MBF 748

ADVANCED EVALUATION METHOD

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MODULE 1

UNIT 1 TIME VALUE OF MONEY

CONTENTS

1.0 INTRODUCTION

In most of our financial discussions, we treated money in absolute terms. We did not consider time when computing the value of money. If a firm borrows N5,000,000 (five million naira only) from a bank in January 2007 to finance the acquisition of plant and machinery and repays the money in December 2007, a lot of people may not see the difference between the N5,000,000 in January 2007 and the other N5,000,000 in December 2007. But in real terms, the two sums of money do not have the same value because of what is known as the time value of money. In this Unit, we shall discuss the concept of the time value of money which is very important. The applications of the time value of money will feature repeatedly throughout this course.

Understanding the concept will be useful to you as you go along in your study.

2.0OBJECTIVES

By the end of this unit, you should be able to:

- Discuss the concept of the time value of money
- Explain the methods used to adjust the impact of time on money

3.0MAIN CONTENT

3.1 Time Value of Money

In practical terms, time usually separates the firm's receipt of cash and its disbursement of cash in its day to day operations.

Expenditures and other movements of cash out of the firm are usually termed outflows of cash while revenues and other movements of cash into the firm are termed inflows. Outflows and inflows are separated usually by time. But it is important to recognize the fact that the inflows that a firm expects to receive and the outflows should be logically comparable especially if they are separated by time. To explain the time value of money, we shall proceed by discussing the time preference for money.

3.1.1 Time Preference for Money

A rational person who is offered to collect the sum of N1,000,000 in January 2007 or December 2007 would prefer to collect the money in January 2007 instead of December 2007. There are many reasons for this namely:

The future is uncertain and anything can happen to cancel the opportunity of receiving the money later.

The desire to spend now instead of later.

The money could be invested immediately to earn interest. Most people know profitable avenues to invest money.

This attitude of preferring money now instead of in the future is referred to as an individual's time preference for money.

So we shall define "time preference for money" as an individual's preference for possession of a given sum of money now rather than at a future date.

The concept of the time preference for money does not apply only to individuals. It also applies to the firm. Firms are usually supposed to be rational investors and therefore properly recognize time preference for money. Ordinarily, a firm recognizes the fact that a future cash flow involves a lot of risks which arise from the market place.

3.1.2 The Time Preference Rate

We have recognized the fact that the same sum of money separated by time may not have the same value for a rational investor. If the time value of money exists, is there any way that it can be expressed? Yes. The time preference for money is usually expressed by an interest rate. This interest rate is usually known as the time preference or discount rate. This discount rate is very important in investment analysis and evaluation. Different individuals or firms will have different discount rates. But in all, the discount rate is expressing the same thing.

For example, if an individual has a time preference rate of 20%, it means that he can forgo the opportunity of collecting N1,000,000 now if he is offered N1,200,000 a year later. It means he is going to be satisfied by earning 20% interest on his investment. Also firms have their own time preference rates which assist them in taking their investment decisions. As we shall see in subsequent units, the discount rate is a very crucial rate which cannot be glossed over in financial evaluations.

SELF-ASSESSMENT EXERCISE 1

How is the time preference for money expressed?

3.2 Compound Value

Consider an individual called Peter Pan who on 1st January, 2007 deposits the sum of N1,000,000 in a savings account in Diamond bank at an interest rate of 10% per annum. By 31st December, 2007, the savings deposited with the bank would have earned an interest of N100,000 (one hundred thousand naira only). You will recall that in financial analysis, interest 1 = P x T x R

Where

P = Principal

T = Time

R = Interest rate

By the end of December 2007, the value of Peter Pan's money in his savings account will be N1,000,000 + N100,000 = N1,100,000. On 1st January 2008, Peter Pan may decide to reinvest his money (N1,100,000) in the same savings account in his bank. This sum will grow at the interest rate of 10% per annum. By 31st December 2008, the money would have grown to N1,210,000 (one million two hundred and ten thousand naira only).

So generally if the investor (in this case Peter Pan) insists on earnings interest on his original sum N1,000,000 and also further interest on his interest of N100,000 earned for the year 2007, the concept is known as compound interest. Having understood the concept of compound interest, we will go a step further to examine the various forms that compound interest may take.

3.2.1 Compound Value of a Lump Sum of Money

Let P = Lump sum placed in a savings account

r = Interest rate in decimal points e.g. 0.100

n = no of years the sum is placed then
I (interest) = P x r x n

At the end of one year, the total sum of the previous lump sum can now be called A_1.

A_1 = P + 1 (principal + Interest)

= P + Pr n, where n = 1

A_1 = P (1 + r)

In year 2, Interest 1 = A_1. x r
= A_1 . r

The . Sum at the end of year 2 now called A_2 is

A_2 = A_1 + A_1 . r (the Interest Component)

A_2 = A_1 + A_1 . r = A_1 (1 + r)

If we continue the process to n years,

We can now write generally that:

$An = P(1 + r)^n$

So generally, the equation for calculating the future value of a lump sum may be written as follows:

$An = P(1 + r)^n$

Worked Example

A sum of N1000 is placed in a savings account that promises 10% interest annually.

What will be the compound value at the end of 2 years.

Note that 10% interest rate is also 0.10

Solution

Interest in year 1 can be derived as follows:

1 = P x r x n

= ₦1000 x 0.10 x 1

= ₦100

A_1 (amount at the end of year 1) = ₦1000 + ₦100

= ₦1,100

The principal sum at the beginning of year 2 is ₦1,100

Interest in year 2 = A1 . r

= ₦1,100 x .10

= ₦110

A_2 (amount at end of year 2) = $A_1 + A_1 . r$

= ₦1,100 + ₦110

= ₦1,210

Using the formula, the compound value of the same amount can be computed by

$A_2 = P(1 + r)^2$

= ₦1,000 $(1 + 0.10)^2$

= ₦1,000 (1.21)
= ₦1,210

If you have followed this discussion very closely you will realize that if the number of years that a sum is invested is very long, the computation becomes rather difficult.

The solution can be obtained by the use of compound value tables. Generally, to compute compound value, the principal sum (Lump Sum) is multiplied by the appropriate compounding factor.

Worked Example

A man deposits N50, 000 in a bank deposit paying 10% per annum for a period of 5 years. What is the compound value of the sum of the end of 5 years?

Solution

The first step is to determine the compounding factor from the table. Since the interest rate is 10%, open to the page for 10% under compound factor.

In the year column, the appropriate year is 5. The corresponding compound value factor is 1.610510.

Multiply the principal sum by the compound value factor i.e. ₦50,000 x 1.610510

= ₦80,525.50

3.2.2 Compound Value of an Annuity

We have discussed the compound value of a lump sum of money. We will now discuss the compound value of an annuity.

An annuity is a sequence of periodic equal payments. Ordinarily an annuity may be paid at the end of say each year. In investments, interests are also paid on the annuities.

The difference between a lump sum and an annuity is that while a lump sum is one sum that increases with interest and time, and annuity is paid at the end of a period possibly a year.

Example

On 31st December of each year, International Manufacturing Company Limited pays in the sum of ₦5,000 into an Investment fund yielding 10% interest annually for a period of 5 years.
How much is the worth of the annuity?

Solution

You will need to use the compound value of an annuity table to get the answer. From the compound value of an annuity table, you get the compounding factor to be 6.105100.

The sum of the annuity will be ₦5,000 x 6.105100

= ₦30,525.50

The interpretation of this is that if you invest ₦5000 annually for 5 years at an interest rate of 10%, the sum of money will grow to ₦30,525.50 at the end of five years.

3.3 Present Value

When we treated compound value, we arrived at a technique for estimating any amount of cash into its future value. In the present value technique it is the opposite. The central question to be asked is "What is the present value of a future sum of money given an investors time preference rate?

The present value of a future cash inflow or outflow is defined as the amount of current cash that is of equivalent desirability, to the decision maker, to a specified amount of cash to be received or paid at a future date.

3.3.1 Present Value of a Lump Sum

We have seen so far in our discussions that cash inflows and outflows that are separated by time can be logically comparable. They are comparable only if there is a time preference rate or interest rate being used by the decision maker or investor.

By implication, if a person is promised a sum of money in the future, it must also have a present value for the person today.

We shall define present value of any future cash inflow or outflow as the amount of present cash that has an equivalent value with a sum to be received at a future date or spent in the future.

You will recall that when treating compound value, we said that the compound value of a lump sum of money is usually expressed by the equation:

$A_n = P(1 + r)^n$

Substituting for P becomes

$$P = \frac{An}{(1 + r)^n}$$

P is the present value of an amount A_n to be received in n period.

Generally we can state thus:

To get the present value of any future amount, all that you need to do is to multiply the future amount by the discount factor.

You will need to refer to a discount factor table to be able to do this.

Example

A sum of ₦1000 is to be received by Mr. Bola in 5 years time. The interest rate or discount rate is 10%.

What is the present value of the ₦1000 that will be received in 5 years time?

Solution

The first step is to get the correct discount factor. The correct discount factor can be got from the discount table. Open the section on 10% in the table. You will notice that the appropriate discount factor is .620921 (from the year 5 column).

Present value = ₦1,000 x . 620921

= ₦620.921.

The Interpretation given to this result is that ₦620.921 today is the same as ₦1000 to be received in 5 years time if the interest rate is 10% per annum.

Generally thus, to estimate present value of a lump sum, the basic technique is to multiple the future sum by the discount factor.

You can now write thus:

PV (present value) = future sum x discount factor.

3.3.2 Present Value of an Annuity

We have just discussed the present value of a lump sum of money. In that same way, we could equally discuss the present value of an annuity.

You will recall that we have earlier defined an annuity to be a sequence of periodic equal payments. Since the payments are made at the end of each period, it is possible to compute the present value of an annuity.

Consider an investor who receives a series of annuities A_1 in different years.

In year 1, he receives an annuity.
In year 2, he receives an annuity.

We can write that the present value of all the annuities can be estimated thus.

Year1. Present value of annuity = $\frac{A}{1+ r}$

Year2. Present value of annuity = $\frac{A}{(1+r)^2}$

Year3. Present value of annuity = $\frac{A}{(1+r)^3}$

If we add up all the present values, we will get the total present value of all the annuities.

However you will realize that if the number of years involved is very large, then the calculation of the present value of an annuity becomes rather difficult and cumbersome.

The computation of the present value of an annuity can be made easier with the use of an appropriate table known as the present worth of an annuity factor table.

Example

At the end of 31st December of each year Alhaji Bashir deposits N500 into his bank savings account for a period to cover 15 years. The interest rate is 8% per annum.
What is the present value of the annuity?

Solution

The first step is to get the correct present worth of an annuity factor. From the table, the factor is 8.559479.

Present Value of annuity = ₦500 x 8.559479

= ₦4,279.7395

SELF-ASSESSMENT EXERCISE 2

Laraba is 25 years old. How much should she invest each year so that by the age of 40, she would have the sum of N100,000 in her savings account in the bank. The interest rate is 10% per annum.

3.3.3 Present Value of a Perpetual Annuity

When we discussed the present value of an annuity, we did attach a time frame. However, there are situations where annuities are expected to run for ever.

When a series of constant periodic sum (annuities) is expected to be go on perpetually (forever), the perpetual constant periodic sum is called a **perpetuity.**

Let A = Perpetual Sum of money

r = Interest rate

Then P (Present value of a perpetuity) = $\frac{A}{r}$

Example

Harry expects to receive a perpetual sum of N500 annually from his investment in shares. What is the present value of this perpetuity if his time preference or discount rate is 10%.

Solution

The present value of the perpetuity can be determined thus

$$P = \frac{₦\ 500}{r \text{ or } 0.10}$$

P = N5000

The present value of the perpetuity is ₦5000.

3.3.4 Sinking Funds

Most often, it is very difficult to raise money at very short notice. And so, most forward looking firms plan their investments so that acquisition of much needed equipment will not be problematic. Such firms keep money aside periodically to purchase or replace equipment.

When such a fund is created, it is called a sinking fund. Also when a country borrows money from other countries, it is fair to create a sinking fund to accumulate the value of the principal loan amount and interest as at the target date of repayment.

Example of Sinking Fund

Master Ebo is 8 years old. In the next 10 years, he will enroll at the University of Ibadan to read medicine. His father intends to save ₦250,000 for his University education by investing in an industrial stock yielding 10% interest.

How much should Ebo's father invest annually so that he will be able to get ₦250,000 for his son's education in the next 10 years.

Solution

The most important step is to determine the sinking fund factor from the table. From the sinking factor table, the appropriate sinking fund factor is 0.062745.

N250,000	x 0.062745	=	N15,686.25
Sum required for master Ebo's education	Sinking fund factor for 10 years at 10%		money to be invested annually by Ebo's father.

ANSWER TO SELF-ASSESSMENT EXERCISE

1. The time preference for money is usually expressed by an interest rate. This interest rate is usually known as the time preference or discount rate. The discount rate varies between Individuals.

2. The difference between 40 years and 25 years is 15 years. The future sum Laraba expects is ₦100,000. Let the amount she will invest annually be A

₦100,000 = A x Compound value of annuity at 10% for 15 yrs

₦100,000 = A x 31.772

$$A = \frac{₦100,000}{31.772}$$

A = ₦3147.43.

So Laraba will need to invest ₦3147.43 annually for 15 years so as to get ₦100, 000 by the time her age will be 40 years.

4.0 CONCLUSION

In this first unit, we have discussed fully the concept of time value of money which is very crucial in our study. We also looked at time preference for money. We treated compound values and also annuities. Finally, we discussed sinking funds.

5.0 SUMMARY

This unit treats the time value of money, time preference for money, compound value of a lump sum of money, compound value of an annuity, present values of an annuity and perpetuities.

All these provide us with the necessary background for further discussions. Now that the background has been built, in the next unit, we shall discuss Basic Valuation Models

6.0 TUTOR-MARKED ASSIGNMENT

Why is the consideration of time important in financial decision making? How can time be adjusted?

7.0 REFERENCES/FURTHER READINGS

Leon, Ikpe (1999). *Project Analysis and Evaluation*, Impressed Publishers, Lagos.

Pandey, I.M (2002). *Financial Management*, Vikas Publishing House, PVT Ltd, 8th Edition.

UNIT 2 BASIC VALUATION MODELS

CONTENTS

1.0 INTRODUCTION

In the last unit, we discussed the concept of the time value of money which we said was a very important foundation for our study. In this Unit, we shall improve on the foundation and discuss basic valuation models. Valuation models are very important. They provide us with the basic models with which we will carry out our advanced evaluation methods.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- Explain the concept of value
- Discuss valuation models.

3.0 MAIN CONTENT

3.1 Basic Valuation Models

Let us begin our discussion by taking a look at the financial objective of the firm. It is to be agreed that the primary objective of a firm is to be in business but then profitably. The firm is expected to remain profitable but the financial objective of the firm is to maximize the market value per share. This is a departure from the profit maximization objective of the firm as canvassed by earlier writers. Because of our interest in evaluating firms and their share values, we need to develop a model that

will enable us evaluate the value of the shares of a firm. This will help us to evaluate the value of the firm.

We shall start our discussion by identifying those variables which influence the value of the shares of a firm.

Truly speaking, the value of a firm depends on the following:

- expected returns as measured by net cash flows
- the risk associated with the cash flows

The expected return- as measured by the net cash flow is very important. The firm engages in business and incurs expenditures. Also, it generates revenues. The difference between the revenues and expenditures in terms of profit help us in evaluating the value of a firm. If revenues exceed expenditures, then the firm will show a profit. But on the other hand, if expenditures exceed revenues, the firm will post a loss with the attendant implications.

And since we are discussing value, you will realize that most investors are very rational and before they invest, they will want to study a firm's profit history. Firms that show healthy profits and good net cash flows are likely to attract investors while those that show poor operating profit figures and poor net cash flows will not attract investors.

Secondly, there is an element of risk when considering the expected returns of a firm. A firm's cash flow is considered risky if the amount and timing of its cash flows deviate much from expected values.

If we add the concept of risk and that of the expected return, we have what is known as the risk – return character of the firm.

Generally we can state that "the amount of a firm's returns and the risk that they will differ from expected returns combine to form a fundamental basis of value".

The success or profitability of a firm will ultimately depend on its financial decisions. The financial decisions of the firm are broken into three namely:

- the firm's investment decisions
- the firm's financing decisions
- the firm's dividend decisions

Let r = firm's return characters

K = firm's risk characters

I = the firm's investment decisions
F = the firm's financing decisions

D = the firm's dividend decision

Then V = f (r, K)
= g (I, F, D)

Where V is the value of the firm, r = the firms return characters, K = the firm's risk character, I = the firms Investment decisions, F = the firm's financing decisions and D = the firm's dividend decision.

We shall thus state categorically that the value of a firm depends on its return and risk characters. The return and risk characters in turn are dependent on the firm's financing, investment and dividend decisions.

The model we have thus built takes into cognisance all the key decisions of the firm and monitors how directly or indirectly they influence the value of a firm.

We have thus built a valuation model but before we proceed further in our discussion, let us discuss the concepts of value which are very crucial to us as evaluators.

3.1.1 Concept of Value

All along, we have liberally used the word value as if we had a proper working definition of it. In order not to complicate matters, you will agree that there are many types of value and it is our intention to discuss them so that each time we mention them, we are sure of their meaning. Let us take them in turn.

0Present Value

In the last unit (unit 1) we discussed present value. We agreed that when cash flows are discounted at the required rate of return, we get the present value of the asset under discussion. In the type of rigorous analysis we are undertaking as evaluation experts, it is this present value that is important or relevant. It is like saying that the present value of an asset is the true value of the asset or security under consideration.

A major point that you need to understand and which is very important is that present value cannot be determined or estimated without reference to the required rate of return.

In all financial decision making involving present values and compound values, there is the need to know what the required rate of return is. Every individual while investing in an asset or security has a rate of interest in mind. So also do firms.

We shall now go ahead to define the required rate of return as the minimum rate of return expected by investors to part with their investable funds – i.e. to buy assets or securities.

Two individuals may not have the same required rates of returns. Even amongst firms, the required rates of return differ and they reflect the firms understanding of the market and the type of risks they are willing to accept in their normal business undertakings.

Another key point you need to know about the required rate of return is that it consists of two components namely:

- a risk-free interest rate usually associated with government securities

- a risk-premium rate.

Therefore, required rate of return = risk free interest rate + risk premium rate.

Accounting or Book Value

The accounting or book value of a firm's assets and liabilities is usually found by reading the financial statements usually prepared in line with acceptable accounting standards.

A key point you need to understand is that book or accounting values of an asset do not necessarily reflect their true worth. For example, when an asset is used by a firm, the accountant reduces its value annually through depreciation. For example in Nigeria today, when a car is used by a firm in the normal course of business, it is usually written off after four (4) years. What this means is that in the books of the firm, the value of the car will be almost zero. But in real life, you know that a car that is 4 years old is still a new one.

Liquidation Value

When the firm decides to go out of business on its own or is forced to do so by changing business circumstances, it will dispose of its assets. The amount that will be realized when the assets are sold off is usually

known as the liquidation value. In such a situation, the assets being disposed will not be sold at their current true values. They may be sold at distressed prices.
In financial evaluation, liquidation analysis is used by analysts to estimate the future value of a firm with particular reference to a time frame.

For example, a banker wants to appraise a 5 year loan for a manufacturing concern. The banker in his analysis may decide to appraise the loan based on liquidation analysis. In this case the banker will assume that at the end of 5 years, the manufacturing concern will close shop and all of its assets sold off.

3.1.2 Valuation of Bonds or Debentures

In the last section, we discussed the concept of value. We shall now proceed to discuss the valuation of a bond or debenture. A bond is a long term debt instrument.

If a bond is issued with a definite maturity date, calculation of the value is relatively easy.

The formula below is used in calculating the value of a bond or debenture:

$$V = \frac{R_1}{(1+ kd)} + \frac{R_2}{(1 + kd)} + \ldots + \frac{Rn}{(1 + kd)^n} + \frac{Mn}{(1 + kd)^n}$$

Where

V = value of the bond or debenture
R = annual interest
Kd = required rate of return (%)
M = Maturity value
n = number of years to maturity

Example

An investment company is considering the purchase of a 3 yr ₦1,000,000 value bond bearing a coupon rate of interest of 8%. The Investment company's required rate of return is 10%. How much will the company be willing to pay now to purchase the bond?

Solution

$$\text{Value of bond, } V = \frac{₦80,000}{(1.10)} + \frac{₦80,000}{(1.10)^2} + \frac{₦80,000}{(1.10)^3} + \frac{₦1,000,000}{(1.10)^3}$$

If you note well, you will realize that the ₦80,000 is an annuity for 3 years. The ₦1,000,000 will be received as a lump sum at the end of 3 years.

So we shall treat the ₦80,000 as an annuity for 3 years. You will need the annuity table to solve this.

Using the present value tables, the present value of the bond is:

V = ₦80,000 x 2.487 + ₦1,000,000 x 0.751

= ₦198,960 + ₦751,000

= ₦949, 960.

The value of the bond is ₦949,960

3.1.3 Yield on Bond or Debenture

When we were solving for the value of a bond, we indicated that Kd = the required rate of return. We assumed that it was given. However, the realistic rate to be used to discount the bond is the current market yield available on bonds with similar risk profiles.

Let A = Annual interest on a bond
P = Market price of the bond

then, Y (yield on bond) = $\frac{\text{Annual Interest}}{\text{Market price of the bond}}$

SELF-ASSESSMENT EXERCISE

The coupon rate of interest on a ₦1,000,000 par value perpetual bond is 10%. What is its current yield if the bond's market prince is ₦800,000.

3.1.4 Valuation of Equity Shares

In our earlier section, we treated the valuation of bonds. The valuation was very straight forward and therefore relatively easy. But the valuation of equity shares is not as easy as that.

There are two problems which make the valuation of equity shares rather difficult:

The earnings of the firm and the fact that they are uncertain is a matter of concern. They cannot be predicted with any measure of certainty.

0The shareholders of the firm are not static in their expectations of dividends from the earnings of the firm. They are in constant touch with the market and therefore will try to compare the earnings of different firms. These two key problems make valuation of equity shares difficult.

Generally speaking, the value of a share is a function of the cash inflows expected by the investors and the attendant risks associated with the cash flows. In the first place therefore, the amount of the cash flow is important. Secondly, the risk associated with the cash flow is equally important. The risk associated with a firm's cash flow is the deviations from the expected cash flows. The shareholder in a firm expects dividends and also the cash when a share is sold. If the value of a share has appreciated, then the shareholder is entitled to capital gains.

We can rightly state that the value of a firm's share is the present value of its future stream of dividends.

Assume that an investor buys a share to hold for one year and then sell it. The value of the share is the present value of dividend and the price expected from the sale of the price.

We can write thus:

$$P_o = \frac{D_1}{(1+K)} + \frac{P_1}{(1+K)}$$

Where

Po = price of the share today

D_1 = dividend per share at end of 1st year

P_1 = price per share at the end of the first year.

K = required rate of return

Generally, if dividends are expected to grow, we can write the rate of return on equity as:

$$K_e = \frac{D_1}{P_1} + g$$

Where

Ke = expected rate of return
D_1 = Dividends in year 1
P_1 = Price of the share
g = growth rate in share prices.

ANSWER TO SELF-ASSESSMENT EXERCISE

The current yield of the bond can be calculated as follows:

$$Y \text{ (yield)} = \frac{\text{Annual Interest}}{\text{Market price of the bond}}$$

$$Y = \frac{₦100,000}{₦800,000}$$

The yield is = 12 . 5%.

4.0 CONCLUSION

In this unit, we have discussed basic valuation models. We discussed the concept of value. We also discussed present value, accounting or book value and liquidation value. Valuation of bonds and equity shares were equally discussed. All these helped to consolidate our knowledge of valuation.

5.0 SUMMARY

This unit treats basic valuation models. It is a stepping stone towards a more rigorous study which we will undertake in subsequent units. We have tried to look at the key issues in valuation of both shares and bonds.

In the next unit, we shall discuss capital budgeting.

6.0 TUTOR-MARKED ASSIGNMENT

Explain the different concepts of valuation

7.0 REFERENCES/FURTHER READINGS

Leon, Ikpe (1999). *Project Analysis and Evaluation*, Impressed Publishers, Lagos.

UNIT 3 CAPITAL BUDGETING

CONTENTS

1.0 INTRODUCTION

In unit 2, we discussed basic valuation models which we said were very important. In this unit, we shall discuss capital budgeting. Capital budgeting is a very major topic because the capital budgeting decisions are in the frontline of company decision making. The capital budgeting decision involves the firm's decision to commit funds in assets. Some of the commitments are not easily reversible.

The Investment decisions of the firm influence the earnings of the firm and also its return-risk characters. The earnings of the firm also affect the values of a firm's shares and subsequently the wealth of shareholders.

It is because of all these that we consider the discussion on capital budgeting very necessary in such a class as yours.

2.0 OBJECTIVES

By the end of this unit you should be able to:

- Discuss Capital Budgeting
- Describe the Capital budgeting process

3.0 MAIN CONTENT

3.1 Capital Budgeting

A major function of the firm is the allocation of resources as it engages in its activities. The way the firm allocates its resources affects its earnings and also its risk characters.

The effect of the investment decisions of the firm will not be felt for one year only. It will be felt over a period of years. Again, investment decisions are mainly irreversible. For example, when a firm invests in the construction of a brewery, it will not be possible for it to easily disinvest.

So generally, you will see that the investment decisions of the firm affect its earnings, its value and the wealth of shareholders.

Because of the importance of capital budgeting, we shall discuss it in detail so that we can understand how best to make wise investment decisions. Having said this, we shall now proceed to discuss the nature of investment decisions.

3.1.1 The Investment Decisions of the Firm.

The investment decisions of the firm are what we shall define as the capital budgeting decisions. The capital budgeting decisions involve the planned commitment of resources into activities with a view to earning revenues.

Let us briefly discuss the nature of some investment decisions of the firm namely:

Initiation of a new project

Consider a firm that decides to set up a sachet water manufacturing plant. It will construct the factory building, purchase and install the necessary machinery/equipment, recruit the necessary staff and commence the actual production of the sachet water. This is a classic example of what is called a new project. In the literature some analysts refer to a new project as a start-up and in some cases they are called green projects. New projects create new products, new wealth and improve on the general welfare of the larger society especially if they are well managed.

Mechanisation of a process

At times, firms invest funds in the mechanization of their manufacturing processes. For example, a soap manufacturing firm which uses the cold process of soap manufacture might decide to mechanise its processes by investing in a mechanized soap plant that will cost ₦1,000,000. However, the soap plant will save operating expenses of ₦50,000 for 10 years.

We shall call the investment a decision to invest ₦1,000,000 with the aim of saving ₦50,000 for 10 years. You will observe that the total saving will be ₦500,000 for those 10 years. The key question is whether or not the firm should undertake the Investment.

Choosing between alternative machines

At times the Investment decisions of the firm center on choosing between alternative machines. Consider a firm that has the option to choose between two machines namely:

- An injection moulding machine that costs ₦4,000,000, has an installed capacity of 2,000 bottle caps per hour but has annual operating expenses of ₦500,000.

- An injection moulding machine costing ₦2,000,000, has an installed capacity of 1,000 bottles per hour but has annual operating expenses of ₦700,000.

The key capital budgeting decision centers on the two options to be taken.

Make or buy decisions

A car manufacturing plant is deciding whether to manufacture the car's speedometer or to purchase from a reputable manufacturer of car speedometers.

If for example, the speedometer manufacturing plant will cost N10,000,000 to install but will reduce the Unit price of a speedometer by N1000, the investment proposal involves a decision on whether to commit the sum of N10,000,000 to achieve a Unit price cut of N1000 per speedometer. The answer to this question will depend on many other things or considerations.

Expanding the business

A yoghurt manufacturing plant wants to increase its production capacity.

To increase this capacity it will need to install new machinery and equipment costing ₦20,000,000. The new equipment will increase annual revenues by ₦2,000,000 but increase operating expenses by N1,200,000 for the next 15 years.

In this case, this is a decision on whether to spend N20,000,000 today to get a net annual income of N800,000 for the next 15 years.

All the examples we have discussed are real life situations which you as evaluators will find yourselves in.

If you pause a while you can summarize that the capital budgeting decisions of the firm will involve the decision to initiate a new project, the mechanization of a process, choosing between alternative machines, make or buy decisions and expanding the business.

Such is the nature of the capital budgeting decision. We need to point out clearly that the decisions on current assets do not constitute capital budgeting decisions.

The decisions on how to manage the current assets of the firm fall into the area of learning called working capital management.

To conclude, we shall stress the importance of capital budgeting decisions. They affect the wealth of the firm. If the capital budgeting decisions of the firm turn out to be profitable, then the firm's wealth will increase and obviously the shareholders wealth will be maximized.

Also we shall repeat the fact that capital budgeting decisions have long term implications for the firm. The decisions that a firm takes today will influence its value for the next twenty or thirty years.

Again, we stressed that capital budgeting decisions involve large scale commitment of scarce resources. If the resources required for capital budgeting are not available inside the firm, then the firm will need to raise money externally and this becomes a financing decision of the firm.

We must also add for your careful understanding that capital budgeting decisions are one of the most difficult decisions to make in the firm. They are difficult to make because they involve assessments of future cash flows.

As you are aware, assessment of the future is very uncertain because of the existence of risks in the market place and the general operating macro environment.

Changes in government policies affect the firm either positively or negatively. Changes in technology affect the firm in a number of ways. They may lead to firms modernizing their equipment.

The Capital Budgeting Process

In the last section, we spent quite some time discussing the concept of capital budgeting which we agreed was a very important topic in our quest for understanding the evaluation methods. And having done that, we shall now focus our attention on the capital budgeting process. The capital budgeting process involves all the processes involved from the conception of a project to its execution. The various processes constitute what is known as the project cycle.

We discussed the project cycle in another course MBF 739 – Project Evaluation. But for the benefit of all doubts, we will repeat that discussion here at least for purposes of continuity. Our discussion of the project cycle is important as it helps to consolidate our understanding of the capital budgeting process.

The Project Cycle

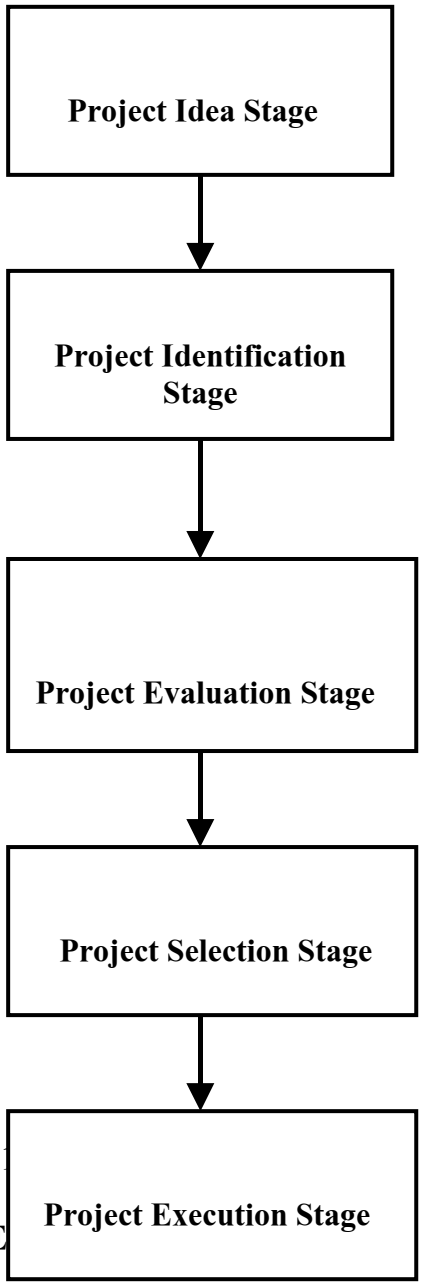


Figure3.

SELF-ASSESSMENT EXE

List the stages of a project cycle.

3.2 The Project Idea Stage

The project idea stage is the first stage of a project cycle. The idea about a project arises from a variety of sources within the internal environment or market place.

New project ideas could originate from within an organization or from outside the organization. If the idea originates from within, it could be from a sales person who has encountered some success or problems with customers while performing his or her functions.

You will also realize that a new project idea could emanate from outside an organization. Coming from outside an organization, it could be requests from existing customers asking for bigger or better products.

New project ideas may fall into any of the following categories:

Proposal to add new products to existing lines

A company with existing product lines may decide to add new products to its existing lines.

Proposal to expand capacity in existing lines

A company may have a proposal to expand capacity to enable it take advantage of enlarged market opportunities.

We need to stress that new project ideas may originate from any level in an organization. A factory cleaner within an organization can come up with a new product idea. Also an executive director in an organization can also generate a new project idea.

3.2.1 Project Identification Stage

After the project idea stage, the next stage is the project identification stage. The project identification stage consolidates the idea stage. Project ideas are not really useful except if they are clearly identified and put down in a systematic manner for further processing.

The idea to introduce a new product into the market may come from a company salesman who is very familiar with the market. At the board room level, the entire organization has to see the project idea properly and clearly identify it as a possible area of business investment. The totality of the new idea will be considered.

3.2.2 Project Evaluation Stage

When a project has been identified, the next step is to evaluate the project. Project evaluation involves the estimation of the benefits and costs of a project. Benefits and costs should be measured in terms of cash flows.
We have to emphasise at this point that the estimation of the cash flows of a project is a very difficult task. It is difficult in the sense that the cash flows to be estimated are future cash flows. For example in the year 2007, we will try to estimate the cash flows for the year 2008.

In a corporate set up, the evaluation of projects should be carried out by a team of experts drawn from the various departments like production, marketing, accounts and administration. The team of experts should be objective in their evaluation of projects.

Alternatively, the evaluation of a project may be contracted out to third parties like consultants. Contracting evaluation of projects to outside parties tends to eliminate bias.

3.2.3 Project Selection Stage

After the project evaluation stage, the next stage is the project selection stage. Faced with an array of projects with different values and worth, there is need to select which projects will be embarked upon. There is no standard procedure for selecting projects as this will differ between firms. The important thing to note is that the project selection function is a top management responsibility which in most cases goes to the board of Directors of an organization. In selecting projects, management usually considers the financial outlays involved and match them with the financial capabilities of the firm. For example, a firm that has only N10,000,000 (ten million naira only) investment funds cannot be considering a new investment that involves a capital outlay of N40,000,000 (forty million naira only) except if it can source money externally like from banks.

3.2.4 Project Execution Stage

The project execution stage is the final stage in the project cycle. After a project has been selected, it moves on to the execution stage. In most organizations, the responsibility for execution of projects is vested on a project management team raised by top management. The function of the team is to ensure that the budget for the project is spent entirely on the project and that the project is completed on schedule.

In an ideal organization, the project management team usually prepares a monthly budget report on projects to top management. This is important for project monitoring and control

SELF-ASSESSMENT EXERCISE 2

List three sources of new project ideas.

3.3 Investment Criteria

We have discussed capital budgeting and the capital budgeting process. The next topic we shall discuss is Investment Criteria. Having

introduced capital budgeting decisions into the picture, we need to develop appraisal methods which we shall use to evaluate or measure the values of projects under consideration. Any appraisal method so developed and chosen should possess the following characteristics.

It should be able to provide the means of distinguishing between acceptable and unacceptable projects in a consistent manner.

It should be able to rank projects according to their values

It should be able to solve the problem of choosing between alternative projects.

It should recognize the time value of money. And that early cash flows are better than later cash flows.

The Investment criteria consist of two broad categories namely the traditional criteria and the discounted cash flow criteria

3.3.1 The Traditional Criteria

The traditional criteria consist mainly of two popular methods namely:

The pay back (or payout) period
The accounting rate of return method

3.3.2 The Discounted Cash Flow Criteria

The discounted cash flow criteria consist mainly of three main and popular methods namely:

The net present value method
Internal rate of return
Profitability index or Benefit – Cost ratio

We shall discuss these investment criteria at a later stage of our study.

ANSWER TO SELF-ASSESSMENT EXERCISE

1. The stages of a project cycle are:

Project idea stage
Project identification stage
Project evaluation stage
Project selection stage
Project execution stage

2. Three Sources of new project ideas are:

   From within the organization
   From outside the organization
   As a result of competition

4.0 CONCLUSION

In this unit, we have discussed capital budgeting. This took us through the investment decisions of the firm. We also discussed the capital budgeting process and introduced the concept of Investment Criteria. With that we closed our discussions.

5.0 SUMMARY

The capital budgeting decisions of the firm are the focus of this unit. And we have seen through our discussions that they are very important as they affect the return-risk characters of the firm. They also influence the value of the firm and consequently the wealth of share holders.
Now that we have understood capital budgeting, we shall be discussing the cost of capital in the next unit.

6.0 TUTOR-MARKED ASSIGNMENT

What are the key steps involved in a capital budgeting process?

7.0 REFERENCES/FURTHER READINGS

Leon, Ikpe (1999). *Project Analysis and Evaluation*, Impressed Publishers, Lagos.

Quirin, G. David, *The Capital Expenditure Decision*, Homewood, Ill: Richard D, Irwin Inc. 1967.

UNIT 4 THE COST OF CAPITAL THEORY

CONTENTS

1.0 INTRODUCTION

In the last unit (Unit 3), we discussed Capital budgeting. We discussed the Investment decisions of the firm. We discussed the capital budgeting process where we discussed the various stages of a project. We discussed Investment Criteria and classified criteria into broad categories namely – the traditional criteria and the discounted cash flow criteria. All these enabled us to understand capital budgeting. In this unit, we shall discuss the cost of capital theory.

2.0 OBJECTIVES

By the end of this unit you should be able to:

- Explain what is meant by the Cost of capital
- Discuss the cost of capital.

3.0 MAIN CONTENT

3.1 The Cost of Capital Theory

In financial decision making, the cost of capital appears to be the most important consideration. The principal reason for knowing what the cost of capital is and how to measure is that it is a very crucial aid in the evaluation of investment proposals. When faced with an investment decision making, the project analyst is faced with two options namely:

Accept the project
Reject the project

We shall start our discussion by stating that the cost of capital is the discount rate that is used in evaluating the desirability of investment projects. In financial evaluation, a project will be accepted if it has a rate of return greater than the cost of capital. And if the rate of return is less than the cost of capital, the project will be rejected.

In a sense, the cost of capital is the minimum rate of return required on an investment project. It is a cut-off rate of return. In a firm the cost of capital is very useful to management. It helps to decide how to finance the firm's investments. Cost of capital also affects the dividend policy and working capital sourcing policy.

We have seen that every investment project has a required rate of return which is at the back of the mind of the investor. That is the rate that the investor wants or expects to earn on the investment. However as we also noted, there is what we know as the cost of capital. It makes sense for us to expect that there is a relationship between the expected rate of return and the cost of capital. Our definition of the cost of capital is in general terms. We shall now proceed to examine the various concepts of the cost of capital.

3.1.1 Historical Cost and Future Cost

In financial decision making, the historical costs are not important. Rather what is important is the future cost. When an investment is to be undertaken, the analyst tries to compare the project's expected cost of funds to finance the project and also the expected rate of return on the investment project. The expected costs are the future costs. Also in designing the capital structure of the firm, the aim is to minimize the future cost of capital and obviously not the historical costs. The only importance of the historical cost in financial decision making is that it helps us to predict or project for future costs. Historical costs enable the analyst to measure the performance of the firm.

3.1.2 Specific Cost and Combined Cost

The first type of cost that we discussed was historical cost and future cost. We shall now discuss the concept of specific cost and combined cost. The cost of each component of capital be it equity, debt or preference shares is known as the component or specific cost of capital. It therefore means that equity capital has its own cost. Also debt capital has its own cost. For example a firm may be faced with a choice of equity capital at a cost of 10% and debt capital at a cost of 16%.

The decision of the firm to use debt in its capital structure adversely affects to a large extent its potential to raise debt at a future rate. Also debt increases the risk of the firm. Also the decision of the firm to use equity in its capital structure enlarges its potential to use debt in the capital structure.

However, the composite or combined cost of capital is an all-inclusive cost of capital from all identified sources in the capital structure. This combined cost is known as the weighted cost of capital.

3.1.3 The Cost of Debt

The cost of debt is relatively easy to calculate. Generally the cost of debt is the rate of return expected by the provider of the debt fund – (the lender). The cost of debt is usually expressed as an interest rate. For example a firm may issue a five year debenture with 10% rate of interest.

$$\text{Before- tax cost of debt, Kd} = \frac{\text{Interest}}{\text{Principal}}$$

Worked Example

A bank lends N200, 000 to Mr. Ojo and at the end of the day earns interest of N18, 000. What is the before- tax cost of debt?

Solution

$$\text{Before- tax cost of debt, Kd} = \frac{\text{N18, 000}}{\text{N200, 000}} = .09 \text{ or } 9\%.$$

If the firm resorts to the use of debt, then it has to ensure that the interest rate on debt (cost of debt) should at least be equal to the rate of return earned by the investment. If the rate of return earned is greater than the cost of debt, then the value of the firm will increase. But if the rate of return earned is lower than the cost of debt, then the value of the firm will decrease.

We should also realize that the interest paid on debt is tax deductible. As a result, we have what is known as the effective cost of debt. This is also known as the after – tax cost of debt.

$$\text{After- tax cost of debt} = \text{Kd}(1- t)$$

Where t = the tax rate.

For example if the before- tax cost of debt is 10% and the tax rate is 50%, then after- tax cost of debt = 10 %(1-0.5) = 5%.

3.1.4 The Cost of Perpetual Debt

We have just discussed the cost of debt. We are now going to discuss another class of debts which are called perpetual bonds. A firm may issue perpetual bonds. It may also have a strategic policy of trying to maintain a constant amount of debt in its capital structure. If the firm repays any debt, it replaces it with new debt. In this case, debt remains a constant feature of its capital structure arrangement. In this situation, the after- tax cost of debt adjusted for tax purposes will be thus:

$$\text{After- tax cost of debt} = \frac{R}{P}(1 - t)$$

Worked Example

A firm issues a 9.5% perpetual bond for N95. The tax rate is 50%. What is the cost of the issue?

Solution

$$\text{After tax – cost of perpetual bond} = \frac{N9.5\ (1\text{-}0.5)}{N95}$$

$$= 0.05 \text{ or } 5\%$$

3.1.5 Cost of Preference Capital

We have just discussed the cost of debt which did not pose any conceptual difficulty. We shall now be discussing the cost of preference capital. The cost of preference capital is not a straight forward issue. As you are aware, debt is legally binding on a firm. But in the case of preference capital, payment of dividend is not legally binding and so it poses difficulty of estimation. Payment of preference dividend is not a charge on the earnings of the firm. It is a distribution of profits to a class of owners who hold preference shares. However, preference capital has a cost.

The cost of preference capital is a function of the dividends expected by the investors. The holders of preference shares expect to be paid dividends but that is when the firm makes profit. By their nature preference shareholders normally will receive dividends before ordinary shareholders. If a firm is well run, dividends on preference capital would be paid regularly.

We now see preference shares as perpetual Securities especially where they are not redeemable. Thus we can write that the cost of preference shares is given by the equation:

$$Kp = \frac{Dp}{P}$$

Where Kp = Cost of preference share
Dp = the fixed dividend
P = Price per preference share.

Worked Example

A firm issues a 10% preference share capital which has no maturity date. The face value per preference share is N1000 but the issue price is N950. What is the cost of the issue?

Solution

The cost of preference capital is given by:

$$Kp = \frac{Dp}{P}$$

$$Kp = \frac{N100}{N950} = .1053 \text{ or } 10.53 \text{ percent.}$$

It has to be noted that the cost of preference capital is not adjusted for taxes. This is because the dividends on preference capital are usually paid after taxes have been paid.

3.1.6 The Cost of Equity Capital

There is this general impression that equity capital has no cost. This is because equity represents the owners' stake in a business. But that is not true. The people who reason that equity has no cost do so because it is not legally binding on a firm to pay dividend.

In a normal situation, dividends are paid after a company makes profit and pays taxes to the Central authorities. What is left after taxation can now be paid out as dividend. Also if a firm makes a loss, then no dividends will be paid.

In real life, shareholders of a company invest their money in the company with the hope of earning dividends or return on their

investments. We should have it at the back of our mind that the market value of a share depends on the dividends expected by the shareholders.
Now back to the cost of equity capital. Equity capital has two main components – external equity or new issue of common shares and retained earnings. Each of them has different costs. We shall now treat them separately.

Cost of external equity (new issues)

External equity means new issues of common shares. And it is this cost that we want to measure.
At any point in time, the management of a firm is responsible to existing shareholders, especially for dividends. So that when a firm is issuing new shares, it has to ensure that the earnings of existing shareholders is not diluted.

The cost of new issues of common shares (external equity) is the minimum rate of return which is required on the new investment, financed by the new issue of common shares that keeps the market value of the share unchanged. The central issue is how to measure this rate of return. We shall do this by examination of the dividend model. The dividend model seeks to explain that the price of a company's shares depends on the return expected by the shareholders.

This return is made up of the expected stream of dividends. Technically speaking, the cost of equity can be stated thus:

$$\text{Cost of equity, } Ke = \frac{Di}{Po} + g$$

Where D_1 = Expected dividend
Po = Current price of the share
g = the growth of the share.

Worked Example

The current price of a share is N45 and the expected dividend per share next year is N4.50. If the dividends are expected to grow at a rate of 5%, calculate the cost of equity.

Solution

$$\text{The cost of equity} = \frac{Di}{Po} + g$$

$$= \frac{N4.5}{N45} + g$$

$$= 0.10 + 0.05$$

$$\text{Cost of equity} = 0.15 \text{ or } 15\%$$

We have measured the cost of external equity. The next thing we shall discuss is the cost of retained earnings.

The Cost of Retained Earnings

The firm does not pay any dividends on retained earnings and for this reason, some people tend to regard retained earnings as cost free. But that is not true.

Retained earning has a cost because it involves an opportunity cost. The opportunity cost of retained earnings is the dividend foregone by the shareholders.

In the analysis, the cost of retained earnings is measured by the equation

$$Ke = \frac{D}{Po} + g$$

Where Ke = cost of retained earnings.

The cost of retained earnings is the return expected by the common shareholders plus the growth in dividends. It is important to note that retained earnings belong to the common shareholders. It represents earnings that were not distributed to them.

3.1.7 Weighted Average Cost of Capital (WACC)

In taking financial decisions, the cost of capital that is used is the weighted average cost of capital (WACC). This is so because in a firm's capital structure, there are so many sources of capital. In a firm's capital structure there will exist equity and debt. It will be wrong to measure the cost of capital from a specific source and then go ahead to describe it as a firm's cost of capital. The cost of capital must be seen from the composite angle.

The composite or overall cost of capital is the weighted average of the costs of various sources of funds. The weights are the proportion of each source of funds in the firm's capital structure.

Computation of Weighted Average Cost of Capital

Worked Example

The following is the capital structure of a firm

Source Of Finance	**Amount (N)**	**Proportion**
Equity share capital	2, 250, 000	45%
Retained Earnings	750, 000	15%
Preference share capital	500, 000	10%
Debt issues	1, 500, 000	30%
Total	5, 000, 000	100%

The firm's after- tax component cost of the various sources of finance are as follows:

Source	**Cost**
Equity share capital	15%
Retained earnings	12%
Preference capital	10%
Debt issues	8%

The weighted average cost of capital can be computed as follows:

Weighted average cost of capital = 11.95 %

SELF-ASSESSMENT EXERCISE

List four sources of capital in a firm's capital structure.

ANSWER TO SELF-ASSESSMENT EXERCISE

The four sources of capital in a firm's capital structure are:

1. Equity (common shares).
2. Preference shares.
3. Retained earnings.
4. Debt.

4.0 CONCLUSION

In this unit, we introduced the cost of capital theory. We discussed the various sources of capital and their specific costs. We discussed the cost of equity capital and cost of retained earnings. We also discussed the cost of preference shares and the cost of debt. All these enabled us to discuss the weighted average cost of capital.

5.0 SUMMARY

This unit treats the cost of capital theory. It tries to examine how the cost of capital is determined for the firm. There are various sources of finance for a firm and each source has a specific cost. But we saw that the cost of capital is seen from a composite perception.

In the next unit, we shall discuss Traditional Investment Criteria.

6.0 TUTOR-MARKED ASSIGNMENT

What do you understand by the cost of equity capital?

7.0 REFERENCES/FURTHER READINGS

Leon, Ikpe (1999). *Project Analysis and Evaluation*, Impressed Publishers, Lagos.

Pandey, I M (2002). *Financial Management*, Vikas Publishing House, PVT Ltd, 8th Edition.

UNIT 5 TRADITIONAL INVESTMENT CRITERIA

CONTENTS

1.0 INTRODUCTION

In the last unit (unit 4), we discussed the cost of capital theory. We discussed historical costs and future costs. We also discussed specific and combined costs. We also examined capital structure components such as equity, preference capital and debt. We then examined their various costs. In this unit, we shall discuss traditional Investment criteria.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- Select traditional Investment Criteria.
- Discuss their application in capital budgeting.

3.0 MAIN CONTENT

3.1 Traditional Investment Criteria

The firm has three main decisions to make – the investment, financing, and dividend decisions.

Our focus in this unit is to discuss the investment decisions of the firm and see how the firm arrives at its accept or reject selection process. The investment decisions of the firm are of various dimensions. It could involve the mechanization of a process, or the replacement of machines. Whatever the investment is, a decision has to be made on whether to

accept or reject an investment. The investment or capital budgeting decisions are very important because:

They involve huge capital outlays.
Investments when made are very difficult to reverse.

Because of all these the firm must develop techniques for evaluating the investment proposals before it.

3.1.1 Investment Criteria

As we earlier discussed, the investment decision is a very important one. Because of its importance, a lot of care should be exercised in selecting the investment proposals before the firm. There should therefore be in place a mechanism, a model or method for selecting which projects to accept and those to reject.

The investment selection criterion to be used must be such that it should possess certain characteristics:

- It should provide the project evaluator the simple means of distinguishing between acceptable and non- acceptable investment projects.

- It should also be able to assist the project evaluator to choose between alternative projects. This is important especially in a situation of capital rationing.

- It should also be able to rank projects in their order of desirability.

- It should also be able to recognize the fact that bigger cash flows are more preferable to smaller ones and also that early cash flows are better than later cash flows.

- It should be applicable to any type of project and no matter however named or described.

In the literature there are many investment criteria in use. The first group of investment criteria in use amongst project evaluators is known as the traditional investment criteria.

There is another group also known as the discounted cash flow criteria or methods. However our focus in this unit is the traditional investment criteria. Let us now treat the subject matter.

3.1.2 Pay back Period

The pay back period is one of the earliest and simplest methods used in evaluation of investment proposals. Apart from the fact that it is simple, it is also popular amongst investment analysts.

The pay back period is defined as the number of years required to recover the original cash outlay invested in a project.

In a simple situation, if a project generates constant annual cash inflows, the pay back period can be computed thus:

$$\text{Pay back period} = \frac{\text{Cash outlay (investment)}}{\text{Annual Cash Inflow.}}$$

Worked Example

A community hospital project requires an outlay of N5, 000,000 and yields annual cash inflow of N1, 000,000 for the next ten years. Calculate the pay back period.

Solution

The pay back period for the hospital project is:

$$\text{Pay back period} = \frac{\text{N5, 000, 000}}{\text{N1, 000, 000}} = 5 \text{ years.}$$

The example of the hospital project which we used is a simple and straight forward one. In reality, cash inflows are never constant. Cash inflows do not follow any regular pattern.

In a situation of irregular and uneven cash inflows, the pay back period can be computed by merely adding up the cash inflows until the total cash inflows become equal to the initial cash outlay (Investment).

We shall demonstrate this by using the example of an urban nursery school.

Worked Example

An urban nursery school requires an outlay of N6, 000, 000 to establish and generates annual cash inflows of N2, 000, 000, N3, 000, 000, N2, 000, 000 and N5, 000, 000 for the next 4 years. Calculate the pay back period.

Solution

If we add up the cash inflows of the first 2 years, N5, 000, 000 of the initial outlay has been recovered remaining N1, 000, 000 to be recovered. In the third year, the cash inflow is N2, 000, 000. If the third year inflows are even, then it will take 6 months to cover the outstanding N1, 000, 000 required to recover the total initial outlay. So the pay back period is 2 $^{1}/_{2}$ years.

The pay back period can be used in two ways. Firstly, it can be used as an accept – or – reject criterion. Secondly, it can be used to rank projects.

Normally the firm should have a maximum pay back period set up by management to guide it in investment decision making. For example, a firm can set 5 years as the maximum pay back period of any investment proposal that it can engage in. What it means is that any project which has a pay back period greater than 5 years will not be accepted. Then too, any project which has a pay back period of less than 5 years will be accepted.

In a sense therefore the use of pay back period as a dividing line in investment decision making makes it to assume importance in the financial analysis.

Secondly, pay back period can be used for the ranking of projects. As a ranking method, pay back period gives highest rank to a project with a shorter pay back period. And so if a firm is faced with the option to choose between two mutually exclusive projects, the project with the shorter pay back period will be accepted.

3.1.3 Evaluation of Pay back Period

Starting from the definition of pay back period, we can see that it is a relatively easy concept to understand. The pay back period is simple and also very easy to compute. It does not involve complex mathematical calculations.
Secondly, pay back period is not costly. It costs less than other evaluation methods because it does not use up a lot of costly analysts' time. It does not also require the assistance of computers to compute pay back period.

However despite the fact that it is simple to use and also cheap in terms of cost, pay back period is not a good investment criterion because it suffers from various obvious limitations.
Firstly, it does not take into account, the cash inflows generated after the pay back period. Once the pay back period of a project has been

reached, no further inquiry will be made on any other cash inflows that may arise.

Secondly, since it does not consider all the cash inflows generated by a project, it is a weak criterion.

Thirdly, it does not consider the pattern of cash inflows. The pattern of cash inflow consists of the magnitude and timing.
In the financial analysis, the pattern of cash inflows is very important as we know fully well that money has a time value.

We have spent quite some time to discuss the short comings of pay back period. Despite all the weaknesses that we have highlighted, pay back period has a place in the minds of project analysts.

Practically, some firms still use pay back period and it guides them in selecting their investment projects given an array of projects. Also analysts are beginning to worry that the future cannot be easily determined and as such, projects with shorter pay back period should appeal to investors and management alike.

Even at that, at the rudimentary level of business, the emphasis of an investor is on early recovery of the investment outlay.
We have discussed the concept of pay back period. Next, we shall discuss another traditional investment criterion known as the Accounting rate of return method.

3.2 Accounting Rate of Return Method

We have just discussed the pay back period as a traditional investment criterion. We are now taking a look at the Accounting rate of return method.

The accounting rate of return (ARR) method uses accounting information to measure the profitability of an investment proposal.

The accounting rate of return is calculated by dividing average income after taxes by the average investment. Average investment is equal to the original investment plus salvage value divided by two (2).

Thus the accounting rate of return is given by the following:

$$ARR = \frac{\text{Average Income}}{\text{Average Investment.}}$$

We shall use a rural poultry farm to demonstrate the computation of the accounting rate of return. But before we do that, we shall first briefly

look at three concepts which will assist us to understand fully the accounting rate of return method:

0Depreciation

Depreciation is a non- cash expense item. Depreciation is the allocation of cost of the fixed assets used in a business. It involves an accounting entry and does not involve any out flow of cash. But depreciation is usually charged to the profit and loss account because it is an accounting way of matching costs of fixed assets with the benefits. For example a firm purchases a lorry for its transportation of raw materials. The lorry may cost for example N5, 000, 000 but the useful life may stretch for over 10 years. It makes sense that for every year of its use; it provides benefits to the firm.

1Salvage Value

Salvage value can be seen from two angles. The first is the cash salvage value. Cash salvage value of an investment or asset is the market price of the investment or asset at the end of its life. On the other hand, book salvage value is the cost of the machine or asset at the end of its life. In the accounting rate of return method, the book salvage value is usually used as we shall shortly see.

Worked Example

A rural poultry farm costs N5, 000, 000 to set up and has a scrap value of N1, 000,000. Its stream of income before depreciation and taxes during the first five years is N1,000,000, N1,200,000, N1,400,000, N1,600,000 and N2,000,000. If depreciation is on straight line basis and tax rate is 50%, calculate the accounting rate of return (ARR).

Solution

COMPUTATION OF THE ACCOUNTING RATE OF RETURN.

Average earnings after taxes

	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
Earnings before depreciation & taxes	1,000, 000	1,200,000	1,400,000	1,600,000	2,000,000
Depreciation	800,000	800,000	800,000	800,000	800,000
Net earnings before taxes	200,000	400,000	600,000	800,000	1,200,000
Taxes at 50%	100,000	200,000	300,000	400,000	600,000
Book Value of Investment	100,000	200,000	300,000	400,000	600,000
Beginning	5,000,000	4,200,000	3,400,000	2,600,000	1,800,000
Ending	4,200,000	3,400,000	2,600, 000	1,800,000	1,000,000
Average	4,600,000	3,800,000	3,000,000	2,200,000	1,400,000

$$= \frac{N100,000 + N200,000 + N300,000 + N400,000 + N600,000}{5}$$

$$= N320, 000$$

Average Investment

$$= \frac{N4,600,000 + N3,800,000 + N3,000,000 + N2,200,000 + N1,400,000}{5}$$

$$= N3, 000,000.$$

$$\text{Accounting rate of return} = \frac{\text{Average income}}{\text{Average investment.}}$$

$$= \frac{N320, 000}{N3, 000, 000}$$

Accounting rate of return = 10.666%

SELF-ASSESSMENT EXER CISE

List four public sector projects in your neighbourhood.

Under the accounting rate of return method, the accept-or-reject rule is to accept those investment proposals whose ARR is higher than the minimum rate established by management.

Also, the investment proposals whose ARR is lower than the minimum rate established by management will be rejected.

3.2.1 Evaluation of ARR Method

One of the major advantages of the accounting rate of return method is that it is relatively easy to use. It can be easily calculated using accounting data. It uses accounting profits to measure the rate of return.

Although the ARR is relatively easy to use, if suffers from the three main serious disadvantages.
Firstly, it ignores the time value of money. By so doing, profits occurring at different times are given the same value and of course that is very wrong.

Secondly, it uses accounting profits not cash flows to appraise investment proposals. It is incompatible with the firm's objective of maximizing the market value of shares.
This is because share values depend on cash flows, earnings and not upon accounting rates.

ANSWER TO SELF-ASSESSMENT EXERCISE

The four public sector projects in my neighbourhood are:

1. The general hospital
2. The Primary School.
3. The library.
4. The Government motor park.

4.0 CONCLUSION

In this unit, we discussed Traditional Investment Criteria. Under Investment Criteria we discussed pay back period and accounting rate of return which are both traditional investment criteria. We also evaluated both of them.

5.0 SUMMARY

This unit treats Traditional Investment Criteria which is very important in evaluation of the Investment project or proposal. It provides a good background for the analyst to conduct proper evaluation of a project proposal.

In the next unit, we shall discuss discounted cash flow criteria.

6.0 TUTOR- MARKED ASSIGNMENT

In evaluating an investment project, a sound appraisal method should be used. What are the characteristics that a sound appraisal method should have?

7.0 REFERENCES/ FURTHER READINGS

Leon, Ikpe (1999). *Project Analysis and Evaluation*, Impressed Publishers, Lagos.

Pandey, I M (2002). *Financial Management*, Vikas Publishing House, PVT Ltd, 8th Edition.

MODULE 2

UNIT 1 DISCOUNTED CASH FLOW CRITERIA

CONTENTS

1.0 INTRODUCTION

In unit 5, we discussed traditional investment criteria. We discussed the accounting rate of return method and the payback period. The two methods are traditional investment appraisal methods. We also examined their advantages and of course their deficiencies. In this unit we shall discuss Discounted Cash Flow Criteria.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- Understand discounted cash flow criteria in investment decision making.
- Discuss their practical applications

3.0 MAIN CONTENT

3.1 Discounted Cash Flow Criteria

When in unit 5, we discussed payback period and accounting rate of return methods, we came to the conclusion that both of them were defective as investment appraisal methods. One reason was that both methods fail to recognize the time value of money. Our task in this unit is to discuss investment criteria that recognize the time value of money in evaluating investment proposals. The two methods are the net present value (NPV) method and the internal rate of return (IRR) method. As a group they are known as the discounted cash flow methods. We shall now devote more time discussing them.

3.1.1 The Net Present Value (NPV) Method.

The net present value method is the most admired amongst the discounted cash flow methods of evaluation. This is so because it recognizes the time value of money. At the background, it correctly postulates that cash flows which arise at different periods have different values. And that they can only be comparable when their present values have been computed.

In the analysis, there are three basic steps to be taken to compute the net present value (NPV).

First, an appropriate rate of interest is selected which will be used to discount cash flows. Technically, the appropriate rate of interest to be used is the firm's cost of capital which as we said is the minimum rate of return expected by the investors to be earned by the firm on any of its investment proposal.

Secondly, the present values of investment proceeds (inflows) are computed and the present values of investment outlays (outflows) are computed also using the cost of capital as the discount rate.

Thirdly, the net present value (NPV) is computed by subtracting the present value of cash outflows from the present value of cash inflows. If the present value of cash inflows is greater than that of outflows, then the project has a positive net present value. However if the present value of cash inflows is lesser than the present value of cash outflows, then the net present value of the investment proposal will be negative. We shall now proceed to define the net present value NPV method.

The net present value method is a process of calculating the present value of cash flows (inflows and outflows) of an investment proposal

using the cost of capital as an appropriate discount rate. And like we said, the net present value is found out by deducting the present value of cash outflows from the present value of cash inflows.

Assuming that all cash outflows of an investment are made in year $t_{o,}$ then the equation for the net present value is given by;

$$NPV = \frac{A_1}{(1+k)} + \frac{A_2}{(1+k)\,2} + \ldots + \frac{A_n}{(1+k)\,n} - C$$

Where $A_1, A_2 \ldots + + A_n =$ Cash inflows

K = the firm's cost of capital
C = cost of the investment proposal
n = expected life of the investment proposal

Under the net present value method, the acceptance rule is to accept the investment proposal if the net present value (NPV) is positive and to reject it if the net present value is negative.

Worked Example

A bakery project costs ₦2,000, 000 to set up and generates year end cash inflows of ₦800,000, ₦900,000, ₦1,000,000 and ₦800,000 over a four year period .The required rate of return is 10%. Calculate the Net present value of the bakery project.

Solution

Year	Cash Inflow	Discount Factor at 10%	Present Value of Cash Inflow (₦)
1	N800, 000	.909	727,200
2	N900, 000	.826	743,400
3	N1,000,000	.751	751,000
4	N800, 000	.683	546,400
			2,768,000
	Less Project Cost		2,000,000
	Net Present Value	=	768,000

3.1.2 Interpretation of Net Present Value (NPV)

We have used the example of the bakery project to compute net present value (NPV). But we need to understand what NPV is and be able to interpret it.

The positive net present value may be interpreted as the immediate increase in the firm's wealth if the investment proposal is accepted. It is equivalent to an unrealized capital gain. The unrealized capital gain will be when the expected cash inflows materialize.

3.1.3 Evaluation of Net Present Value Method

We have discussed the net present value concept and used an example to compute the NPV of a project. We shall go ahead to evaluate NPV method.

The most important merit of the NPV method is that it recognizes the time value of money. Also it considers all the cash flows that arise throughout the duration of the investment project. The NPV method is consistent with the objective of maximizing the objective of the firm.

However the Net present value method suffers from some limitations.
Firstly, it is difficult to use. It involves the use of discount tables and also computers.

Secondly, in calculating NPV, it is assumed that the appropriate discount rate is known. The discount rate to be used is the firm's cost of capital. The cost of capital is not very easy to compute. The NPV method may not give satisfactory answers when the projects in question have different initial outlays.

NPV result may be misleading when we are dealing with alternative projects – under capital rationing situations.

3.2 The Internal Rate of Return (IRR) Method

We have discussed the net present value method and did a computation of NPV. We shall now discuss the internal rate of return (IRR) method.

The internal rate of return is another discounted cash flow technique which recognizes the time value of money and apparently the magnitude and timing of cash flows.

The internal rate of return (IRR) can be defined as that rate which equates the present value of cash inflows with the present value of cash

outflows of an investment. At that rate (IRR), the net present value of the investment is zero (0).

It is called an internal rate because it depends entirely on the outlays and inflows of the investment and not any other rate outside the investment. If we write the equation;

$$C = \frac{A_1}{(1+r)} + \frac{A_2}{(1+r)^2} + \ldots \frac{An}{(1+r)^n}$$

Where C = the Investment outlay

$A_1, A_2 + + \ldots A_n$ = Cash inflows

$$\text{Then } 0 = \frac{A_1}{(1+r)} + \frac{A_2}{(1+r)^2} + \ldots. \frac{A_n}{(1+r)^n} - C$$

The value of r in the equation where the cash inflows and the investment outlay is zero is known as the internal rate of return.

Under the internal rate of return (IRR) method, a project is accepted if the internal rate of return is higher than or equal to the minimum required rate of return. This minimum required rate of return is known as the firm's cost of capital.

3.2.1 Interpretation of IRR

The interpretation of IRR is that it is the highest rate of interest that a firm will be ready to pay on the funds borrowed to finance a project without being financially worse off after repaying the principal and interest. In a technical sense, the IRR is the break – even rate of borrowing from a bank.

Obviously if a firm is able to borrow at a rate lower than the internal rate of return, the investment project will be profitable.

3.2.2 Measurement of Cash Flows

In the earlier section of this unit, we discussed two of the discounted cash flow methods – the Net present value (NPV) and the internal rate of return (IRR) methods. And we saw that the two methods used information on cash flows for the investment analysis.

In discussing both methods, we discussed cash inflows and cash outflows. But at this point in time, we are going to take a technical look

at cash flows and make sure we understand how they are used in the investment analysis.

A lot of students do confuse profit and cash flows. And so we must first draw a line between the two. Changes in profits may not lead to changes in cash flows.

Increase in profit may be tied up in credit sales with no increase in cash flow. So a firm may be very profitable but at the same time will be experiencing severe cash flow problems.

So it is to be stated that in the Investment Analysis, it is the inflows and outflows of cash that is important. In an ideal situation, the receipt of cash is a clearly defined corporate objective.

3.2.3 Depreciation and Cash Flows

In computing cash flows, the net cash flow is usually on an after – tax – basis. That is to say that taxation should be deducted before arriving at the net cash flow. In the computation of after- tax net cash flows, the treatment of non- cash items deserve special treatment. One of those non-cash items is depreciation. Depreciation is a way of allocating cost of fixed assets. In accounting, depreciation is usually charged to the profit and loss account as a way of matching cost of fixed assets with their benefits. Depreciation however does not involve any outflow of cash. And so depreciation is usually ignored in cash flow computation. And in a situation where depreciation has been deducted before arriving at profit after tax, the practice is to add back depreciation to arrive at after tax net cash flow.

Worked Example

Below is the projected income statement of Fellowship Aluminium Limited. Compute the net cash flow after taxation.

Note: The Company has an outstanding loan for which it pays ₦10, 600,000 per annum.

PROJECTED INCOME STATEMENT
FELLOWSHIP ALUMINIUM LIMITED

YEAR ENDING	31/12/ 2007 ₦
REVENUE	
Sales revenue	839,280,000
Direct Cost of Production	
Production raw materials	567,927,360
Electricity and gas	6,880,000
Repairs and maintenance	500,000
Depreciation of machinery	3,346,000
TOTAL DIRECT COSTS	578,653,360
INDIRECT COSTS	
Management and Labour	2,508,000
Interest and bank charges	3,000,000
Selling expenses	7,250,000
Insurance of assets	50,000
TOTAL INDIRECT COSTS	12,808,000
TOTAL DIRECT + INDIRECT COSTS	591,461,360
PROFIT before taxation	247,818,640
Taxation	74,000,000
Profit after taxation	173,818,640

PROJECTED CASH FLOW STATEMENT
FELLOWSHIP ALUMINIUM LIMITED

CASHIN FLOWS	₦
Profit before taxation	247,818,640
Add back depreciation	3,346,000
Total cash inflows	251,164,640
CASH OUTFLOWS	
Loan repayment	10,600,000
Taxation	74,000,000
TOTAL OUTFLOWS	84,600,000
Cash inflows less cash outflows	166,564,640
Opening cash balance	------
Closing cash balance	166,564,640

3.2.4 Fixed Assets and Cash Flows

After treating depreciation, another item which we need to understand properly is fixed assets. What we are really interested in is the treatment of the purchase of fixed assets. In the cash flow analysis, when an asset is purchased, the purchase cost is treated as an outflow. The entire purchase price is an outgoing.

3.2.5 Salvage Value and Cash Flows

When we talk of salvage value, we are talking of the estimated value of an asset at the completion of its useful life for the firm. Normally, salvage value is of two types namely;

- Book salvage value is the cost of the asset at the end of its useful life.
- Cash salvage value is the market value of the asset at the end of its useful life.

SELF-ASSESSMENT EXERCISE

List four expense items that you consider as cash outflows in a firm's profit and loss account.

ANSWER TO SELF-ASSESSMENT EXERCISE

Four expense items I consider as cash outflows in a firm's profit and loss account are:

1 Salary and wages
2 Raw material expenses
3 Advertising expenses
4 Telephone expenses

4.0 CONCLUSION

In this unit, we have discussed discounted cash flow criteria. We discussed the net present value (NPV) and the internal rate of return (IRR).

5.0 SUMMARY

In this unit, we have treated discounted cash flow criteria which are more sophisticated than the traditional criteria. We also discussed cash flows.

In the next unit, we shall discuss net present value (NPV) Vs internal rate of return (IRR).

6.0 TUTOR-MARKED ASSIGNMENT

A hospital costs N5,000,000 to set up and generates year end cash flows of N1,000,000, N1,500,000, N2,000,000, N3,000,000. The cost of capital is 10%. Calculate the Net present value of the hospital investment.

7.0 REFERENCES/FURTHER READINGS

Leon, Ikpe (1999). *Project Analysis and Evaluation*, Impressed Publishers, Lagos.

Pandey, I M (2002). *Financial Management*, Vikas Publishing House, PVT Ltd, 8th Edition.

UNIT 2 NET PRESENT VALUE (NPV) VS INTERNAL RATE OF RETURN (IRR)

CONTENTS

1.0 INTRODUCTION

In the last unit (unit 6), we discussed discounted cash flow criteria. We discussed the net present value (NPV) method and the internal rate of return (IRR) method. We also discussed the measurement of cash flows. All these helped to improve on our understanding of discounted cash flow criteria.

In this unit, we shall discuss Net present value (NPV) Vs the Internal rate of return.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- Compare the Net present value (NPV) with the Internal rate of return (IRR)
- Identify the source of their differences.

3.0 MAIN CONTENT

3.1 Net Present Value (NPV) Vs The Internal rate of return (IRR)

In our earlier studies we discussed the net present value (NPV) method of investment evaluation. The net present value method is a process of calculating the present value of cash flows (Inflows and outflows) of an investment proposal using the cost of capital as an appropriate discount rate. We also discussed the internal rate of return (IRR).

We defined the internal rate of return (IRR) as the rate which equates the present value of cash inflows with the present value of outflows. At that rate, the net present value of an investment is zero (0).

We note that the net present value and the internal rate of return are closely related as discounted cash flow methods.

Firstly, both are time-adjusted methods for measuring the worth of an investment.

But the two methods do not invariably lead to the same decisions – accept or reject.
It is the source of the differences that we now want to examine as evaluators.

3.1.1 Equivalence: Independent Projects.

As a starting point, we shall first distinguish between what is known as conventional and non- conventional investments. In the analysis a conventional investment is defined as one whose cash flow take the pattern of an initial cash outlay (Outgoing) followed by cash inflows. Therefore the conventional investment will have only one change in sign.

For example a conventional investment may be stated thus:
- + + + + …

Where – represents the initial cash outlay
And + represents the cash inflows.

Truly when the investment is undertaken, it is followed by spending of financial resources called outlays. After the investment has been undertaken, what follows is the return in the form of cash inflows.

Now let us look at a non- conventional investment. A non- conventional investment is one whose cash outflows are not restricted to the initial period.
For example a non-conventional investment can be expressed thus:

- + + + - - + +

Where – represents cash outflows
And + represents cash inflows.

If you examine the cash flow pattern of the non- conventional investment, you will note that a cash outflow can occur at any time and not only at the commencement of the investment.

Generally, we can state that in the case of conventional investments which are economically independent of each other, the net present value (NPV) and internal rate of return (IRR) methods result in same accept or reject rules if the firm is not constrained in any way in accepting all the profitable projects.

Put in a simpler way, what we are saying is that if the firm has all the funds it requires for investment, and has an array of conventional investments facing it, both NPV and IRR methods will arrive at consistent accept or reject decisions.

If a project is indicated to be profitable by the NPV method, then the IRR method will also indicate it to be profitable. In that case, we say that both methods are showing consistency. The reason is not far fetched.

You will recall that we stated earlier that if the NPV method is used, all projects having NPV greater than zero (NPV > 0) would be accepted.

Similarly, we also stated that all projects for which the internal rate of return is greater than the required rate of return (r > k) will be accepted if the IRR method is used. The last or marginal project to be accepted under the NPV method is that which has zero (0).

NPV i.e. (NPV = 0). Also if we are using the IRR method, the last or marginal project to be accepted will have internal rate of return equal to the required rate of return (r = k).

Therefore it is easy to picture that any project which has a positive net present value (NPV) will have the internal rate of return greater than the required rate of return.

3.1.2 Difference: Ranking of Dependent Projects

We have seen that the NPV and IRR methods arrive at the same accept or reject decisions when conventional independent projects are being evaluated. However, they tend to yield differences when ranking dependent projects or investments. Practically the firm does not always have the resources to undertake all of the investment proposals brought before it.

So that when faced with a variety of projects, accepting a project will mean not accepting the other projects. That leads us to the concept of **mutual exclusiveness.**

Investment projects are said to be mutually exclusive if acceptance of one investment completely eliminates the expected proceeds of other investments. For example a car manufacturer has to choose between making and buying tyres. Also a distributor of baby food has to choose between selling through distributors or through direct sales to the consumers.

Also there is what we refer to as **financial exclusiveness**. If a firm has a financial constraint, it will not be able to accept all investment projects. It will either accept Project A or Project B. In such a situation, we say that there is financial exclusiveness or **capital rationing.**

Under a situation of mutually exclusive projects, the NPV and IRR can give conflicting ranking to projects submitted for evaluation.

Worked Example

There are two investment proposals A and B facing a firm. Project A involves a capital cash outlay of ₦20, 000 and year end cash inflow of ₦24, 000. Project B involves a capital outlay of ₦30, 000 and year end cash flow of ₦35, 400. If the firm's cost of capital is 12%, which of the investment proposals should the firm accept if it uses NPV and IRR methods of project evaluation?

Solution

Project A

Cash Inflow	Discount Factor At 12%	Present Value (₦)
₦ 24,000	0.893	21,432

Less initial cash outlay 20,000
Net Present Value = 1,432

Project B

Cash Inflow	Discount Factor At 12%	Present Value (₦)
₦ 35,400	0.893	31,612.20

Less initial cash outlay 30,000.00
Net Present Value = 1612.20

SUMMARY OF RESULTS

Project	Cash outlay (₦)	Inflow (₦)	NPV at 12%	IRR (%)
A	20,000	24,000	₦1432	20%
B	30,000	35,400	₦ 1612.20	18%

You will note that if Project A and Project B are independent projects, both of them will be acceptable by both NPV and IRR methods.

However if they are mutually exclusive projects then NPV and IRR can give us conflicting results. It is important to note this fact.

It is seen from the result that under the NPV method, Project B has a higher net present value and is ranked higher than Project A.

However, if the IRR method is used to evaluate the two projects, Project A will be ranked higher than Project B.

3.1.3 Sources of Conflicting Results -NPV Vs IRR

We have just seen through the last example that under exclusiveness, the NPV and IRR will give conflicting results when ranking projects.

The conflicting results arise under the following conditions:

Projects have different expected lives.

The life span of a project goes a long way to determine the nature of the cash flows and how they affect both NPV and IRR computations.

Different Capital Outlays.

Another condition under which NPV and IRR will yield conflicting ranking of projects is when the outlays of projects are of different sizes. Differences in capital outlay for projects usually lead to conflicting ranking of the projects using the NPV and IRR methods.

Differences in Cash Flow Pattern.

Another condition under which the NPV and IRR will yield contradicting results is where the cash flow patterns are different. In some projects, the cash inflows may arrive earlier than in other projects. Some projects are like that.

3.1.4 Incremental Approach

The apparent conflict between the NPV and IRR methods of evaluation can be resolved through using the incremental approach.

Consider for example two projects with the following cash flows

Cash Flows (₦)

	t_0	t_1	t_2	NPV at 8%	IRR
Project A	- 20,000	20,000	4,800	2,633	20%
B	- 30,000	20,000	16,680	2,818	15%

It is to be observed that the incremental project is called Project B – A, and the incremental cash flow is expected thus:

Incremental Cash Flow (₦)

	t_0	t_1	t_2	IRR
Project (A- B)	-10,000	0	11,880	9%

We need to perfectly understand what we are trying to reach at. You will note that Project A has a lower NPV (₦ 2633) but a higher IRR at 20%. Project B has a higher NPV (₦ 2818) but a lower IRR.

Under the incremental approach, we can define a project called B - A. Project B- A is an algebraic deduction of Project A from Project B.

Ordinarily one would be tempted to prefer Project A under the IRR method because it has an IRR of 20%. But if you take a critical look at the incremental project, Project B-A, you will realize that the incremental project offers an extra 9% IRR over and above the 20% offered by project A. So one would be inclined to prefer or select Project B-A.

As far as the NPV and IRR conflict exists, the most satisfactory solution is to use the incremental approach. A good financial manager should be

interested in evaluating the impact of incremental cash flows on the investment proposal.

SELF-ASSESSMENT EXERCISE

Project A has outlay of ₦30, 000 and cash inflow of ₦50, 000. Project B has an outlay of ₦50, 000 and cash inflow of ₦ 90,000. What is the incremental project?

3.1.5 NPV AND IRR: Choice of Method

We have discussed the NPV and IRR methods. Although both methods are discounted cash flow methods, they give conflicting answers under conditions of capital rationing or financial exclusiveness. So the key problem facing financial decision makers is that of choosing between the two.

The NPV gives a consistent solution to investment analysis problems. This is because it gives a figure known as NPV which can be easily comparable. It is also easier to compute and so many analysts prefer to use the NPV method in their analysis.

On the other hand, some other analysts prefer to use the IRR method. First, IRR appeals a lot to businessmen because it is a rate that can be used to compare with a required rate of return. It is therefore according to them, easier to understand IRR than Net Present Value. Also in the IRR method, the analyst is saved the problem of calculating the cost of capital which is the starting point of the NPV analysis.

ANSWER TO SELF-ASSESSMENT EXERCISE

The incremental project is Project B-A.
It can be expressed thus:

	t_0	t_1
Project (B-A)	- ₦ 20,000	₦ 40,000

4.0 CONCLUSION

In this unit, we have discussed the Net Present Value (NPV) Vs the Internal Rate of Return (IRR) .We tried to look at the sources of conflict between the two methods.

5.0 SUMMARY

The NPV method and the IRR method are both discounted cash flow methods used in the investment analysis and evaluation. This unit treats comparison between the methods, bringing out their differences.

It also traces the sources of their apparent conflicting solutions to the investment decisions.

In the next unit, we shall discuss Risk Analysis in Capital Budgeting.

6.0 TUTOR-MARKED ASSIGNMENT

In the cases of financial exclusiveness, the IRR and NPV do not yield consistent answers in evaluating projects. What are the reasons for the inconsistencies?

7.0 REFERENCES/FURTHER READINGS

Van, Horne (1989). Financial Management and Policy-Prentice Hall, New Delhi.

UNIT 3 RISK ANALYSIS IN CAPITAL BUDGETING

CONTENTS

1.0 INTRODUCTION

In the last unit (unit 7) we discussed Net Present Value (NPV) Vs The Internal rate of return (IRR). We examined the conflict between the NPV and the IRR and identified the sources of the conflict. All these added to our knowledge of the analysis of investments.

In this unit, we shall discuss Risk Analysis in Capital Budgeting.

2.0 OBJECTIVES

By the end of this Unit, you should be able to:

- Explain the concept of risk in capital budgeting.
- Discuss their nature.

3.0 MAIN CONTENT

3.1 Risk Analysis in Capital Budgeting

All along in this course, we have talked a lot about the investment process and also methods of evaluating investments. We indeed discussed cash flows which consist of cash outflows (outgoing cash) and inflows of cash. And so we just did all our computations and calculations as if everything computed will come to reality. The assumption we had was that investments do not involve any kind of risk. And that once a project takes off, cash flows predicted would just arrive as planned. But that is not true.

In real life, the firm is always exposed to different types of risks. Risks exist in all business because the analysts and investors are incapable of predicting the future. No analyst can predict tomorrow and the cash flows that will arise tomorrow. Tomorrow is unpredictable to the firm because:

1. Workers may go on strike.
2. A war with another country could start.
3. A flood may destroy the firm.
4. An earthquake may occur.
5. Hoodlums may invade the firm and cart away equipment and cash.
6. A new competitor may emerge and enter the market with a low pricing strategy.
7. A substitute good may emerge to make the firm's product obsolete.

We have just cited some of the above examples so that we can see the varied nature of events that could arise and distort cash flows of the investment project. Because of uncertainty regarding the future, the forecast of future cash flows can never be perfect. And so, we can say that risk arises in the investment evaluation because of our inability to accurately predict future cash flows and their sequence. A number of events are likely to influence the forecasts of the future cash flows. Some are political while others are economic. And in some cases, the firm faces specific risk for example if the workers suddenly go on strike. There are also risks faced by all the firms in an industry. For example, a shut down of all refineries in Nigeria will adversely affect all the firms in the down stream of the oil and gas sector. Interest rates might change. The level of taxation might be increased so also the level of Government expenditures. Inflation rate might increase. All these influence the accuracy or otherwise of our future forecast.

3.1.1 The Definition of Risk

We have just discussed the nature of risk and some of those things that could lead to risk. We shall now go ahead and define risk.

The risk associated with a project may be defined as the variability that is likely to occur in the future returns from the project. So when we are talking of risk, we are generally talking about the variability of the expected future returns of a project.

Consider for example a 90 day Treasury bill issued by the Central Bank of Nigeria and which promises to pay 9% interest. Now if we look at the Treasury bill, we know that the Central bank of Nigeria will be able to

pay the 9% interest promised on the Treasury bill. As a result, we state that the Treasury bill investment is a risk- free investment. It is for this reason that in the financial analysis, the interest rate paid on government securities such as treasury bills are regarded as the risk- free rate of interest. However if instead of investing in a treasury bill with an assured income, the investors buy shares in a company quoted on the stock exchange, then automatically the investment becomes risky because of the expected variability of the expected cash flows.

3.1.2 Conventional Techniques to Handle Risk

We have defined risk. Now let us discuss the conventional techniques to handle risk.

Pay back period

In our earlier discussions, we talked of pay back period. Pay back period is one of the easiest and oldest commonly used methods for recognising and handling risk in the investment analysis. The firm that will use pay back period usually will prefer a shorter pay back period to a larger one. So most firms as a matter of policy usually go ahead and establish their pay back period that will guide them in choosing their investments. For example, firm A might establish that its acceptable pay back period is four years (4 years). This becomes a matter of policy. Any investment proposal whose pay back period is more than 4 years will be rejected and those investment proposals with pay back period of less than 4 years will be accepted.

Pay back period as a conventional technique to handle risk only covers risks associated with time. For example, simple intuition tells us that a project with a pay back period of 20 years is riskier than another project with a pay back period of 3 years. And that is the problem of using pay back period as a method of handling risks. The risks do not arise from time alone but from other sources that do not have a bearing with time. And so besides that, pay back period does not recognise the time value of money and as such is considered an inferior method to the discounted cash flow methods.

Risk-adjusted discount rate

When using the discounted cash flow method to evaluate the investment proposal, the analyst has to use a discount rate to discount the cash flows. Let us assume that the discount rate used is 10% and that this is not a risk- adjusted discount rate.

In the literature, financial analysts are advocating the use of a risk-adjusted discount rate with which to discount the cash flows.

In the analysis,
Let 1 = the risk free rate.
0 = the risk premium.

Then r (risk – adjusted discount rate) = 1 + 0

The use of the risk- adjusted discount rate involves using a much higher discount rate for riskier projects and a lower discount rate for less risky projects.

The advantage of the risk- adjusted discount rate is that it is simple and can be easily understood. It also appeals to risk – averter- business man.

A major disadvantage of the risk – adjusted discount rate is that there is no easy way of deriving the risk – adjusted discount rate. Different people looking at the same investment proposal may end up using different risk – adjusted discount rates.

3.1.3. Probability Assignment and Expected Monetary Value

So far, we have made it quite clear that risk in the market place arises because of our inability to predict the future. In the investment decision the most important information that is required is that of the future cash flows (inflows and out flows). When an investment analyst is asked about a project's cash flow, he/she is expected to come up with at least two or three forecasts or estimates. Coming up with one estimate could be fatal or misleading. Three estimates that are used in the analysis are:

1. The best guess.
2. The high guess.
3. The low guess.

Apart from making these guesses the analyst is expected to attach probabilities to the guesses. If the event is certain to occur, then a probability of 1(one) is attached to it. If we are certain that an event will not occur, then it will have a probability of 0 (zero) attached to it.

For example, a fast food project may have the following cash flow forecasts for a one- year period:

	N
Best guess	5, 000, 000
High guess	4, 000, 000
Low guess	3, 000, 000.

We have said that estimates of cash flows cannot be certain. And as such so many estimates should be made as to future cash flows.

Also we discussed the fact that the analyst apart from making guesses should also indicate the probabilities attached to the guesses.

So if the probabilities have been calculated and assigned to the future events (cash flows), we can go ahead and compute what we call the Expected Monetary value (EMV).

The Expected monetary value (EMV) is computed by multiplying the future possible cash flows by the probabilities and then Summing up. We shall use an example to compute the Expected monetary value of a project.

Worked Example

Below are the given possible cash flows of a new hospital project at Suleja.

Future Possible event	Cash flow N	Probability
A	15,000,000	.10
B	13,000,000	.20
C	12,000,000	.10
D	10,000,000	.60

Compute the expected monetary value of the New hospital project.

Solution

Possible event	Cash flow N	Probability	Expected value N
A	15,000,000	.10	1,500,000
B	13,000,000	.20	2,600,000
C	12,000,000	.10	1,200,000
D	10,000,000	.60	6,000,000
	Total		**11,300,000**

Technically speaking, if there are two projects that need to be evaluated and selected, then their expected monetary values need to be compared.

The project to be accepted should be the one with the higher expected monetary value.

3.1.4 Sensitivity Analysis

We are still discussing risk analysis in capital budgeting. Generally when the investment proposal is made, the analyst makes a preliminary set of cash flow projections based on his/ her own understanding of the expected nature and timing of future cash flows.

Usually the first sets of financial projections made by the financial analyst are described as normal estimates. Practically there are so many risks facing the firm in the market place. Some of the risks are peculiar to the firm and some are peculiar to the industry to which the firm belongs.

Critical risks facing the firm in the market will include the following:

1. Revenue risks – arising from the fact that the earlier projected revenues will not be realized either due to market competition or other market forces.
2. Rise in prices of raw materials and other expenditure items. Increase in prices will lead to reduction of net revenues.
3. Unavailability of critical raw materials especially if they are imported. If a project depends solely on imported raw materials for production, it is very vulnerable to international market price movements.

If we consider these types of risk, then there will be need to sensitize the cash flows.

Sensitivity analysis is a way of evaluating the changes in the cash flow of a project by varying the assumptions of the cash flow forecast. Table 8.1 is a projected income statement for an integrated agric farm.

PROJECTED CONSOLIDATED INCOME STATEMENT.

(Normal estimate) - N

Table 8.1: Projected income statement for an integrated agric farm (normal estimate)

Year Ending	Year 1	Year 2	Year 3	Year 4	Year 5
Year Ending	31/12/2008	Year 131/12/2009	Year 2 31/12/2010	Year 3 31/12/2011	Year 4 31/12/2012
INCOME		31/12/2008	31/12/2009	31/12/2010	31/12/2011	31/12/2012
Income before tax (expansion project)	18,026,000	31,289,100	37,513,855	37,385,347	38,400,915
Turnover from existing business	1000,000,000	1040,000,000	1092,000,000	1,140,000,000	1190,000,000
Total Turnover (existing business)	1018,026,000	1071,289,100	1129,513,855	1,177,385,347	1228,400,915
Less: Costs of Sales	884,000,000	930,000,000	978,000,000	1025,000,000	1073,000,000
Gross Profit	134,026,000	141,289,100	149,513,855	152,385,347	155,400,915
Deduct					
Establishment expenses	3,300,000	3,500,000	3,750,000	4,000,000	4,300,000
Administration expenses	13,800,000	14,000,000	14,300,000	14,500,000	14,800,000
financial & professional charges	900,000	930,000	950,000	970,000	990,000
Depreciation	9,660,542	9,660,542	9,660,542	9,660,542	9,660,542
Total expenses	27,660,542	28,090,542	28,660,542	29,130,542	29,750,542
Profit b/4 tax	106,365,458	113,198,558	120,853,313	123,254,805	125,650,373
Estimated tax	15,954,819	16,979,784	18,127,997	18,488,221	18,847,556
Profit after tax	90,410,639	96,218,774	102,725,316	104,766,584	106,802,817

INCOME
Income before tax (expansion project)
Turnover from existing business
Total Turnover (existing business)
Less: Costs of Sales
Gross Profit
Deduct
Establishment expenses
Administration expenses
financial & professional charges
Depreciation
Total expenses
Profit b/4 tax
Estimated tax
Profit after tax

We have before us a projected income statement which we need to subject to sensitivity analysis. Suppose for example we want to evaluate the impact of revenues falling by 20%, we will have a new set of revenues that have been sensitized. We shall now call this new revenue the risk – adjusted revenue.

RISK- ADJUSTED INCOME STATEMENT – 3 YRS

	N	N	N
	Year 1	**Year 2**	**Year 3**
Risk- adjusted Revenue	814,420,800	857,031,280	902,011,084
Less Cost of Sales	884,000,000	930,000,000	978,000,000
Gross profit / (Loss)	(69,579,200)	(72,968,720)	(75,988,916)

From what we have seen, should there be a drop in revenue by 20%, the integrated agric farm will run at a loss. As you can see, this was revealed by the sensitivity analysis.

There are other critical assumptions used in sensitivity analysis. it is the duty of the analyst to choose what to vary.

SELF-ASSEESSMENT EXERCISE

List four events that could affect the cash in flows of the firm.

ANSWER TO SELF-ASSESSMENT EXERCISE

The four events that could affect the cash inflows of a firm are:

1. Strike
2. Flood
3. Earthquake
4. Market.

4.0 CONCLUSION

In this unit, we have discussed Risk Analysis in capital budgeting. We defined risk and also conventional techniques to handle risk.

We discussed probability assignment and expected monetary value. We also discussed sensitivity analysis. All these helped us to understand risk analysis in capital budgeting.

5.0 SUMMARY

This unit treats Risk Analysis in capital budgeting. It takes a good look at risk analysis in capital budgeting.

In the next unit, we shall discuss Financial analysis – Part one.

6.0 TUTOR-MARKED ASSIGNMENT

Discuss the nature of risks facing the firm.

7.0 REFERENCES/FURTHER READINGS

Hertz, David B, *"Risk Analysis in capital Investment",* Harvard business Review, 42 (January – February 1964 P.P. 95 – 106.

UNIT 4 FINANCIAL ANALYSIS – I

CONTENTS

1.0 INTRODUCTION

In the Last Unit (Unit 8) we discussed Risk Analysis in Capital budgeting. We discussed the definition of risk and conventional techniques to handle risk. We also discussed probability assignment and expected monetary value. We also discussed sensitivity analysis. All these enabled us to improve on our understanding of risk analysis.

In this unit we shall discuss financial analysis. It will form the background for further work in the next unit.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- State what the Objective of financial analysis is.
- Discuss the conduct of financial analysis.

3.0 MAIN CONTENT

3.1 Financial Analysis

Every business organization needs to report its activities in the form of financial statements. When these financial statements are prepared they become easily readable, easily understandable, easily interpreted and this saves a lot of time. Without financial statements, it will not be easy to appraise the activities of a company and compare it with activities of other periods.

The key objective of the financial analysis is to analyse the information as contained in the financial statements and use same for decision making. We shall not as yet define financial analysis

That is because we must first discuss what we intend to analyse. Our approach therefore is to first present a discussion on financial statements before preparing the ground to analyse the statements.

3.1.1 Financial Statements

The Financial Statements contain the summarized information on the financial affairs of the firm. They represent the means of reporting the results of operations mainly to owners of the firm, creditors and the public at large.

In the practice, it is the duty of the investment analyst to read the financial statements and interpret it for use in banking, finance or general business management. For our own purpose, there are three main financial statements and we shall discuss them briefly before departing into the area of financial analysis. The three financial statements are the balance sheet, the Income statement and the cash flow statement. We shall treat each of the items separately.

0**The balance sheet** obviously is one of the most important of the financial statements. The balance sheet shows the financial position of a firm as at a particular date. The balance sheet contains Information on the resources (assets) of a business and obligations (Liabilities) of the business as at a particular date.

Let us start with the assets. The assets are divided into two – fixed assets and current assets. Fixed assets as you know will include buildings, vehicles, plant and machinery and all other assets held for periods longer than the accounting period.

Current assets as you know are those resources of the business which are held in the form of cash or expected to be converted into cash within the accounting period. Current assets will include cash, stock, debtors and marketable securities. After the assets, the next item to discuss is liabilities.

Liabilities are debts payable by the firm to outside parties (creditors & owners). We can equally divide the liabilities into:

1. Current liabilities like bank overdraft
2. Long- term liabilities like debentures.
3. Owner’s equity.

An examination of the right- hand side of the balance sheet indicates to the analyst the sources of financing that are supporting the assets of the firm. And like we said, they are primarily composed of debt (an external finance source). Equity as we all know is an internal finance source.

Another way to think of the right- hand side of the balance sheet also is to see it as claims against assets. So if debt represents the claim of outsiders, equity represents those of insiders.

Technically we need to remind ourselves as analysts that the claims of insiders in times of insolvency are subordinate to, or come after the claims of outsiders have been met.

The technical evaluation of the firm's financial structure is very important. First there is the need to see the relationship between debt and equity in the capital structure of the firm. And more specifically, banks do properly conduct painstaking examination of the capital structure to know if the firm will be able to meet its future obligations. In our examination of the liabilities of the firm we must have the concept of Seniority of claims at the back of the analysts mind.

If a company goes bankrupt, the various claims of the company will be paid out in a given order based on seniority of claims. External claims are senior to internal claims.

When a banker therefore is appraising the financial statements of a prospective borrower, caution demands that the existing seniority claims be measured and the impact on the firm evaluated.

The singular action of identifying the senior claims against the firm is not the only interest in financial analysis. Rather the impact of the claims on cash flow must be evaluated and laid on the table. Interest payments on debts and all borrowed funds must be repaid whether or not the firm makes a profit. And basically therefore, the analyst should address attention to the interest repayment capacity of the firm.

The Income statement (Profit and Loss Statement)

The Income Statement is another significant financial statement. The income statement presents the summary of revenues, expenses and the resulting net profit or loss of a business. If revenues exceed expenses, then the firm makes a profit. But if expenses exceed revenues, the result is a loss. The income Statement is prepared for an accounting period say one year.

Cash Flow Statement

The cash flow statement shows the level of cash inflows and outflows for the period Segregated into:

- Operating activities
- Investing activities
- Financing activities

3.1.2 The Nature of Financial Analysis

In a previous section of this unit, we identified three key financial statements of the firm– the balance sheet, the Income statement and the cash flow statement. The information contained in the financial statements is used by Investors, creditors, management and the general public to form an opinion about the operating performance and financial position of the firm.

Financial analysis is the process of identifying the financial strengths and weaknesses of the firm by establishing relationships between the Items of the balance sheet and the income statement. The focus of financial analysis differs and is related to the use to which the analysis will be put. For example, providers of short time funds like banks will be interested in the short term Liquidity of the firm. Providers of the long term debt will be interested in the long term survival and solvency of the firm. They will be interested in evaluating the future cash generating ability of the firm. Ratio analysis is a powerful tool used in the financial analysis. And as we know, a ratio is the mathematical relationship between two or more things.

For our discussions, we shall take a look at four key types of ratios namely:

Liquidity ratios
Leverage ratios
Activity ratios
Profitability ratios.

For our practical discussion, we shall use the financial statements of Jumbo Nigeria Limited.

SELF-SSESSMENT EXERCISE

List four assets that can be found in the current assets section of the balance sheet.

JUMBO NIGERIA LIMITED
Balance sheet
As At 31st December, 2006

EMPLOYMENT OF FUNDS	2006		2005	
FIXED ASSETS	N	N	N	N
Factory and office Buildings	28,442,652		30,077,289	
Plant and Machinery	88,233,549		86,487,718	
Furniture and Equipment	1,060,115		920,395	
Motor Vehicles	1,266,783		2,264,758	
NEPA Installation	195,873		391,746	
		119,198,972		**120,141,906**
CURRENT ASSETS				
STOCK	27,262,244		15,881,181	
Debtors and Other accounts	11,701,273		10,027,989	
Staff Advances	962, 161		637,776	
Cash at Bank	2,684,217		2,697,747	
Cash in Hand	377,444		388,801	
	42,987,339		**29,633,494**	
LESS CURRENT LIBILITIES				
Trade and Other Creditors	8,905,840		5,320,740	
Bank Overdraft	9,657,168		132,640	
Accruals	278,482		143,082	
	18,841,490		5,596,462	
EXCESS OF CURRENT ASSETS OVER CURRENT LIBILITIES	24,145,849		24,037,032	
NET ASSETS	**143,344,821**		**144,178,938**	
FUNDED BY				
SHARE CAPITAL				
5,000,000 Ordinary shares of N1.00 each	5,000,000		5,000,000	
Profit and Loss Account	64,111,495		44,653,793	

Director's Current Account	74,233,326	94,525,145
	143,344,821	**144,178,938**

TABLE 9.1 Balance Sheet

JUMBO NIGERIA LIMITED
Trading, Profit and Loss Account
For the Year ended 31st December, 2006

	2006		2005
	N	N	N
EARNINGS		148,949,159	113,267,236
Opening Stock of Finished Goods	(4,421,469)		(3,463,204)
Cost of Production transferred from Manufacturing Account	(120,564,747)		(85,314,002)
	124,986,216)		(88,777,206)
Less Closing Stock of Finished Goods	14,998,147		4, 421,469
Cost of Goods sold	(109,988,069)		(84,355,737)
Gross Profit	38,961,090		28,911,499
Marketing and Distribution Expenses	(1,345,263)		(889,870)
Indirect Expenses	(14,970,878)		(10,311,051)
Profit before Depreciation	22,644,949		17,710,578
Depreciation	(2,968,765)		(3,110,431)
Profit after Depreciation	19,676,184		14,600,147

Table 9.2. Income Statement

JUMBO NIGERIA LIMITED
Statement of Cash Flow
For the Year ended 31st December, 2006

CASH FLOW FROM OPERATING ACTIVTIES	2006 N	N	2005 N
Profit before Taxation		19,676,184	14,600,147
Adjustment for item not involving movement of Cash:			
Depreciation		17,246,934	15,786,200
Accrued audit fee		60,000	60,000
OPERATING PROFIT BEFORE CHANGES IN OPERATING ASSETS AND LIABILITIES		36,983,118	30,446,347
CHANGES IN OPERATING ASSETS AND LIBILITIES			
(Increase)/ Decrease in Stock	(11,381,063)		(5,141,332)
(Increase)/ Decrease in Trade Debtors	(1,673,284)		(1,268,523)
(Increase)/ Decrease in Staff Advances	(324,385)		(349,390)
(Increase)/Decrease in Trade Creditors	3,585,100		3,901,448
Accrued Audit Fee Paid	(60,000)		(50,000)
(Increase)/(Decrease) in Directors' Current A/c	(20,291,819)		44,645,687
	(30,145,451)		41,737,890
Tax Paid	(83,082)		(32,920)
		(30,228,533)	41,704,970
NET CASH FLOW FROM OPERATING ACTIVITIES		6,754,585	72,151,317

CASH FLOW FROM INVESTING ACTIVITIES		
Purchase of Fixed Assets	(16,304,000)	(72,515,608)
CASH FLOW FROM FINANCING ACTIVITIES		
Increase/(Decrease) in Bank Overdraft	9,524,528	132,640
Increase in Cash and Cash Equivalents	(24,887)	(231,651)
Opening Cash and Cash Equivalents	3,086,548	3,318,199
CLOSING CASH AND CASH EQUIVALENTS	**3,061,661**	**3,086,548**

Table 9.3. Cash flow Statement.

ANSWERTO SELF-ASSESSMENT EXERCISE

The four assets that can be found in the current assets section of the balance sheet are:

1. Cash at hand
2. Cash at bank
3. Stock
4. Accounts receivable.

4.0 CONCLUSION

In this unit, we have discussed financial analysis. We discussed financial Statements which we said contain information on the financial affairs of the firm. We also discussed the nature of financial analysis. All these put together, provide a background for more discussions.

5.0 SUMMARY

This unit treats financial analysis. Financial analysis as discussed is the process of Identifying the financial strengths and weaknesses of the firm by establishing relationships between the Items of the balance sheet and the Income Statement. In the next unit, we shall discuss financial analysis - part two. This is a continuation of financial analysis.

6.0 TUTOR-MARKED ASSIGNMENT

Discuss financial Statements you know and the Information they contain.

7.0 REFERENCES/FURTHER READINGS

Pandey, I M (2002). *Financial Management,* Vikas Publishing house, PVT Ltd, 8th Edition.

UNIT 5 FINANCIAL ANALYSIS - II

CONTENTS

1.0 INTRODUCTION

In the last unit (Unit 9), we discussed Financial Analysis- I. We discussed financial Statements and basically talked about the balance sheet, the income statement and the cash flow statement. We also discussed the nature of financial analysis and isolated ratios as powerful tools of analysis.

In this unit, we shall continue with the financial analysis. Unit 9 presents the theoretical framework while in this unit (unit 10), we shall practically engage our selves in financial analysis.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- Conduct proper financial analysis of the firm.
- Discuss the strengths of ratio analysis in the financial analysis.

3.0 MAIN CONTENT

3.1. Financial Analysis - II

In the last unit (Unit 9), we provided the background for this unit which focuses attention on practical financial analysis. For our practical examples, we shall use the financial statements of Jumbo Nigeria limited as set out in unit 9. The financial statements are:

1. Balance sheet as at 31st December, 2006
2. Trading, profit and loss for the year ended 31st December, 2006.
3. Statement of cash flow for the year ended 31st December, 2006.

3.1.1 Liquidity Ratios

Liquidity ratios measure the ability of the firm to meet its current obligations. Liquidity ratios by establishing a relationship between cash and other items of current assets to current obligations provide a quick measure of liquidity. The firm must ensure that it meets it current obligations as and when due. It should be able to pay its suppliers, bankers and short term creditors. In the literature, the liquidity ratios are the current ratio and quick ratio.

Current Ratio

The current ratio is calculated by dividing current assets by current liabilities. So we write thus:

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

The current assets include cash at hand, cash in bank, stock and all other assets which can be converted to cash in a year. Also liabilities maturing within a year are included in current liabilities. They will include bank overdraft, tax liabilities etc.

For Jumbo Nigeria limited, in 2006, Current ratio is

$$\text{Current ratio} = \frac{\text{Current assets}}{\text{Current liabilities}}$$

$$= \frac{\text{N42, 987,339}}{\text{N18, 841,490}}$$

$$= 2.28: 1$$

A high value of the current ratio indicates that the firm will be able to pay its bills as when due. Jumbo Nigeria limited has a current ratio of 2.28:1 and therefore is considered liquid.

As a conventional rule, a current ratio of 2: 1 or more is considered satisfactory. However, the analyst has to use his or her judgment to take a closer look at the quality of the current assets. For example if the firm's debtors are slow paying or bad debtors, the current ratio might be misleading.

The Quick Ratio (acid- test ratio)

The quick ratio or acid- test ratio is a more stringent measure of the firm's liquidity. The ratio establishes a relationship between the quick or liquid assets and current liabilities.

The quick assets include cash, book debts (debtors and bills receivable) and marketable securities like treasury bills. The quick ratio is calculated by dividing quick assets by current liabilities.

$$\text{Quick ratio} = \frac{\text{Quick assets}}{\text{Current liabilities}}$$

For Jumbo Nigeria limited in 2006, the quick ratio is:

$$\text{Quick ratio} = \frac{\text{Quick assets}}{\text{Current liabilities}}$$

$$= \frac{\text{N14, 762,934}}{\text{N18, 841,490}}$$

$$= 0.78:1$$

As a conventional rule, a quick ratio of 1:1 is considered satisfactory. But the analyst has to interpret the quick ratio with a measure of caution.

3.1.2 Leverage (or Capital Structure Ratios)

The firm has short term creditors like the bank that provides an overdraft facility. The firm also has long term creditors like debenture holders. Leverage or capital structure ratios are used to indicate the relationship between funds provided by owners and creditors.

It is important to understand that between debt and equity, debt is riskier from a firm's point of view. A firm that has debt in the capital structure has an obligation to pay interest and principal whether a profit is made or not. This introduces risk.

Generally in the analysis, a firm with a high level of debt in the capital structure is considered a risky firm. But at the same time, financial

leverage is desirable. It enables shareholders to magnify their earnings by trading on equity. Generally leverage ratios can be calculated from the balance sheet.

One of the leverage ratios is the debt- equity ratio. The debt- equity ratio is calculated thus:

$$\text{Debt – equity ratio} = \frac{\text{long term debt}}{\text{Shareholders equity}}$$

Or

$$\text{Debt – equity ratio} = \frac{\text{Total debt}}{\text{Shareholder's equity.}}$$

For the Jumbo Nigeria limited in 2006, the debt – equity ratio can be calculated thus:

$$\text{Debt – equity ratio} = \frac{\text{Total debt}}{\text{Shareholders equity}}$$

$$= \frac{\text{N18, 841,490}}{\text{N69, 111,495}}$$

.272:1 or 27.2%.

In the literature, there is this controversy whether we should include current liabilities as part of debt for purposes of calculating the debt – equity ratio. A school of thought suggests that since the current ratio measures the firm's ability to settle current liabilities there is no need to include current liabilities when calculating the debt – equity ratio.

Another school of thought insists that current liabilities should be included in calculating the debt – equity ratio.

In interpreting the debt – equity ratio, the analyst should exercise some measure of caution. A very high proportion of debt in the capital structure is unfavourable because the firm will be seen as highly leveraged and therefore risky. However, a low debt – equity ratio indicates that the owners' claims are greater than that of the external debtors.

SELF-ASSESSMENT EXERCISE

List four quick assets that you know.

3.1.3 Activity Ratios

As you are aware, in doing business, the firm makes use of its own funds together with the funds of creditors. These funds finance the assets of the firm. Activity ratios are usually employed to measure the efficiency with which the firm manages its assets. The activity ratios are also known as turnover ratios. They are called turnover ratios because they measure the speed with which the firm's assets are converted or turned into sales. Generally therefore, activity ratios seek to establish the relationship between a firm's assets and sales. We shall now discuss some of the activity ratios.

Inventory (or stock) Turnover

The inventory or stock turnover indicates the efficiency of the firm in managing inventory. It is usually calculated by dividing cost of goods sold by average inventory:

$$\text{Inventory turnover} = \frac{\text{cost of goods sold}}{\text{Average Inventory.}}$$

Cost of goods sold is computed by deducting closing stock of finished goods from the total of opening stock of finished goods and costs of production.

Average inventory is the average of opening stock of finished goods.

So using the Jumbo Nigeria limited as our example, we can compute the inventory turnover for year 2006.

$$\text{Inventory turnover} = \frac{\text{Cost of goods sold}}{\text{Average inventory}}$$

$$= \frac{\text{N109, 988,069}}{\text{N4, 421,469 + N14, 998,147/2}}$$

$$= \frac{\text{N109, 988,069}}{\text{N9, 709,808}}$$

$$= 11.32 \text{ times.}$$

However if the cost of goods sold is not available in an income statement, then the inventory turnover may be computed by dividing sales by the closing inventory.

So we can now write thus:

$$\text{Inventory turnover} = \frac{\text{Sales}}{}$$

Inventory.

Generally the interpretation of the ratio should be perfectly understood. It indicates the speed at which inventory is being converted into receivables through sales. A high inventory turnover indicates efficiency in inventory management.

Debtor's Turnover

The firm usually will sell some goods on cash basis and some on credit basis. So when a firm sells on credit to its customers it creates book debts. The debtors are expected to pay up at a future date. Generally the liquidity position of the firm is determined by the quality of its debtors and how quickly they are paying their debts. In the analysis, there are two ratios used to judge the quality of debtors. One is the debtors' turnover. Another is the average collection period.

The debtor's turnover is computed by dividing credit sales by the average debtors:

$$\text{Debtors turnover} = \frac{\text{Credit sales}}{\text{Average debtors}}$$

The debtors turnover indicates the number of times on the average that the debtors turnover each year. The higher the value of the debtors turnover, the more efficient is the firm's management of assets.

In some situations, information on credit sales is not available from the financial statements of the firm. In such a case, the analyst computes debtors turnover using sales figures.

So we can now write thus:

$$\text{Debtors turnover} = \frac{\text{Total sales}}{\text{Debtors}}$$

For the Jumbo Nigeria limited in year 2006 debtor's turnover is calculated as follows:

$$\text{Debtors turnover} = \frac{\text{Total sales}}{\text{Debtors}}$$

$$= \frac{\text{N148, 949,159}}{\text{N11, 701,273}}$$

$$= 12.72 \text{ times.}$$

The second ratio is the average collection period ratio. This ratio brings out the quality of the firms debtors clearly. The average collection period shows the number of days the firm waits after making a sale before collecting cash for the sale. The average collection period is computed thus:

$$\text{Average Collection period} = \frac{\text{Days in year}}{\text{Debtors turnover}}$$

$$= \frac{\text{Debtors x Days in year}}{\text{Sales.}}$$

For Jumbo Nigeria limited in year 2006,

$$\text{Average collection period} = \frac{\text{N11, 701, 273 x 365}}{\text{N148, 949, 159}}$$

$$= 28.6 \text{ days.}$$

The shorter a firm's average collection period the better the quality of the debtors and of course the chances of sound liquidity position of the firm. In the analysis, the firm should establish a benchmark for its average collection period.

3.1.4 Profitability Ratios

We have discussed the liquidity ratios, the leverage ratios and the activity ratios. We shall now discuss the profitability ratios.

Business organizations are set up mainly for the profit motive. Profit is the measured difference between total revenues and total expenses of a business. If revenues exceed expenses, the result will be a profit. And if expenses exceed revenues, the result will be a loss. Various groups are interested in whether the firm makes a profit or not. Shareholders who invested in the firm will be interested in knowing the financial results of the firm's operations. Creditors especially banks will also be interested in the profit showing of a business. So also will potential investors and management of the firm. A firm will survive if it makes profit. We shall now discuss the types of ratios used to measure profitability of the firm's operations.

Gross Profit Margin

The gross profit margin (also known as the gross margin) is usually computed by dividing the gross profit by sales. And so we write thus

$$\text{Gross profit margin} = \frac{\text{Sales - Cost of goods sold}}{\text{Sales}}$$

$$= \frac{\text{Gross profit}}{\text{Sales}}$$

For the Jumbo Nigeria Ltd in year 2006,

$$\text{Gross profit margin} = \frac{\text{Sales revenue – cost of goods sold}}{\text{Sales}}$$

$$= \frac{\text{N148, 949, 159 – N109, 988, 069}}{\text{N148, 949, 159}}$$

$$= \frac{\text{N38, 961, 090}}{\text{N148, 949, 159}}$$

$$= 26.1\%$$

The gross profit margin measures the efficiency with which the firm produces each unit of its products. It shows the spread between revenues and costs of production. For example, it shows the percentage of sales that goes to the firm as it operates. The balance is consumed by expenses. A high gross profit margin indicates that the firm is efficient in the management of its expenses. It is a sign of competent management.

Usually a high gross profit margin arises from effective control of expenses and maintenance of good sales price.

A low gross profit margin is a sign of bad management and lack of control over expenses.

Net Profit Margin

The net profit margin is computed by dividing the net profit after taxes by sales.

$$\text{So we write thus:} = \frac{\text{Net Profit after taxes}}{\text{Sales}}$$

For Jumbo Nigeria Limited in year 2006, the Net profit margin can be computed thus:

$$\text{Net Profit margin} = \frac{\text{Net Profit after taxes}}{}$$

$$\text{Net profit margin} = \frac{\text{Net profit after taxes}}{\text{Sales}}$$

$$= \frac{\text{N19, 593, 102}}{\text{N148, 949, 159}}$$

$$= \mathbf{13.1\%}$$

The net profit margin is the final measure of the firm's competence in the management of its resources. A firm with a high net profit margin will survive in the face of competition and falling prices. A firm with a low net profit margin will find it difficult to survive in the market place.

Technically a good analyst is one that should be able to evaluate the gross margin and the net margin jointly. For example if the gross margin increases over years but the net margin decreases, it calls for further analysis to detect the sources of leakages. The sources of leakage must be expenses that are not being controlled.

Return on investment (R O I)

Apart from the gross and net margin, the profitability of the firm can also be measured by the return on investment (ROI). Some of the ratios under the return on investment are:

1Return on total assets (ROTA)
2Return on capital employed (ROCE)
3Return on shareholders equity (ROSE)

Return on total assets (ROTA) is computed by dividing net profit after taxes by the total assets.

So we write thus:

$$\text{Return on total assets} = \frac{\text{Net profit after taxes}}{\text{Total assets}}$$

For Jumbo Nigeria Limited in year 2006, return on total assets is:

$$\text{Return on total assets} = \frac{\text{N19, 593, 102}}{\text{N162, 186, 311}}$$

$$= 12\%$$

Care however should be taken in the computation of total assets. Total assets are made up of total fixed assets of N119,198,972 and total current assets of N42, 987, 339.

The return on total assets (ROTA) is a very useful measure of the profitability of all the financial resources used by the firm in its operation. It does not differentiate whether the funds come from equity or debt.

Apart from the return on total assets, another important profitability ratio is the return on capital employed.

Capital employed is working capital plus non-current assets.

For Jumbo Nigeria Limited in year 2006, capital employed is N143, 344, 821 made up of working capital of N24,145 849 and fixed assets of N119, 198, 972.

Return on capital employed (ROCE) is computed by dividing net profit after taxes by capital employed.

And so we state thus:

$$\text{Return on capital employed} = \frac{\text{Net profit after taxes}}{\text{Capital employed}}$$

For Jumbo Nigeria Limited in year 2006, capital employed can be computed thus:

$$\text{Return on capital employed} = \frac{\text{N19, 593, 102}}{\text{N143, 344, 821.}}$$

$$= 13.6\%$$

Using the same line of argument, return on shareholders equity is defined as net profit after taxes divided by shareholders equity or net worth.

So we can state thus:

$$\text{Return on shareholders equity (ROSE)} = \frac{\text{Net profit after taxes}}{\text{Shareholders equity.}}$$

3.1.5 Earnings per Share and Dividends per Share

The value of the firm depends to a large extent on its earnings and also dividends paid.

Earnings per share can be computed by dividing net profit after taxes by the number of common shares outstanding.

So we write thus:

$$\text{Earnings per share (EPS)} = \frac{\text{Net profit after taxes}}{\text{No. of common shares outstanding}}$$

For Jumbo Nigeria Limited in year 2006, earnings per share can be computed thus:

$$\text{Earnings per share (EPS)} = \frac{\text{N19, 593, 102}}{\text{5, 000, 000}} = \text{N3.91}$$

Dividends per share can be computed by dividing earnings paid to shareholders by the number of common shares outstanding.

3.1.6 Comparative Statements

All along, we have tried to explain the computation of various types of ratios in the financial analysis. But we did that from a static point of view. In financial analysis, there is the need to monitor periodic changes in the performance of the firm. The best way to do that is to prepare comparative statements. And that explains why for Jumbo Nigeria Limited, we had to use a comparative statement.

A good comparative financial statement will contain information for at least two periods so that the analyst can compare the results of the ratios so computed.

In interpreting comparative statements over periods of time, there is the need to understand the direction of change. Apart from detecting the direction of change, the analyst should identify causes of the various changes detected.

ANSWER TO SELF-ASSESSMENT EXERCISE

Four Quick Assets I Know Are:

1. Cash in hand
2. Cash at bank
3. Debtors
4. Marketable securities e.g. treasury bills.

4.0 CONCLUSION

In this unit, we discussed financial analysis. We discussed liquidity ratios, the leverage (or capital structure ratios), the activity ratios and the

profitability ratios. We also discussed comparative statements. In discussing all of the topics, we also did some practical computations which are aimed at making sure that the topics are well understood.

5.0 SUMMARY

This unit treats financial analysis - part two. It tries to build upon the topics that we discussed in unit 9. We devoted a lot of time in this unit to computations of the various ratios in the financial analysis.

We did compute the liquidity ratios, the leverage ratios, the profitability ratios.

In the next unit, we shall discuss "Evaluating financial risk."

6.0 TUTOR-MARKED ASSIGNMENT

The profitability ratios are used to measure the financial performance of the firm.

List four profitability ratios and discuss their computations.

7.0. REFERENCES/FURTHER READINGS

Pandey, I M (2002). *Financial Management*, Vikas Publishing House, PVT Ltd, 8th Edition.

MODULE 3

UNIT 1 EVALUATING FINANCIAL RISK

CONTENTS

1.0 INTRODUCTION

In the last unit (unit 10), we discussed Financial Analysis – II. We discussed and computed the liquidity ratios, the leverage ratios, the activity ratios and the profitability ratios. In this unit, we shall discuss Evaluating Financial risk.

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- Discuss the concept of financial risk
- Discuss how financial risk can be evaluated.

3.0 MAIN CONTENT

3.1 Evaluating Financial Risk

When you examine the right hand side of the firm's balance sheet (the liability side), you will identify the sources of funding for the acquisition of the firm's assets. Prominent among them are equity and debt.
Financial leverage enables the firm to magnify the earnings of its shareholders. But that is when the firm is doing well and posting profits. When a firm begins to encounter difficulties and begins to post a loss, then it might be unable to pay its debtors. In the literature, when a firm introduces debt into its capital structure, it has introduced financial risk into its capital structure. Financial risk arises because the use of debt increases variability of the returns expected by the share holders and also the possibility of insolvency. If the firm decides not to use debt in its capital structure, then it avoids financial risk.

Financial risk from a financial analysis view point may be defined as the possibility that a company may not be able to meet its debt obligations in a timely manner or at all.

In terms of timely manner, we are thinking of periodic repayments of debt which may be spread monthly or quarterly by the lender.

In the literature, analysis of financial risk concentrates on two key areas:-short term liquidity and long term solvency.

3.1.1 Measuring Short-term Liquidity

Short term liquidity means the ability of the firm to meet its current obligations out of cash or near-cash resources. If a firm has a short term liquidity problem, it might translate into a long term problem. And that is why any meaningful measure of the future financial health of the firm should start with a measure of the short term liquidity.

The primary concern of good credit analysis is the liquidity of the firm. Usually, the most useful tool to detect the ability of the firm to meet short term obligations would be to prepare a schedule of anticipated cash receipt and disbursements for various periods. Such schedules normally will be prepared by the management of the firm to guide operations.

But in an ideal situation, the lending banker may not rely on a cash schedule to decide whether or not to make a credit advance to the firm.

The lending banker therefore should look for other tools with which to measure the liquidity of the firm.

The first tool used is working capital analysis. But we shall first define working capital. Working capital is defined as the excess of current assets over current liabilities.

We can write thus:

Working capital = current assets – current liabilities.

In the financial analysis, working capital has been given a very important position. Analysts use it as a starting point to evaluate the short term liquidity of the firm. At a glance and from a technical perspective, working capital represents a cushion or safety margin for current creditors to the firm. The working capital as a figure represents what is left when the creditors are settled from the current assets of the firm. A positive and healthy working capital is desirable at least to give creditors assurance that obligations of the firm will be met timely.
When a bank is considering lending to the firm at least it must satisfy itself that the firm is liquid. Again, the adequacy of the working capital will be evaluated.

Technically, the starting point of working capital analysis is the nature of the firm's operations and also the quality of its assets.

When we say the nature of the firm's operations, we are talking about the type of business that the firm does. Critical information will include the following:

1. The products or services of the firm.
2. The nature of competition in the firm's industry.
3. The competitive position of the firm in the industry.
4. The future of the industry to which the firm belongs.

Generally, for every specific firm, there is a peculiar nature of business. A manufacturing firm will have a long asset conversion cycle starting from purchase of raw materials, manufacturing, and cash sales or credit sales. Also the firm that sells a lot on credit is likely to encounter liquidity problems. Also when you look at the current assets profile of the firm, there is no assurance that the stock of goods will eventually be sold.

Even for manufacturers, we need to distinguish between those with short and those with long production cycles. A bread manufacturing company will have a shorter production cycle compared to a car manufacturing firm. So the company with a longer production cycle will carry a greater degree of risk.

Also the quality of current assets as shown in the financial statements must be fully analysed when determining an adequate level of working capital. We use the term quality to highlight the risk that the realisable value of the current assets will be lower than the value stated in the balance sheet.

If actual realisable value of the current assets is lower than the stated value of the current assets in the balance sheet, then shrinkage has occurred. Also the debtors of the firm may be slow paying debtors and this adds to more risks in dealing with the firm.

Sound analysis also demands that the analyst looks into the ageing schedule of book debts as shown in the balance sheet. A balance sheet may be carrying obsolete debts in its books.

SELF-ASSESSMENT EXERCISE

List three measures of the liquidity of the firm.

3.1.2 Current Ratio

You will recall that in unit 10, we discussed current ratio. We are going to discuss it again but from another perspective. As earlier explained, the current ratio is computed by dividing current assets by current liabilities.

We also said that as a conventional rule, a current ratio of 2: 1 or more is considered satisfactory. We also stressed that the quality of the firm's assets must be taken into consideration in interpreting the current ratio.
We want to introduce a new dimension to our discussion of the current ratio. The changes in a firm's current ratio over time may be fairly difficult to interpret. We shall show that by considering the following data from an imaginary balance sheet.

CA = Current Assets

CL = Current liabilities

Year 2001

CA	CL
200	160

$\frac{CA}{CL} = 1.25$

Year 2002

CA	CL
240	200

$\frac{CA}{CL} = 1.2$

Year 2003

CA	CL
280	280

$\frac{CA}{CL} = 1$

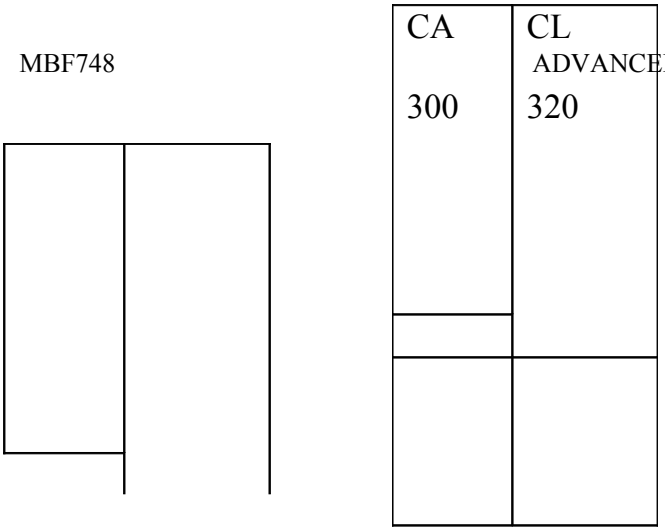
Year 2004

CA	CL
300	300

Year 2005

Year 2006

CA	CL
350	370



CA = 1 CA = 0.9375 CA = 0.945
CL CL CL

You will observe that when the current ratio is greater than one, equal increases in both the current assets (CA) and current liabilities (CL) will decrease the current ratio. You can verify this by examining the imaginary balance sheet and comparing year 2001 and year 2002. In year 2001, current ratio stood at 1.25, but in year 2002, following equal increases in current assets and liabilities, the current ratio declined to 1.2

Also when the current ratio is less than 1 equal increase in both current assets and current liabilities will increase the current ratio. You should again confirm this by examining the imaginary balance sheets for year 2005 and year 2006. In year 2005, current ratio stood at 0.9375, but in year 2006, following equal increases in both current assets and current liabilities, the current ratio increased to 0.945

We have brought out these examples to alert the analyst about the difficulties in interpreting the current ratio over time.

A major practical problem associated with current ratio is that of accounting window- dressing. Most firms window-dress their financial statements to show good liquidity.

3.1.3 Measuring Long-term Solvency

We have discussed the evaluation of short term liquidity risks for the firm. We shall now discuss the measurement of long term solvency. By long term solvency, we mean the ability of the firm to meet its obligations as they become due.

Long term debt of the firm will usually involve the payment of principal and interest at the ruling rate. In discussing long term solvency of the firm, the concept of financial leverage comes to the fore front. You will recall that in unit 10, we discussed leverage (or the capital structure

ratios). But we did not discuss leverage in detail. Now we shall discuss the financial leverage properly as it will assist us in understanding financial risk.

There are two ways of looking at financial risk. Firstly, from the shareholders' view point. Introduction of debt into the capital structure of the firm introduces financial risk. And so we can easily see that even the return to the shareholders becomes rather uncertain and varies according to the level of profit. Before the shareholders can earn any returns, the creditors of the firm such as banks must have been paid interest and other obligations. So when the profits shrink, it might not be possible for the shareholders to get any returns as there will be nothing to share.

The second way of looking at financial leverage is from the lending banker's view point. At the point the bank is requested to lend money to the firm on long term, what comes to mind easily is financial leverage.
There are various measures of financial leverage in the literature. But for our discussion, we shall define leverage as total liabilities divided by tangible net worth.

So we write thus:

$$\text{Financial leverage} = \frac{\text{Total liabilities}}{\text{Tangible Net Worth.}}$$

Tangible net worth is the book value of Net Worth less intangible assets as shown on the spread sheets.

When computed, financial leverage ratios indicate how much the firm is relying on creditors to fund its assets. Firms with high leverage rely heavily on external fund to finance their assets acquisition and so are very risky.

Practically, leverage can be either favourable or unfavourable. And everything depends on the existing circumstances in industry, competition and rates of return. We shall now look at leverage practically using the example of two firms A and B.

Worked Example

Firms A and B are identical and engaged in the same business. However firm B is levered (i.e. it has debt in the capital structure)

	Firm A	Firm B
Assets	₦5, 000,000	₦ 5,000, 000

Debt	N 0	N2,500,000 (10% debenture)
Equity	N 5,000, 000 (5,000,000 Ordinary shares)	N2, 500,000 (2,500,000. Ordinary shares)
Rate of return (before taxes)	20%	20%

Calculate EPS (earnings per share) for firms A and B. Assume that the tax rate is 30%.

Solution

	Firm A	Firm B
	N	N
Earnings before Interest and taxes	1,000,000	1,000,000
Less Interest paid	0	250,000
Earnings after interest	1, 000,000	750, 000
Less taxes at 30%	300,000	225, 000
Earnings after taxes	700, 000	525,000
No. of shares	5,000,000	2,500,000
Earnings per share (EPS)	₦0.14	₦0.21

This is an example of a favourable financial leverage. But leverage can turn out to be unfavourable. We shall demonstrate that by using the same data for firms A and B. but we shall reduce rate of return before taxes to 6%.

Worked Examples

Firms A and B are identical and engage in the same business. However firm B is levered (i.e. it has debt in the capital structure

	Firm A	**Firm B**
Assets	N5, 000,000	N5,000,000
Debt	N 0	N2,500,000(10 %debenture)
Equity	N5, 000,000 (5,000,000 ordinary shares)	N2,500, 000 (2,500,000 ordinary shares)
Rate of return (before taxes)	6%	6%

Calculate EPS (earnings per share) for firms A and B.
Assume that the tax rate is 30%.

Solution

	Firm A	**Firm B**

	N	N
Earnings before Interest and taxes	300,000	300,000
Less Interest paid	0	250,000
Earnings after interest	300, 000	50, 000
Less taxes at 30%	90,000	15, 000
Earnings after taxes	210, 000	35, 000
No. of shares	5,000,000	2,500, 000
Earnings per share (EPS)	₦0.04	₦0.01

It is therefore clear that leverage can be either favourable or favourable. If earnings of the firm are increasing, then leverage is a good option. However, when the earning of the firm shrinks, financial risk come to the forefront.

3.1.4 Business Risk and Financial Risk

Using the example of firms A and B, we have demonstrated the fact that financial leverage magnifies the share holders' returns under favourable conditions. But under unfavourable conditions, leverage exposes shareholders to financial risk. Financial risk is different from business risk. The firm's business risk is basically related to its investment decisions and asset mix, so we can define business risk as the variability in returns on assets. Business risk is unavoidable in the firm's environment. All firms face business risk. Consider two firms A and B in the Market place as shown in figure 11.1.

FIRM A FIRM B

	Debt N40,000,000
Business risk	
	Equity N60,000,000

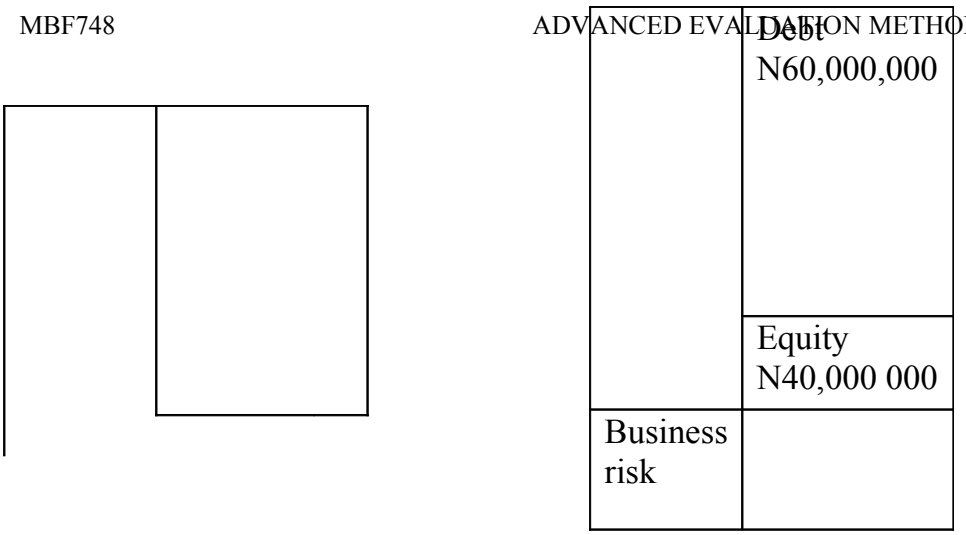


Figure 11. 1. Business risk

Technically equity holders should absorb a firm's business risk and not creditors. In the example as shown in figure 11.1, Firm A many be Judged to be more highly leveraged than firm B because it has a high proportion of business risk. This is despite the fact that firm B has a higher debt than firm A. This is so because of the level of business risk facing firm A.

ANSWER TO SELF-ASSESSMENT EXERCISE

Three measures of the liquidity of the firm are:

1. Working capital
2. Current ratio
3. Quick ratio.

4.0 CONCLUSION

In this unit, we discussed Evaluating Financial risk. We discussed measuring short term liquidity. We discussed current ratio and also the measurement of long term solvency. We also discussed business risk and financial risk. All these enabled us to understand evaluation of financial risk.

5.0 SUMMARY

This unit treats evaluating financial risk. Financial risk arises when the firm introduces debt into its capital structure.

The unit also examines the measurement of short term liquidity and long term solvency. Both assist in the evaluation of financial risk. In the next unit, we shall discuss "Evaluating company performance".

6.0 TUTOR-MARKED ASSIGNMENT

Distinguish between business risk and financial risk.

7.0 REFERENCES/FURTHER READING

Pandey, I M (2002). *Financial Management*, Vikas Publishing House, PVT Ltd, 8th Edition.

UNIT 2 EVALUATING COMPANY PERFORMANCE

CONTENTS

1.0 INTRODUCTION

In the last unit (unit11), we discussed evaluating financial risk. We discussed current ratio. We discussed measuring long- term solvency risk. All these enabled us to understand evaluating financial risk. In this Unit, we shall discuss **Evaluating company performance.**

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- Evaluate company Performance
- Discuss the evaluation of company performance.

3.0 MAIN CONTENT

3.1 Evaluating Company Performance

The asset conversion cycle of the firm describes how the company manufactures its products, sells and generates cash. This asset conversion cycle is explained by the balance sheet. The asset side shows the resources of the firm at the various stages of the Cycle. The liability

side shows the sources of finance for the assets. The income statement of the firm presents a summary of the financial results of the completion of the various asset conversion cycles during one period usually one year. It shows the profitability of the firm. Generally in the theory of the firm, profits are the reason for the existence of the firm. Whether profit should be maximized or not is not the issue. But the fact remains that businesses are established to make profit.

The only way to measure the success of the firm is through the profit showing. We can therefore state that the Income statement is the main tool for evaluating the performance of the firm. And that is essentially the focus of this unit. Technically, profit of the firm is arrived at through the deduction of expenses from sales revenue. Therefore, evaluation of the profitability of the firm should require a good understanding of the key factors that determine the firm's revenue and expenses profile.

The operating business environment of the firm is given. The cost structure in the industry and competition are given. And so every firm operates within the given environment.

Although the environment is given for all firms, the reactions of the various firms will be very different. And so will be their management. All these contribute to differences in profit takings amongst all firms. It is our intention in this unit, to probe deep into the key determinants of profitability.

3.1.1 The Key Elements of the Income Statement

Generally when you look at the income statement, it will report the outcome of the financial operations of the firm. It will show the expenses, the sales revenue and the net profit figure. If sales revenue exceeds expenses, the result will be profit. If however expenses exceed sales revenues, the result will be a loss.

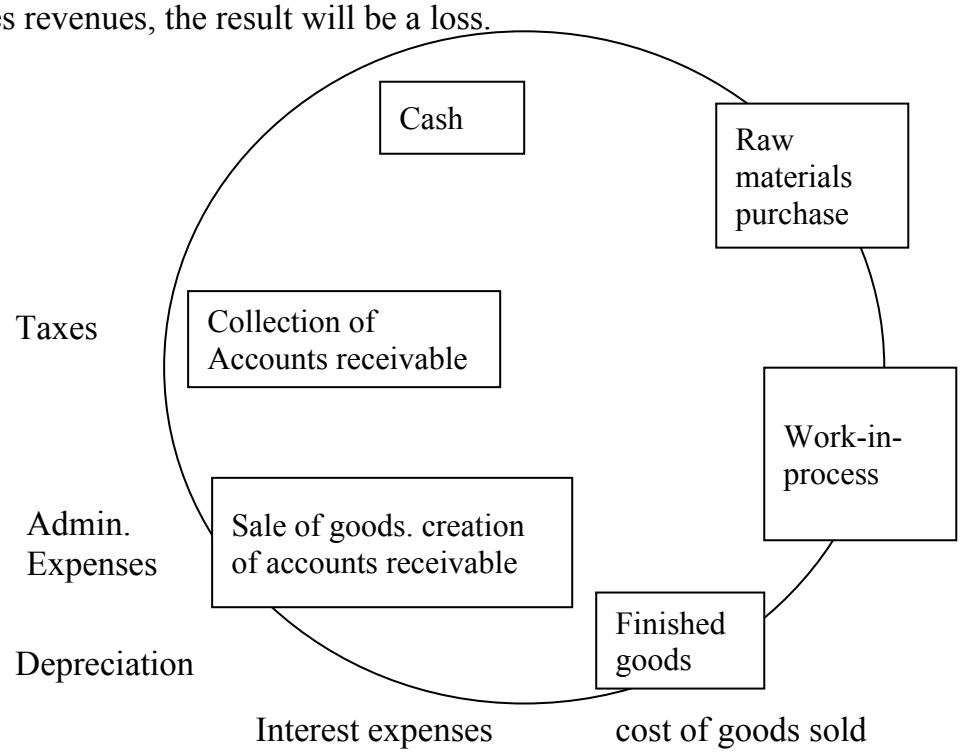


Figure12.1. Expenses and the asset conversion cycle

The asset conversion cycle as in figure 12.1, shows at a glance the relationship between the expenses of the firm and the asset conversion cycle. Technically, the asset conversion cycle starts with raw materials purchase. When raw materials are purchased, it heralds the beginning of asset conversion. This leads to materials being assembled and which leads to work – in- process. Work –in- process ultimately leads to the production of finished goods of the firm. The finished goods could be consumer goods, intermediate goods or capital goods. From the finished goods state, the asset conversion cycle moves on to the sale of the finished goods. Some proportion of finished goods usually will be sold on cash basis and another proportion will be sold on credit basis. Sale of goods on credit will lead to the creation of accounts receivable. The proportion of finished goods that will move into the accounts receivable category will of course depend on the credit policy of the firm. When the accounts receivable are collected (i.e when the debtors pay up) then cash is realized to complete the asset conversion cycle of the firm.

At the same time, we need to understand the flow of expenses as the firm goes through the asset conversion cycle.
The key expenses along the line include the following:

1. Depreciation
2. Cost of goods Sold
3. Interest expenses
4. Administrative expenses
5. Taxes

We shall now discuss the format of the Income Statement of the firm.

INCOME STATEMENT FORMAT

NET SALES

Cost of Goods Sold

Depreciation

GROSS PROFIT

Selling General and Administrative expenses
Depreciation.

NET OPERATING PROFIT

Interest expenses

Sundry income or expenses

NET PROFIT BEFORE TAX

Provision for income tax

Unusual Items

NET PROFIT AFTER UNUSUAL ITEMS

Cash dividends

RETAINED EARNINGS FOR PERIOD

Figure12.2. Income Statement Format

JUMBO NIGERIA LIMITED
Trading, Profit and loss Account
For the Year Ended 31st December 2005

Sales Revenue ……..	113,267,236
Opening stock of Finished goods …….	(3,463,204)
Cost of production transferred from the Manufacturing account ……	(85,314,002)
Less closing Stock of Finished goods	4,421,469
COST OF GOODS SOLD	(84,355,737)
GROSS PROFIT	28,911,499
Marketing and distribution expenses	(889,870)
Indirect Expenses	(10,311,051)
Profit before depreciation	17,710,578
Depreciation	(3,110,431)
Profit after depreciation	14,600,147
Interest Expenses	(200,000)
Profit before tax	14,400,147
Taxation	(4,000,000)
Profit after Tax 10,400,147	

Table12.1: Income Statement

Sales Revenue

We shall start our discussion of the income statement by looking at sales revenue. In the income statement revenue is the most important item as it is what comes into the firm by way of naira and kobo. Revenue is the life wire of the firm. To define revenue of the firm, we write thus:

Sales revenue = Number of Units Sold x Price per unit.
Following the rules of market behavior, it is possible to increase revenue by bringing down the unit price of the good thereby encouraging increased purchases. This will increase sales volume.

Also sales revenue can be increased through increase in price while holding the volume constant. Because the income statement does not include the breakdown of prices and volumes sold by the firm, the analyst should be able to understand the factors that affect the revenues of the firm.

The firm is not alone in the market place. The revenue showing of the firm will depend amongst other things on the firm's Installed capacity and of course the actual operating capacity. Competition amongst various firms in the industry will also affect the revenue of the firm and so will Government controls and regulation as in the prices of petrol and diesel.

Cost of goods sold

Cost of goods sold reflects the entire costs associated with the goods that must have been produced and sold within the period under review. For a manufacturer, cost of goods sold will consist of:

1. Cost of Materials
2. Direct labour costs
3. Over heads.

To compute cost of goods sold, the following equation is used:
Cost of goods Sold = opening stock of finished goods + cost of production transferred from the manufacturing account less closing stock of finished goods.

So for Jumbo Nigeria Limited, cost of goods sold
= N3, 463,204 + N85, 314,002 – N4,421, 469.

That gives us a figure of N84, 355,737.

Having computed cost of goods sold, it is possible to measure the relationship between cost of goods sold and sales. Such a ratio would be:

$$\frac{\text{Cost of goods sold}}{\text{Sales}} = \frac{\text{N84, 355,737}}{\text{N113, 267,236}} = 74.47\%$$

What it means is that for each N1.00 of sales revenue, N0.74.47 was spent on the goods sold.

Gross Profit Margin

When the cost of goods sold is deducted from sales revenue, we get what is known as the gross profit in naira terms.

$$\text{Gross Profit Margin} = \frac{\text{Gross Profit}}{\text{Sales}}$$

For the Jumbo Nigeria Limited, gross Profit Margin can be computed thus:

$$\text{Gross Profit Margin} = \frac{\text{N28, 911,499}}{\text{N113, 267,236}} = 25, 52\%$$

What it means is that for every N1 of sales revenue, the company's gross profit is N0.25.52. The gross profit margin is very important. It is a key indicator of the firm's ability to pass on costs to its customers.'

Any changes in the gross profit margin over time need to be analysed especially if it begins to decline. Decreasing gross margin means that the firm will be unable to pass on price increases to customers.

Marketing and Distribution expenses

Marketing and distribution expenses largely depend on the sales techniques used by the firm. Marketing expenses also depend on the nature of the business of the firm.

In marketing the products of the firm, advertisements may be employed. And if the area to be covered is large, the higher the expenses involved. Distribution of goods also involves further expenses. All these add up to make marketing and distribution.

Interest expenses

When the firm borrows money, it has to pay interest in addition to repaying the money borrowed. So interest expenses are the cost of borrowed funds. There are many types of funds which the firm can borrow. The first is the bank loan. When the firm takes the loan, it has to repay the principal plus the interest. The interest component is charged to the income statement while the principal repayment is paid out of the cash flows of the firm. The overdraft is also a form of borrowing. Many banks usually grant overdrafts to the firm for working capital purposes. In the ideal situation, the overdraft is granted at a specific level say N5 million and expires in one year but could be renewed subject to satisfactory operations by the firm. Most firms will pay interest on overdraft monthly as the debits for interest are passed on to the accounts of the firm by the banks.

Taxation

The evaluation of the performance of the firm is done on an after-tax basis. That is after taxes have been deducted to arrive at net profit usually termed profit after tax.

In most situations, the tax payable by the firm is estimated after the necessary adjustments involving capital allowances and depreciation. Most of the taxes to be paid appear as provisions. They will be paid in the future.

SELF-ASSESSMENT EXERCISE

List two ways in which the firm can increase its sales revenue

ANSWER TO SELF-ASSESSEMENT EXERCISE

The firm can increase its sales revenue by:

1. Increasing sales volume while holding prices constant.
2. Increasing prices while holding sales volume constant

4.0 CONCLUSION

In this unit, we have discussed the key elements of the income Statement. We discussed expenses and the asset conversion cycle. We discussed the format of the Income statement. We discussed the components of the income Statement – the gross profit, interest expense, taxes etc. All these assisted in our understanding of company performance.

5.0 SUMMARY

This unit treats the evaluation of company performance. We have seen from our analysis of the income statement that profitability of the firm depends on the nature of its operations, its cost structure and the ability of management to control costs and increase revenue.

In the next unit, we shall discuss **Evaluating cash flow statements**.

6.0 TUTOR-MARKED ASSIGNMENT

Discuss the various stages of the asset conversion cycle of the manufacturing firm.

7.0 REFERENCES/FURTHER READINGS

Pandey, I M (2002). *Financial Management,* Vikas Publishing House: PVT Ltd 8th Edition.

UNIT 3 EVALUATING CASH FLOW STATEMENTS

CONTENTS

1.0 INTRODUCTION

In the last unit (unit 12), we discussed the evaluation of company performance. We discussed the key elements of the Income Statement. We also discussed the income statement format. We also discussed revenue and expenses of the firm.
In this unit, we shall discuss **"Evaluating cash flow statements".**

2.0 OBJECTIVES

Be the end of this unit, you should be able to:

- Understand the meaning of cash flows
- Discuss the Interpretation of cash flow statements.

3.0 MAIN CONTENT

3.1 Evaluating Cash Flow Statements

In the last unit, we discussed the evaluation of company performance. We discussed how to evaluate the profitability of the firm following the management of the assets conversion cycle. In this our current discussion, we are beginning to ask key questions:

1If the firm borrows money, will it be able to repay?
2If the firm can repay, what is the degree of certainty?

The answers may not be found in the balance sheet or the income statement. Rather, the cash flow statement will answer such questions. The best way to evaluate the ability of the firm to repay debt and interest is by examination of the cash flow statement.

The cash flow statement is a report of the inflows and out flows of cash of the firm. It is a statement of cash in and cash out. Technically speaking, the cash flow statement is the most important tool that explains the financial transactions of the firm. It is the key tool of credit and financial analysis especially for bank lending.

At this juncture, it will be very important to stress that the income statement is very different from the cash flow statement of the firm. We advance four reasons why the income statement is not the same as the cash flow statement.

Firstly, due to the concept of accrual accounting, net income which is usually reported in the income statement will not be equal to net cash inflow. When incomes are recognized in the income statement, they may not exactly mean the actual receipt of cash. Some of the sales revenues reported in the income statement may be trapped in accounts receivable. They will not be cashed until the accounts receivable are converted to cash.

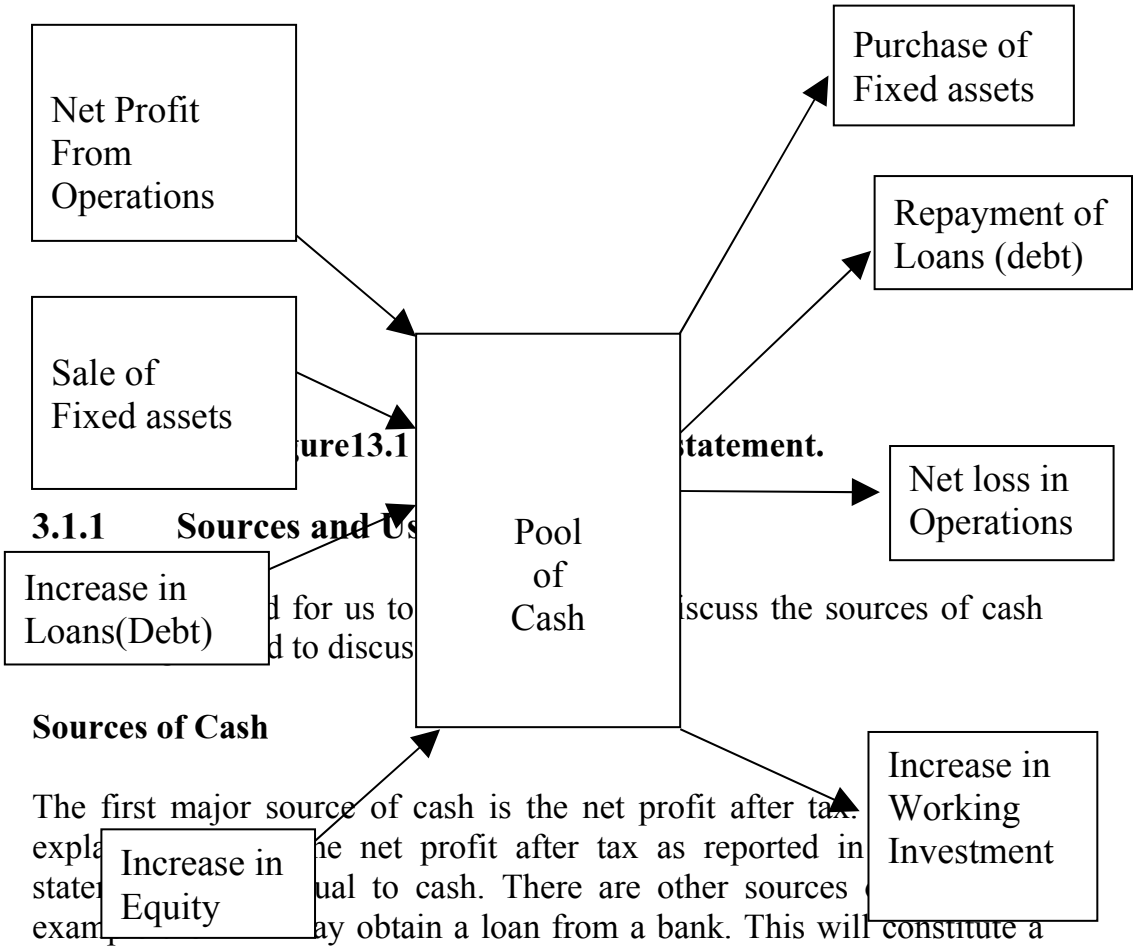
Secondly, the recognition of expenses as contained in the income statement may not actually be evidenced by disbursement of cash. For example debts owed to employees and other creditors though appearing in the income statement may not be strictly followed with actual cash disbursement.

Thirdly, is the concept of Depreciation. While depreciation is charged to the income statement of the firm, it does not involve any outflow of cash.

Finally, some firms earn money from their investments which are different from their normal operation. For example a food manufacturing firm may invest its surplus funds in shares of companies quoted on the stock exchange. And indeed, some firms disburse cash following transactions which may not be reported in the income statement. For example when the firm makes a loan repayment it does not appear in the income statement. Rather it appears in the cash flow statement.

We have taken the liberty to make this important clarification to demonstrate the fact that the receipt of cash is a clearly defined objective of the firm. The importance of the cash flow statement is brought to the front when we realise that it provides a link between two balance sheets. It shows how cash came in and went out between two comparable periods.

SOURCES OF CASH USES OF CASH



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3.1.1 Sources and Us

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Sources of Cash

The first major source of cash is the net profit after tax. expla e net profit after tax as reported in state ual to cash. There are other sources exam ay obtain a loan from a bank. This will constitute a source of cash. Also the firm may sell some ageing fixed assets like vehicles and collect cash in return.

The firm can also get cash from increase in equity. This is a situation where the owners of the firm or new members inject cash into the firm.

Uses of Cash

A look at figure 13.1 explains the sources of cash. We can see how all the sources of cash all empty into the central pool.

The next things to consider are the uses of cash. The first item that uses cash is purchase of fixed assets. The firm may purchase fixed assets like plant and machinery and this will use cash. Again if the firm is indebted to the banks for loans earlier granted, loan repayments will constitute uses of cash. Also increases in working investment can use up cash of the firm.

Another major use of cash is for the payment of dividends. But for analytical purposes, we treat payment of dividend as discretionary. It is discretionary in the sense that payment of dividends may not take priority over the repayment of loan principal.

Practically therefore, the analyst in casting the cash flows must first contain the interest of external funders before allocating cash for the use of the internal owners of the firm.

SELF-ASSESSMENT EXERCISE

List four sources of cash for the firm.

CICO NIGERIA LIMITED
BALANCE SHEET (N'000)

	1990	1991	1992
ASSETS			
Cash……..	5,972	8,160	10,626
Receivables …….	56,263	59,404	74,023
Inventory…….	78,821	63,981	82,953
Current assets….	141,056	131,545	167,602
Equipment…….	113,642	135,938	148,500
Acc.Depreciation….	(38,387)	(46,876)	(55,821)
Equipment	75,255	89,062	92,679
Prepaids……	1,877	2,138	1,754
Sundry assets…	6,650	6,804	6,320
**Total…… **	**224,838**	**229,549**	**268,355**
LIABILITIES			
Notes……	9,932	9,003	14,799
Financing costs:	2,224	2,497	5,070
Accounts payable:	17,153	17,074	21,847
Accrued expenses...	11,227	10,211	13,564
Taxes payable….	8,695	219	7,344
Sundry liabilities…	12,112	10,409	11,659
Current liabilities	61,343	49,413	74,283
Long term debt ...	44,680	55,465	59,484
Total liabilities...	106,023	104,878	133,767
Deferred taxes…	5,348	9,906	10,394
Share capital	9,565	9,565	9,565
Capital surplus…	40,443	40,443	40,443
Retained earnings...	63,459	64,757	74,186
Net-worth…….	113,467	114,765	124,194
Total	**224,838**	**229,549**	**268,355**

Table 13.1: The Balance Sheet

CICO NIGERIA LIMITED
INCOME STATEMENT (N'000)

	1990	1991	1992
NET SALES	296,348	282,608	361,929
Cost of goods sold	177,517	187,508	233,205
Depreciation Expenses	7,727	9,535	10,508
GROSS PROFIT	111,104	85,565	118,216
Selling General & Admin Expenses	71,884	69,303	85,576
NET OPERATING PROFIT	39,220	16,262	32,640
Interest Expense	4,126	6,337	7,160
Sundry	880	461	-
NET PROFIT BEFORE TAX & UNUSUAL ITEMS	34,214	9,464	25,480
Provision for Income Taxes:			
Current	14,829	5,123	12,720
Deferred	2,471		
NET PROFIT BEFORE TAX & UNUSUAL ITEMS	16,914	4,341	12,760
Cash Dividends	3,042	3,043	3,331
RETAINTED EARNINGS FOR PERIOD	13,872	1,298	9,429

Table13.2: The Income Statement

CICO NIGERIA LIMITED
CASH FLOW STATEMENT (N'000)

	1990	1991	1992
NET Profit	16,914	4,341	12,760
Depreciation non- Cash Charges	7,727	9,535	10,508
Tax Provision	17,300	5,123	12,720
T0TAL SOURCES FROM OPERATIONS:	41,941	18,999	35,988
Existing Debt Amortization	(850)	(2,224)	(2,497)
Taxes Paid	(13,388)	(9,041)	(5,107)
SOURCES AFTER DEBT AMORTIZATION/ TAXES	27,703	7,734	28,384
Net Plant Expenditure	(28,196)	(23,342)	(14,125)
Working Investment	(37,565)	10,604	(25,465)
Dividends	(3,402)	(3,043)	(3,331)
Sundry Assets	(1,122)	(415)	868
Sundry Liabilities	2,494	(1,703)	1,250
CASH BEFORE FINANCING	(39,728)	(10,165)	(12,419)
Short term debt	5,030	(929)	5,796
New Long Term Debt Drawdowns	25,205	13,282	9,089
Equity	270	-	-
CASH	(9,223)	2,188	2,466

Table 13.3: The cash flow Statement.

3.1.2 Interpreting the Cash Flow Statement

Table 13.3 is the cash flow statement of CICO Nigeria Limited which we shall use as a model for the interpretation of the cash flow statement. Take a look at the cash flow statement of 1990. The first major block to be computed is Total Sources from Operations.

You will note that depreciation is added back to net profit because it does not involve any use of cash but had been deducted before arriving at net profit. Also note that tax provision of N17, 300,000 is added back because it is a provision already deducted before arriving at net profit. The tax provision of N17,300,000 is made up of provisions of N14,829,000 + N2,471,000 as seen in the income statement in Table 13.2.

Our attention is drawn to how the cash from operation was then applied first to wards meeting tax payments and amortization of debt. We argue that this is the core attention of credit analysis.

It is important in the analysis that the firm be able to meet its debt obligations from cash from normal operations.
It is after the debt obligations of the firm have been met that all other outflows will be accommodated.
In interpreting the cash flow of the firm, the analyst should focus attention primarily on two key areas:

1. Total sources from operations
2. Cash before financing.

Total sources of cash from operations ideally should be positive because it shows the ability of the firm to generate sufficient cash from current operations. If cash from operations is negative, then the analyst should take a cautious look at the figures.

Positive “Cash before financing” indicates that the firm generates more cash than it requires. Negative cash before financing- as shown in the cash flow of 1990- Indicates that the firm is in need of bank financing.

You are requested to study tables 13.1, 13.2 and 13.3 properly and see how they are linked.

ANSWER TO SELF-ASSESSMENT EXERCISE

Four Sources of Cash for the firm are:

1Cash from operations

2Borrowing from banks
3sale of fixed assets
4Increase in equity.

4.0 CONCLUSION

In this unit, we have discussed evaluating cash flow statements. We looked at the concept of the cash flow statement and discussed the interpretation of the cash flow statement. All these enabled us to have a better appreciation of how to evaluate cash flow statements.

5.0 SUMMARY

This unit treats "Evaluating Cash flow statements". Cash flow statements are different from the Income statement of the firm. The cash flow Statement is the primary tool of credit analysis. It is the tool which the lending banker uses to evaluate the firm for lending decisions. In interpreting the cash flow statement, analysts should focus their technical attentions on total cash sources from operations and cash before financing.

In the next unit, we shall discuss **"Evaluating asset Conversion risks**".

6.0 TUTOR-MARKED ASSIGNMENT

Why do you think the cash flow statement is superior to the income statement for a lending banker wishing to lend money to a firm?

7.0 REFERENCES/FURTHER READINGS

Leon, Ikpe (1999). *Project Analysis and Evaluation*, Impressed Publishers, Lagos.

UNIT 4 EVALUATING ASSET CONVERSION RISKS

CONTENTS

1.0 INTRODUCTION

In the last (unit 13) we discussed "Evaluating cash flow statements. We discussed the sources and uses of cash for the firm. We discussed also the interpretation of the cash flow statement.

In this unit, we shall discuss "Evaluating asset conversion risks."

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- Evaluate what the asset conversion risk is
- Discuss how it can be evaluated.

3.0 MAIN CONTENT

3.1 Evaluating Asset Conversion Risks

Basically the asset conversion cycle is the process by which the firm invests in raw materials, converts the raw materials to finished goods, sells the goods and collects cash.

In most cases, banks are asked to finance the asset conversion cycle of the firm through the provision of working capital finance in the form of overdraft.

The objective of this unit is to identify and evaluate those risks in the asset conversion cycle which are likely to pose problems for the lending banker's funds.

We shall start our discussion by taking a look at the asset conversion cycle. We discussed it briefly in unit 12. It is back in our focus since it will play a vital role in making sure we understand the discussion fully.

3.1.1 Steps in the Asset Conversion Cycle

We have just defined the asset conversion cycle. We shall now examine the steps in the asset conversion cycle. We identify five basic steps which are shown in Figure 14.1.

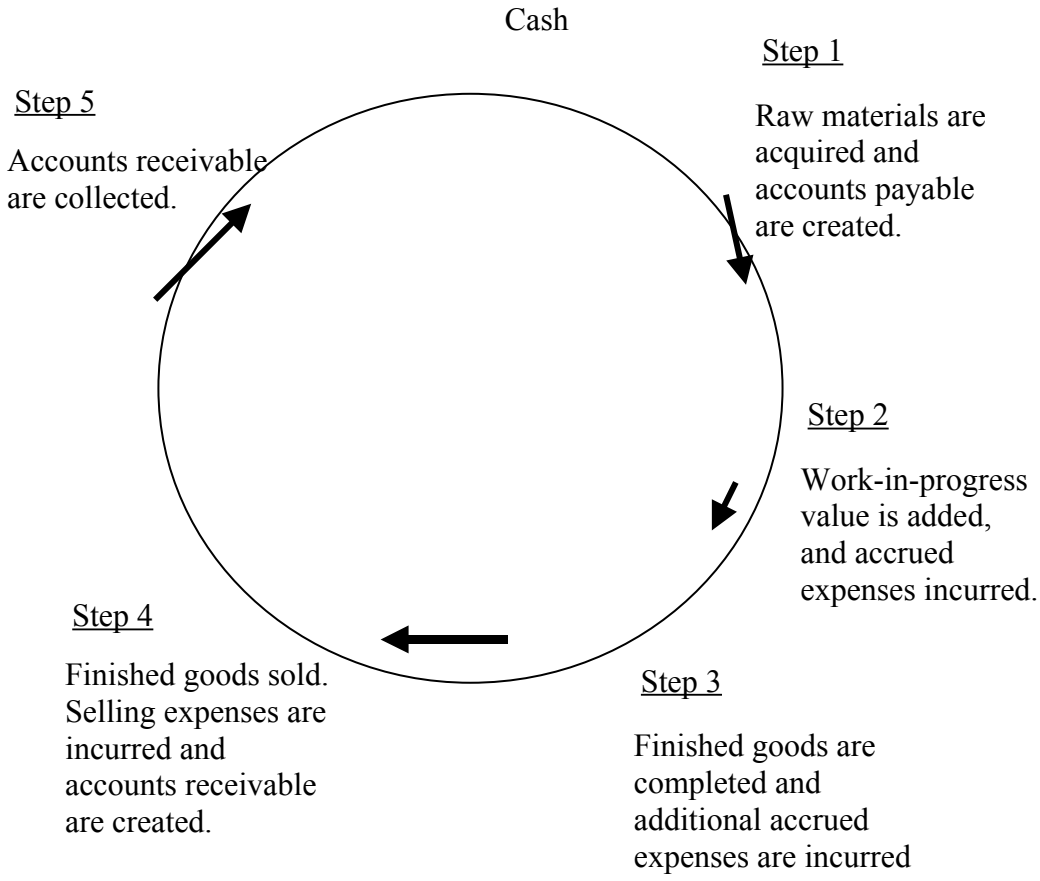

Figure 14.1 Steps in the Asset Conversion cycle.

Step 1 of the asset conversion cycle involves the acquisition of raw materials by the firm. It is either the firm pays cash for the raw materials or accounts payable are credited. Accounts payable represent liabilities which will be paid at a future date.

Step 2 of the asset conversion cycle involves the actual process of converting the raw materials to finished goods. In the process of this

conversion, accrued expenses are added in the form of labour and manufacturing overheads.

In step 3, the manufacturing process is completed as the raw materials are fully converted into finished goods. The completion of the manufacturing process involves further expenses in the form of labour and other manufacturing expenses.

Step 4 involves the sale of the finished goods. There are ways of selling the goods. The goods could either be sold for cash or on credit. If sold on credit, accounts receivable are created. Accounts receivable represent assets of the firm which will be realizable in cash form in the near future.

Step 5 involves the receipt of cash through the collection of accounts receivable.

3.1.2 Financing Needs of the Firm

We have highlighted the asset conversion cycle of the firm. We now need to go a little bit further to discuss the financing needs of the firm.

The first financing need of the firm is that of financing current assets. To help us quantify the financing needs of the firm to complete the asset conversion cycle, we shall introduce the concept of working investment. Working investment is defined as that portion of trading assets (accounts receivable and inventory) that is not financed spontaneously (i.e. by accrued expenses and accounts payable)

So we write thus:

Working Investment = Trading assets–Spontaneous financing

Working Investment = (A/R + Inv.) – (A/Ps + A/Es)

Where	A/R	=	Accounts receivable
	Inv.	=	Inventory
	A/P	=	Accounts Payable
	A/E	=	Accrued expenses.

Working Investment therefore means the amount of accounts receivable and inventory that must be financed by sources other than accounts payable and accrued expenses. Working investment must be supported either by borrowing or owners equity.
If the working investment is to be provided by through borrowing, then need for bank finance arises.

SELF-ASSESSMENT EXERCISE

List four expenses of the firm during the asset conversion cycle.

3.1.3 Types of Working Investment Financing Needs

We have generally defined working investment. But we need to distinguish the different types of working investment financing needs:

1. Permanent level of working Investment

Some firms have overlapping asset conversion cycles which mean that at every point in time, they should have a level of inventory which allows them to have new asset conversion cycles starting before completion of a previous cycle. That means that there will be a base stock (or safety stock) which will allow the firm meet demand for its products at short notice. The permanent level of working investment required by the firm depends on the length of asset conversion cycle, its accounts payable pattern and the rate of conversion of accounts receivable into cash .The firm should finance a good level of permanent level of working investment.

2. Increasing Working Investment Due to Sales growth

When there is sales growth for the firm, there will be need to increase the level of working investment. There is a relationship between the sales level and the level of working investment.
Again, a firm should be able to finance a portion of its growth financing needs. If not it will be permanently going to the banks for assistance.

3. Seasonal Working Investment

Some companies have seasonal demands for their products as in the case of umbrella manufacturers. Umbrella manufacturers require extra working investment during the rainy season as the demand for their goods increase during the period.

3.1.4 Risks in the Asset Conversion Cycle

We now understand what the asset conversion cycle is all about. The bank as a lender will be interested in the ability of the firm to successfully complete the asset conversion cycle. Before the bank advances any money (Loan, overdraft or asset protection loan), it has to be assured that the lending will turn out to be hitch-free. So the lender must first understand the risks inherent in the asset conversion cycle of the firm.

A basic approach to the analysis of the firm's ability to complete the asset conversion cycle is to identify the risks at each stage of the asset conversion cycle which may frustrate the successful completion of the cycle.

The type of analysis we are embarking upon will concentrate on four major areas namely:

1. Supply
2. Production
3. Demand or market risks
4. Collections

We shall now discuss each of these areas.

1. Supply Risks

The supply risks are related to the successful acquisition of raw materials of production for the firm. Without raw materials, the asset conversion cycle will not be completed.

In the identification of supply risks in the asset conversion cycle, the critical factors to be considered are:

1) The key suppliers of the firm's raw materials
2) Are the suppliers few or many?
3) What are the current supply prices for the firm's raw materials?
4) Are the prices stable?
5) What are the factors that affect the supplier's willingness to supply the raw materials to the firm?

2. Production risks

We have discussed supply risks which are related to the supply of raw materials which the firm uses in production of goods. We now address the issue of production risks.

Production risks arise from many sources which may threaten the production of goods.

One of such factors that pose production risk is the quality of plant and machinery used in production. Good and efficient plant and machinery will definitely lead to uninterrupted production flows, but ageing plant and machinery will lead to constant break downs. Production shut downs will generally affect the business of the firm, discourage clients and this will reflect in lower sales volumes.

Apart from quality of plant and machinery, we need to ask the following questions:

1What is supply of labour pool like?
What is the possibility of labour going on strike and disrupting production?
2What is the labour turnover rate for the firm?

3. Demand or market risks

Production of the goods of the firm is not the end of the business of the firm. Once the goods have been produced, they must be sold. A major risk associated with lending to the firm is that the company may not be able to sell all the goods that it produces. That being the case, the evaluator should address his/her attention to what we call demand or market risk.

The type of questions we need to ask here are:

1. What is the product of the firm?
2. What are the uses of the product?
3. What is total market demand for the firm's products?
4. What is the firm's competitive advantage or disadvantage?
5. Who are the company's major competitors?
6. Could Government regulation affect the ability of the firm to sell its product?

4. Collection risks

In the early part of this unit, when we were discussing the steps in the asset conversion cycle, we mentioned that sales of finished goods may lead to the creation of accounts receivable. A major risk in the asset conversion cycle is the likelihood that accounts receivable will not be collected and the generation of cash by the firm severely frustrated.

When we are beginning to address collection risks of the firm, we focus attention on the following questions.

1Who are the key Customers of the firm?
2Are they few or many?
3What is their geographical spread?
4What are the credit terms of the firm?
5What percentage of accounts receivable end up as bad debts?

3.1.5 Asset Conversion Lending

All along, we have been discussing the concept of assets conversion which we have now understood. We took time to explain the asset conversion cycle of the firm and identified five stages in the cycle. We went ahead to discuss the financing needs of the firm. And there we discussed the asset conversion risks. We have now prepared the ground to discuss the concept of asset conversion lending.

Generally lending is the primary function of banks and loans/ advances form a large proportion of the assets of the bank. It will be necessary at this point in time to state that safe banking practices require assurances that any loan granted to the firm will be repaid.

Our primary purpose now is to take a look at the rationale for asset conversion lending. As the firm purchases raw materials and engages in the conversion of the raw material to finished goods, it suffers outflows of resources in the nature of expenses. This outflow (expenses) is not matched by the inflows from the sales of the manufactured goods since there is a big gap between production, sale of goods and receipt of cash.

It would appear that during the asset production cycle, outflow of funds may be greater than inflows because as we have said, production must be completed before sale of goods will commence for the firm. Even when the goods have been sold, some of the goods sold are not paid for immediately leading to creation of accounts receivable. So basically, it is this difference in the flow of funds (expenses and revenues) that give rise to the need for external financing for the firm.
Precisely that is the reason for the firm to approach the bank for asset conversion lending.

Asset conversion lending (loans) are structured to be short term, self-liquidating. They are advanced primarily to finance a temporary build-up of current assets made up of:

1. Inventory
2. Accounts receivable.

For example a bank may extend an asset conversion loan to a toy builder in September in preparation for the Xmas sales in December. Using the funds obtained from the bank in September, the toy manufacturer will purchase materials and commence the production of the toys.

The bank will expect to be repaid in full at the completion of the Christmas sales season from the sale of the toys.

It is therefore clear that the repayment of the asset conversion loan is dependent on the firm successfully completing the asset conversion cycle.

In asset conversion lending, the bank concentrates mainly on identifying risks in the various stages of the firm's asset conversion cycle. We have earlier identified the risks. Theoretically asset conversion loans are generally unsecured. The bank's confidence in granting unsecured asset conversion loan is based on the confidence that the firm will be able to successfully complete the asset conversion cycle.

3.1.6 Structure of the Asset Conversion Loan

We have just described the asset conversion loan. We shall now go ahead and structure the loan.

0Loan purpose

The loan purpose is usually clear. The purpose is to finance working investment build-up.

Source of repayment

The source of the repayment will be from successful completion of the asset conversion cycle.

Risk

The risk in asset conversion loan is the inability of the firm to complete the asset conversion cycle successfully.

Protection

The asset conversion loan is protected by the quality of the working assets of the firm and also the ability of the firm's management to reduce the risk inherent in asset conversion.

ANSWER TO SELF-ASSESSMENT EXERCISE

Four expense of the firm are:

1. Raw materials Purchases
2. Fuel and Lubrication expenses
3. Labor expenses
4. Packaging expense.

4.0 CONCLUSION

In this unit, we have discussed "Evaluating Asset conversion Risks. We discussed the steps in the asset conversion cycle. We discussed the types of working investment financing needs and risks in the asset conversion cycle. We also discussed asset conversion lending. All these helped us to understand asset conversion risks.

5.0 SUMMARY

This unit treats "Evaluating Asset Conversion Risk" it treats the evaluation of the risks facing the firm as it converts raw materials to finished goods and then sale of the goods for either cash or credit. Understanding the asset conversion risks is very crucial to the lending banker.

In the next unit, we shall discuss Sensitivity Analysis.

6.0 TUTOR-MARKED ASSIGNMENT

Discuss the nature of the risks in the Asset conversion Cycle.

7.0 REFERENCES/FURTHER READINGS

Pandey, I M (2002). *Financial Management*: Vikas Publishing House, PVT Ltd, 8th Edition.

UNIT 5 SENSITIVITY ANALYSIS

CONTENTS

1.0 INTRODUCTION

In the last unit (unit 14), we discussed Evaluating Asset Conversion Risks. We discussed steps in the asset conversion cycle. We discussed the financing needs of the firm. We also discussed risks in the asset conversion cycle. In this unit we shall discuss "**Sensitivity analysis".**

2.0 OBJECTIVES

By the end of this unit, you should be able to:

- Explain the concept of Sensitivity Analysis
- Discuss the conduct of Sensitivity Analysis

3.0 MAIN CONTENT

3.1 Sensitivity Analysis

We have come a very long way in the analysis. We have now come to a very important aspect of our study of projects. We discussed the concept of cash flows (Inflows and out flows). And in the traditional setting, the cash flow statement can be constructed from the income statement of the firm. When the accountant prepares the financial report of the firm, the following will be prepared:

1. The Income statement
2. The Cash flow statement
3. The balance sheet.

In preparing the Income statement of the firm the accountant will make basic assumptions some of which are set out below:

1. The selling price of the goods or services involved are known and given.
2. The volume of the goods and services to be sold are known and given.
3. Total income is computed by multiplying the sales prices by the quantity sold.

We can write thus:

Income (R) = Price x quantity

In the analysis, Sensitivity analysis addresses the issue of risks facing the firm in terms of income realization.

To the analyst, sensitivity analysis is a technique for sensitizing the cash flows of the firm by changing the assumptions under which they were made.

First, if the analyst changes the sales price of the goods, he will get new revenues. Secondly, if the volume of goods sold is reduced; then also the revenues will be reduced since revenue is a function of price and quantity sold.

Sensitivity analysis looks at cash flows of the firm from a worst-case-scenario point of view. So when confronted with cash flows, the analyst is expected to subject the cash flows to severe stress and tests and subjects same to changes in critical variables.

For the analyst, critical questions to be asked will include the following:

1. If the selling price of the good or service is reduced, what will be the new revenue or income?
2. If the sales volume reduces due to competition what will be the new revenue or income?
3. If the prices of raw materials used in the manufacture of the goods increase, how will it affect the price of the finished good?
4. If the raw materials used in the manufacture of the goods are imported, what risks face the project and its cash flows if the raw materials importation were banned?
5. If the goods in question have substitutes, what is the effect of reduction in the price of the substitutes?

To aid our discussion of the Sensitivity Analysis, we shall use the example of Water Nigeria limited. Water Nigeria limited is engaged in the production of sachet water (pure water) and bottled water. It also is involved in the contract blowing of plastic bottles and nylon from which it earns Income.

Table 15.1 is a breakdown of both the sachet water and bottled water revenue.

Table 15.2 is the projected profit and loss statement of Water Nigeria Limited.

WATER NIGERIA LIMITED
REVENUE PROJECTIONS

SACHET WATER

Year	Output in Packets	Selling Price N	Total Revenue N
1	19,200,000	2	38,400,000
2	28,800,000	2	57,600,000
3	28,800,000	2	57,600,000
4	28,800,000	2.50	72,000,000
5	28,800,000	2.50	72,000,000

BOTTLED WATER REVENUE

Year	Product	Qty	Selling Price N	Total Revenue (N)
1	500ml	2,400,000	24	57,600,000
	0.75 litre	1,200,000	28	33,600,000
	1.5 litre	1,200,000	50	60,000,000
	TOTAL	4,800,000		151,200,000
2	500ml	4,800,000	24	115,200,000
	0.75 litre	2,400,000	28	67,200,000
	1.5 litre	2,400,000	50	120,000,000
	TOTAL	9,600,000		302,400,000
3	500ml	4,800,000	24	115,200,000
	0.75litre	2,400,000	28	67,200,000
	1.5litre	2,400,000	50	120,000,000
	TOTAL	9,600,000		302,400,000
4	500ml	4,800,000	25	120,000,000
	0.75litre	2,400,000	30	72,000,000
	1.5litre	2,400,000	55	132,000,000
	TOTAL	9,600,000		324,000,000
5	500ml	4,800,000	25	120,000,000
	0.75litre	2,400,000	30	72,000,000
	1.5litre	2,400,000	55	132,000,000
	TOTAL	9,600,000		324,000,000

Table 15.1: Revenue Projections

WATER NIGERIA LIMITED

PROJECTED PROFIT AND LOSS STATEMENT
- NORMAL ESTIMATES (N)

	Year 1 ₦	Year 2 ₦	Year 3 ₦
REVENUE			
Sachet Water revenue	38,400.000	57,600,000	57,600,000
Bottled Water revenue	151,200.000	302,400,000	302,400,000
Contract blowing(Plastic bottles)	4, 800.000	4,800,000	5,760,000
Contract blowing (nylon printing)	13, 600.000	20,400,000	20,400,000
TOTAL REVENUE	208, 000.000	385,200,000	386,160,000
DIRECT COSTS OF PRODUCTION			
Production raw materials	114, 624,000	214,096,.000	227,844,000
Direct Labour	2, 844,000	2,986,200	3,135,510
Repairs/maintenance machinery	600,000	630,000	661,500
Maintenance- factory premises	240,000	252,000	264,600
Electricity and gas expense	6, 780,000	7,119,000	7,474,950
Depreciation	10, 133,440	10,133,440	10,133,440
External Quality Control expenses	480,000	480,000	500,000
TOTAL DIRECT COSTS	135, 701,440	235,696,640	250,014,000
INDIRECT COSTS OF PRODUCTION			
Management and Labour	2, 818,800	2,959,740	3,107,727
Administration expense	750,000	787,500	826,875
Bank Charges/Commission	325,000	700,000	720,000
Selling and distribution expense	6,000,000	6,300,000	6,615,000
TOTAL INDIRECT COSTS	9,893,800	10,747,240	11,269,602
TOTAL DIRECT+ INDIRECT COSTS	145,595,240	246,443,880	261,283,602
Profit (loss) before taxation	62,404,760	138,756,120	124,876,398
Estimated taxation	18,721,428	41,626,836	37,462,919
Profit after tax	43,683,332	97,129,284	87,413,479
Projected dividends	20,000,000	40,000,000	50,000,000

Table 15.2: Projected Profit and loss Statement.

3.1.1 Impact of Reduction in Selling Prices

One way of conducting sensitivity analysis is to examine the impact of reduction in selling price of a good or service. If the selling price of a good is reduced, the total revenue will also be reduced.

Consider the revenue projections for Water Nigeria limited as shown in Table 15.1. Now take a look at the sachet water revenue projections. Assume that the selling price for the sachet water is reduced by 20%.

We will now come up with a revised revenue projection for sachet water as shown below:

Year	Output in Packets	Selling price N	Total Revenue N
1	19,200,000	1.60	30,720,000
2	28,800,000	1.60	46,080,000
3	28,800,000	1.60	46,080,000
4	28,800,000	2.00	57,600,000
5	28,800,000	2.00	57,600,000

Table 15.3: Revised revenues (sachet water)

3.1.2 Impact of Reduction in Sales Volume

Another way of conducting sensitivity analysis is to examine the impact of reduction in sales volume. If the volume of sales is reduced for any reason, the total revenue will also fall. And so, if an analyst is presented with a projected income statement based on normal sales and price figures, it is the duty of the analyst to subject the income to sensitivity analysis.

Consider again the revenue projections for Water Nigeria limited as shown in Table 15.1. Now take a look at the sachet water revenue projections.

Assume that due to market forces, Water Nigeria limited will be unable to sell the volumes as shown in Table 15.1, sales volume now drops by 20%. Hold price constant. We will again come up with a revised revenue projection for sachet water as shown.

Year	Output in Packets	Selling Price (₦)	Total Revenue(₦)
1	15,360,000	2	30,720,000
2	23,040,000	2	46,080,000
3	23,040,000	2	46,080,000
4	23,040,000	2.5	57,600,000
5	23,040,000	2.5	57,600,000

Table15.4- Revised revenues due to reduction in sales volume (sachet water).

Table 15.4- Shows the new revenue to the firm following a 20% drop in sales volumes.

3.1.3 Impact of Increase in Expenditures

At times, it might be necessary to conduct sensitivity analysis on a cash flow by increasing the expenses attached to the project in question. The general thinking behind increasing expenditures is to accommodate unexpected price increases in the economy.
Inflation affects all firms in the country and any expert analysis should accommodate the impact of inflation on the general price level.

SELF-ASSESSMENT EXERCISE

List four factors that can reduce the income of the firm.

ANSWER TO SELF-ASSESSMENT EXERCISE

Four factors that can reduce the income of the firm are:

1. Fall in selling price of its goods
2. Fall in sales volume
3. Increase in expenses
4. Strike by workers.

4.0 CONCLUSION

In this unit, we have discussed the concept of sensitivity analysis which is very important in evaluation of projects. Sensitivity analysis is a way of subjecting a project's cash flows to more severe tests with a view to examining the project's worst case scenario.

5.0 SUMMARY

This unit treats the concept of sensitivity analysis. Sensitivity analysis is a technique for sensitizing the cash flows of the firm or project by changing the assumptions under which the cash flows were made. Sensitivity analysis is the analyst's tool for evaluating the stability of cash flows especially in a lending situation.

6.0 TUTOR-MARKED ASSIGNMENT

Sensitivity analysis tries to examine the sensitivity of a firm or project's cash flows to certain changes.

1. What are those changes?
2. Discuss them.

7.0 REFERENCES/FURTHER READINGS

Pandey, I M (2002). *Financial Management*, Vikas Publishing House, PVT Ltd, 8th Edition.