 of earnings is available to meet each dollar of fixed-charge obligations. A value of less (greater) than 1 means that the applicants has less (more) than $1 of earnings available to pay each dollar of fixed-charge obligations. This ratio can be tailored to the applicant's situation, depending on what really constitutes fixed charges that must be paid. One version of it follows: (EBIT + Lease payments)/[Interest + Lease payments + Sinking fund/$(1 - T)$], where T is the marginal tax rate.[4] Here, it is assumed that sinking fund payments must be made.[5] They are adjusted by the division of $(1 - T)$ into a before-tax cash outflow so they can be added to other before-tax cash outflows. The variability of cash flows (the cash flow ratio) provides a clue as to how much higher than 1 a fixed-charge coverage ratio should be.

The cash-flow-to-debt ratio is a variant of the fixed-charge coverage ratio. It measures the cash flow available for debt service in proportion to the debt principal being serviced and can be compared to the interest rate on the debt. If this ratio is equal to the interest rate on the debt, the applicant's cash flows are just sufficient to pay the required interest on the debt principal. The more the ratio exceeds the interest rate on the debt, the larger is the debt-service cushion.

[4] Another version adds to the denominator investments for replacing equipment that is needed for the applicant to remain in business.

[5] *Sinking funds* are required periodic payments into a fund that is used to retire the principal amounts on bonds outstanding.

Profitability Ratios

$$\text{Gross margin} = \frac{\text{Gross profit}}{\text{Sales}} = \frac{4,175}{12,430} = 33.59\%$$

$$\text{Operating profit margin} = \frac{\text{Operating profit}}{\text{Sales}} = \frac{684}{12,430} = 5.50\%$$

$$\text{Return on assets} = \frac{\text{EAT}}{\text{Total assests}} = \frac{339}{4,430} = 7.65\%$$

$$\text{Return on equity} = \frac{\text{EAT}}{\text{Total equity}} = \frac{339}{1,475} = 22.98\%$$

$$\text{Dividend payout} = \frac{\text{Dividends}}{\text{EAT}} = \frac{50}{339} = 14.75\%$$

EAT
Earnings after taxes.

where **EAT** represents earnings after taxes, or net income.

For all but the dividend payout ratio, the higher the value of the ratio, the higher the profitability of the firm. The dividend payout ratio measures how much of the profit is retained in the firm versus paid out to the stockholders as dividends. The lower the dividend payout ratio, the more profits (percentage wise) are retained in the firm. A profitable firm that retains its earnings increases its level of equity capital as well as its creditworthiness. The analyst should be concerned about large swings in profitability as well as profit trends.[6]

Cautions with Ratio Analysis. While ratio analysis provides useful information about a loan applicant's financial condition, it also has limitations that require care and judgment in its use. For example, many firms operate in more than one industry. For these companies, it is difficult to construct a meaningful set of industry averages. Further, different accounting practices can distort industry comparisons. For example, the loan applicant may be using straight line depreciation for its fixed assets, while industry competitors are using an accelerated cost recovery method (ACRS), which causes depreciation to accrue quickly. ACRS methods will cause fixed asset values to be written down quickly and leave their book value lower than straight line depreciation. This can distort the analysis of fixed asset-based ratios. In addition, it is sometimes difficult to generalize whether a particular value for a ratio is good or bad. For example, a high current ratio can be a sign of a highly liquid firm or one that holds excessive cash. FI loan officers need to be aware of the problems with ratio analysis in analyzing the loan applicant's financial statements and making a loan decision.

Common-Size Analysis and Growth Rates

In addition to the ratios listed above, an analyst can compute sets of ratios by dividing all income statement amounts by total sales revenue and all balance sheet amounts by total assets. These calculations yield common-size financial statements that can be used to identify changes in corporate performance. Year-to-year growth rates also give useful ratios for identifying trends. Common-size financial statements may provide quantitative clues as to the direction that the firm is moving and that the analysis should take.

[6] *Market value ratios* such as the growth rate in the share price, price–earnings ratio, and market-to-book ratio are also valuable indicators if they are available. For a mid-market corporation, however, they are probably unavailable since the debt and equity claims of most mid-market corporations are not publicly traded. The account officer may find it informative to substitute a similar listed firm (a comparability test).

Having reviewed the financial and other conditions of the applicant, the FI can include loan covenants as a part of the loan agreement. Loan covenants reduce the risk of the loan to the lender. They can include a variety of conditions such as maintenance of various ratios at or within stated ranges, key-person insurance policies on employees critical to the success of the project funded by the loan, and so on.

Following Approval

The credit process does not end when the applicant signs the loan agreement. As is the case for mortgage loans, before allowing a drawdown (the actual release of the funds to the borrower) of a mid-market credit, the account officer must make sure that **conditions precedent** have been cleared. Conditions precedent are those conditions specified in the credit agreement or terms sheet for a credit that must be fulfilled before drawdowns are permitted. These include various title searches, perfecting of collateral, and the like. Following drawdown, the credit must be monitored throughout the loan's life to ensure that the borrower is living up to its commitments and to detect any deterioration in the borrower's creditworthiness so as to protect the FI's interest in the loan being repaid in full with the promised interest return.

conditions precedent
Those conditions specified in the credit agreement or terms sheet for a credit that must be fulfilled before drawings are permitted.

Typically, the borrower's credit needs will change from time to time. A growing company has an expanding need for credit. A company moving into the international arena needs foreign exchange. A contractor may have periodic guarantee requests. Even if the credit agreements being offered do not change, a corporation's credit needs are usually reviewed on an annual basis to ensure that they comply with the terms of the original credit agreement. FIs typically wish to maintain close contact with customers to meet their ongoing financial service requirements—both credit and noncredit—so that the relationship will develop into a permanent, mutually beneficial one (the customer relationship effect).