# I. FIRST PRINCIPLES OF VALUATION

Always remember: A Ksh. in the hand today is worth more than a Ksh. Promised sometime in the future, i.e., money has time value!

If you have it today, you can invest it or use it. It is rather difficult to invest or use a promise of some future funds.

1. Future Value and Compounding

* Investing for single period

FV = P (1+r), where P = principal invested, and r = the interest rate on the investment.

What is the FV of Ksh.500 invested for one year at 10%; FV = Ksh.500 (1.10) = Ksh.550.

* Investing for more than one period

FV = P (1+r)t, where t = the number of periods in the future

What is the FV of Ksh.500 invested for 2 years at 10%; FV = Ksh.500 (1.10)2 = Ksh.500 (1.21) = Ksh.605

Note: there are two elements in the Ksh.105 interest;

* + There is the interest on the principal; Ksh.50 each year (total Ksh.100), and
  + There is the interest on the first year’s interest; Ksh.50 x .10 = Ksh.5

This is the result of compounding. For example, the same Ksh.500 left on deposit for 5 years, at simple and compound interest would be, after 5 years: Simple interest: Ksh.750, Compound interest: Ksh.805

How does one calculate the factor (1+r)t ? You can do it manually, using your calculator, your computer or the Future Value Tables (found, along with Present Value and Annuity Tables, in most basic financial management textbooks).

* The Financial Tables
  + For any interest rate and time period, the table will give the value of Ksh.1 for that number of periods in the future.

1. Present Value and Discounting
   * What is Present Value?

It is the current value of a future cash flow(s), discounted at an appropriate discount factor (or interest rate). This follows the same principle as compounding.

Alternatively: What will we need today, invested at that same rate, to give us an amount equal to the future cash flow?

Recall that FV = P (V)(1+r)t ; let’s do some simple algebra, then

PV = FV/(1+r)t , where r is the discount rate for t periods of time in the future

* Let’s look at a single period example:

An antique auto dealer can buy a “mint condition” 2003 Toyota auto for Ksh.60,000. He is certain that he can resell the car in one year for Ksh.70,000. He also has the opportunity to make a well-collateralized loan to an acquaintance for one year at 12% (assume essentially no risk). What should he do?

Before solving this problem, let’s introduce the concept of “Opportunity Cost.” Opportunity cost is simply the best alternative financial opportunity that exists, at the same risk level as the one under consideration. In the auto example, it is the 12% certain, that he can earn on the loan. Therefore, the appropriate discount rate is 12%.

PV = Ksh.70,000/(1+0.12) = Ksh.62,500 vs. the Ksh.60,000 that he must pay for the car today. If he made the loan, then his PV (at 12%, of course) is Ksh.60,000. (If he makes the loan to his acquaintance, he will receive in one year Ksh.67,200 – his Ksh.60,000 plus the 12% interest, or Ksh.7200. Ksh.67,200/1.12) = Ksh.60,000.)

* Present value of multiple periods

Suppose that your favorite uncle promises you Ksh.100,000 for your 30th birthday, which is 8 years from now. He also says that if you are in a hurry, he will give you Ksh.50,000 tomorrow, which is your 22nd birthday. You know that you can earn 7.5% (per year) on an 8 year government bond. What do you want to do?

PV = FV/(1+r)t , which in this case is PV = Ksh.100,000/(1+0.075)8

PV = Ksh.56,070 vs. the Ksh.50,000 you can have tomorrow. So, unless you badly need the cash now, you would be better off to accept the Ksh.100,000 on your 30th birthday.

Alternatively, FV8 = (Ksh.50,000)(1+0.075)8 = Ksh.89,175 vs. the Ksh.100,000

* An interesting approximation: The Rule of 72

To quickly and easily estimate how long it will take to double an investment, with a given compound interest rate, r, take 72/r.

For example, how long will it take to double Ksh.10,000 @ 6%, 8.25%, and 10%? 72/6 = 12 years (actually 11.89 years); 72/8.25 = 8.73 years (actually 8.74 years); 72/10 = 7.2 years (actually 7.27 years).

1. The Present and Future Value of Multiple Cash Flows

* There are two ways to calculate the future value or the present value of multiple cash flows:

FUTURE VALUE: Compound the accumulated value period by period, or calculate the FV of each cash flow and sum them.

PRESENT VALUE: Discount back one period at a time, summing as you go, or discount each amount to time period 0 (the present), and sum them.

Let’s look at some examples:

FUTURE VALUE

Assume you deposit Ksh.2000 today (t0), Ksh.1000 in one year (t1) and Ksh.3000 in two years (t2), all at 8%. What will your deposit be worth at the end of the third year?

FV = (Ksh.2000)(1.08)3 + (Ksh.1000)(1.08)2 + (Ksh.3000)(1.08)1 = Ksh.6925

PRESENT VALUE

You know that you will need Ksh.1200 one year from now, Ksh.1500 after two years, and Ksh.2000 after 3 years. How much will you have to deposit today @ 8% to have the necessary amounts?

PV = Ksh.1200/1.08 + Ksh.1500/(1.08)2 + (Ksh.2000)/(1.08)3 = Ksh.3985

Suppose your stock broker told you that if you made an investment with him of Ksh.4200, you could have Ksh.1200 in one year, Ksh.1500 in 2 years, and Ksh.2200 in 3 years. Would you do it? By inspection of the previous example, would you do it?

You are offered an investment that pays Ksh.5000 after 4 years, Ksh.6000 after 5 years and Ksh.8000 after 6 years. You want to earn 12% on this investment. How much would you pay for it today?

PV = Ksh.5000/(1.12)4 + Ksh.6000/(1.12)5 + Ksh.8000/(1.12)6 = Ksh.3178 + Ksh.3405 + Ksh.4053 = Ksh.10,636

1. Valuing Level Cash Flows: Annuities and Perpetuities

Annuity Cash Flows

An annuity is a series of constant cash flows that occur at regular intervals for a fixed number of periods, for example:

The repayment of a mortgage or car loan

Lease payments on a property

* The Present Value of an Annuity

We could simply discount all of the cash flows at the appropriate rate, but it could become cumbersome. There is a shortcut.

The Present Value of a series of *t* cash flows, of an amount, *C,* at a discount rate, *r*, can be represented by the following equation

1 .

1 - (1+r)t

APV = C x .

r

We can calculate by hand, or use the annuity tables in any financial management text to get the value of

1 .

1 - (1+r)t

. = PVIAF (PV interest annuity factor)

r

Example:

How much can you afford to spend for a new car which you will finance?

1. You examine your budget and find that you can afford Ksh.632/month for 48 months.
2. You go to your bank and find that they will give you a loan for 48 months @ 1% interest per month (12% per year).

Your bank loan payments are an annuity

1 – (1/1+0.01)48

APV = Ksh.632 x 0.01 = Ksh.632 (1 – 0.6203) = Ksh.24,000

0.01

You can afford to pay Ksh.24,000 for the car.

Alternatively, we can go to the annuity tables(PV) and find the PVIF for 48 periods at 1.0% = 37.9740. Then 37.9740 x Ksh.632 = Ksh.24,000.

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* The Future Value of an Annuity

Same principles as the APV, but it is the value at the end of *t* periods of a constant stream of cash flows, *C*, at an interest rate of *r*.

(1+r)t - 1

The value is given by AFV = C x r (Future value annuity table gives the value of the factor to multiply times C)

* The Present Value of a Perpetuity

A Perpetuity is an annuity where the cash flow stream is infinite (t = ∞)

This is a convergent infinite series where PV = C/r

All we need to do is look at the APV equation at *t* goes to ∞; we see that

APV∞ = C x (1-0)/r which = C/r

The perpetuity is an important concept in valuation practice, so remember it!!

Some examples

1. You are thinking of buying preferred shares of stock in a company that will pay you Ksh.8.00 per year dividend. You know that you can get 5% on similar risk investments elsewhere. What is the most that you should be willing to pay for these shares?

A non-callable preferred stock is like a perpetuity, so

PV = C/r, and

PV = Ksh.8.00/0.05 = Ksh.160

1. JBS Corp. wants to sell preferred shares at Ksh.100/share. A similar issue from another company is priced at Ksh.60 and pays Ksh.5 annual dividend. What dividend must JBS Corp. pay to get their price of Ksh.100?

Ksh.60 = Ksh.5/r, so r = 0.0833, which is what JBS preferred stock will have to yield.

(Ksh.100)(0.0833) = Ksh.8.33 as the annual dividend

## II. VALUING STOCKS AND BONDS

1. Bonds and Bond Valuation

Bonds are long-term (longer than one year) debt instruments issued by corporations and government units

* Bond Features and Prices
  1. Most often like an “interest-only” loan with principal paid at maturity – a level coupon bond
  2. Terms – *Face value* refers to the principal payment at maturity date; *Coupon interest* refers to the specified interest rate based on face value

Example: Ksh.1000 bond, 9%, due 4/1/2022, with interest each April 1 and October 1, issued 4/1/2002.

* Bond Values and Yields

1. Value of a bond is the PV of all coupon payments plus the principal repayment, discounted at the *opportunity cost* for similar bonds. This is the price that the market will pay for the bond. It may be less than, equal to or even higher than the face value.

Example: for the Bond cited above (Ksh.1000, 9%, due 4/1/2022, issued 4/1/2002, with interest payable each April 1 and October 1;

If the opportunity cost for similar bonds or the market rate of interest is 9%, then the market price will be Ksh.1000.

If the market rate of interest is 12%, then the price, or PV, is:

Ksh.45.00 + Ksh.45.00 + Ksh.45.00 + … + Ksh.45.00 + Ksh.1000

PV = (1+.06)1 (1+.06)2 (1+.06)3 (1+.06)40 (1+.06)40

Or

PV = [Ksh.45] 1-[1/(1+.06)40] + Ksh.1000.00 = Ksh.774

.06 (1+.06)40

This price (Ksh.774) gives a yield to maturity of 12%

* The Yield to Maturity (the basis for bond pricing)

1. The discounted rate of return on a bond – this is the discount rate, r, that equates the PV of the expected bond cash flows to the current price, P0

P0 = int1 + int2 + … + intn + face valuen

(1+r)1 (1+r)2 (1+r)n (1+r)n

Example: a 9%, 10-year bond with a face value of Ksh.1000 sells at Ksh.920. What is its yield to maturity? For simplicity, assume interest is payable only once per year.

P0 = Ksh.920 = Ksh.90.00 + Ksh.90.00 + … + Ksh.90.00 + Ksh.1000

(1+r)1 (1+r)2 (1+r)10 (1+r)10

or

P0 = Ksh.920 = Ksh.90 x 1 - [1/(1+r)10] + Ksh.1000 , solve for r

r r

* Bond Prices

Bonds will sell at *Face Value*, at a *Discount*, or at a *Premium*.

1. Face Value: Bonds sell at face value when market interest rates for similar bonds are the same as the coupon on the bond.

Example: A Ksh.1000, 10-year bond with a 9% coupon rate, will sell at Ksh.1000 when similar bonds are yielding 9%

1. Discount: Bonds sell at a discount to face value when similar bonds have higher yields.

Example: The bond in the example above will sell at Ksh.939 when market yields on similar bonds are 10%. The bond is selling at a Ksh.61 discount to face value and its yield to market is 10%

1. Premium: Bonds sell at a premium when similar bonds in the current market have lower yields.

Example: Again, in the example above, the bond will sell for Ksh.1067 when similar bonds are yielding 8%. The bond is selling at a Ksh.67 premium to face value and its yield to market is 8%

* The Interest Rate Risk of Bonds

Bond prices vary inversely with market interest rates. A bond price will fall as market interest rates rise and will rise as rates fall.

Suppose you bought a 12-year bond with a 10% coupo

n rate at face value of Ksh.1000. Two years later, market rates for 10-year bonds were now 14%. The market price of your bond would have fallen and would be:

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P0 = ∑ Ksh.100/(1+.14)n + Ksh.1000 = Ksh.781.90

n=1 (1+.14)10

Of course, the Face Value of your bond remains Ksh.1000, but if you had to sell it now, you would incur a capital loss of Ksh.208.10.

Another way to calculate the market price or value of a bond is:

P0 = Annuity present value of coupons + present value of face value

P0 = C x [1 – 1/(1+market rate)t] + FV x 1/(1+market rate)t

market rate

Example:

Ksh.1000 Face Value; Ksh.100 coupon (or 10% coupon rate); 20 years to maturity.

Market rate = 10%

P0 = Ksh.100 x [1 – 1/(1.10)20] + Ksh.1000 x 1/(1.10)20

.10

= Ksh.100 x 8.5136 + Ksh.1000 x .14864

= Ksh.851.36 + Ksh.148.64 = Ksh.1000

Now, suppose that the Market rate = 12%?

P0 = Ksh.100 x [1 – 1/(1.12)20] + Ksh.1000 x 1/(1.12)20

.12

= Ksh.100 x 7.4694 + Ksh.1000 x .10366

= Ksh.746.94 + Ksh.103.66 = Ksh.850.60

1. Common Stock Valuation

* Valuation is based on the same principle of Present Value as bonds, but there are some complications
  + Uncertainty associated with future cash flows in the forms of dividends and share price
  + Difficulty in determining an appropriate discount rate (risk must be explicitly addressed)

Common Stock Cash Flows

Suppose we have a one-year horizon. Price = P0, then

P0 = D1 + P1 , where D1 = next year dividend

(1+r) (1+r) P1 = Selling Price

r = our opportunity cost

Suppose whoever buys the stock at price P1 also has a one-year horizon, then

P1 = D2 + P2 , so substituting

(1+r) (1+r)

P0 = D1 + D2 + P2 , and so on

(1+r) (1+r)2 (1+r)2

In actual fact, with each buyer looking for future dividends and an expected selling price, the general valuation equation is the PV of all future dividends:

P0 = D1 + D2 + D3 + … + DH , where H is a long time

(1+r)1 (1+r)2 (1+r)3 (1+r)H

It is not possible to calculate a unique present value of an infinite stream of dividends that vary, so some simplifying assumptions are made, usually concerning the growth of the dividends (usually earning; assuming a constant payout ratio)

* + - Zero growth
    - Constant growth
    - Non-constant growth (growth phases)

The Zero Growth Case

In the Zero Growth Case, we have a perpetuity

P0 = D1 + D2 + D3 + … + D∞ ,

(1+r)1 (1+r)2 (1+r)3  (1+r)∞

Where D1 = D2 = D3 = … = D∞, and recall that

PVperpetuity = C/r

Example: A preferred stock pays a Ksh.12 dividend annually. If your opportunity cost is 15%, how much is this stock worth to you?

P0 = Ksh.12/0.15 = Ksh.80

The Constant Growth Case

A common stock with a constant dividend growth rate is like a perpetuity that is growing at this rate. We can develop the equation of a constant growth perpetuity as follows:

P0 = D1 + D2 + D3 + … + D∞ ,

(1+r)1 (1+r)2 (1+r)3  (1+r)∞

with a constant growth rate , g, this equation becomes

P0 = D(1+g)1 + D(1+g)2 + D(1+g)3 + … + D(1+g)∞ ,

(1+r)1 (1+r)2 (1+r)3  (1+r)∞

this is a convergent series

P0 = D0(1+g) = D1 , for r>g

r-g r-g

Example: Suppose you want to buy a share of Swiss Farms, S.A., a dairy products company. Swiss Farms paid a recent dividend at an annual rate of Ksh.2.00 per common share. After talking to your broker, you expect the dividends to continue to increase at 5%/year, like the past four years. Your opportunity cost is 12%. What is this stock worth to you?

P0 = (Ksh.2.00)(1.05) = Ksh.2.10 = Ksh.30.00

* + - 1. 0.07

Non-Constant Growth Case

Suppose the dividend growth rate changes during the period of evaluation. There is usually a period of supra-normal growth, followed by a normal growth rate. (Important: Supra-normal growth cannot be sustained for extended periods)

Illustration: Earnings (and dividends) growing at a 20% rate would more than double in 4 years; triple in about 6 years; and increase by more than 6 times in 10 years. This is not likely.

To estimate the value of a stock with non-constant growth requires that the different growth rate periods be handled separately.

Example: Suppose that Husky Corporation’s dividends this year is Ksh.1.20 per share and that dividends will grow at 10% per year for the next three years, followed by a 6% annual growth rate. The appropriate discount rate for Husky Corporation’s common stock is 12%. What is the value of a share of Husky Corporation common stock?

To value this stock, first compute the present value of the first three dividend payments as follows:

Year Growth Rate (g) Expected Dividend Present Value

1 10% Ksh.1.3200 Ksh.1.1786

2 10% Ksh.1.4500 Ksh.1.1575

3 10% Ksh.1.5972 Ksh.1.1369

The present value of the first three dividend payments is Ksh.3.4730. Next, compute the dividend for year 4:

D4 = Ksh.1.20 x (1.10)3 x (1.06) = Ksh.1.6930

The price as of year 3 can be determined by using the formula for the present value of a stock whose dividends grow at a constant rate:

P3 = D4 = Ksh.1.6930 = Ksh.28.2167

r-g .12 - .06

Note that the above formula values the stock as of year 3, using the year 4 dividend in the numerator. To find the present value, as of year 0, of this year 3 price:

PV = Ksh.28.2167 = Ksh.20.0841

(1.12)3

Therefore, P0 = Ksh.3.4730 + Ksh.20.0841 = Ksh.23.56

1. Net Present Value and Other Investment Criteria

* Net Present Value

The difference, expressed in today’s dollars, between the amount invested and the sum of the future cash flows (PV) resulting from the investment

n

NPV = -C0 + ∑CFi/(1+r)i where, -C0 = Investment

i=1 CFi = Cash Flow in year I

r = Discount Rate

Example: A piece of land costs Ksh. 85,000 and produces yearly cash flows of 11,000 , 18,000 Ksh., and 16,000 Ksh. and is sold at the end of the third year for 66,000 Ksh.. Your opportunity cost is 8%. What is the NPV?

NPV = -85,000 + 11,000/1.08) + 18,000/(1.08)2 + 82,000/(1.08)3

NPV = -85,000 + 10,185 + 15,432 + 65,094 = 5,711 Ksh.

That NPV is positive means that the actual return was greater than 8% required. If r is substituted from 8% in the equation and we solve for r, (iteratively) it is equal to 10.74%. This is called the Internal Rate of Return (IRR).

The Net Present Value Rule

*An investment opportunity is worthwhile (economically) if the NPV is positive, at the required rate of return*.

* The Payback Period

The length of time until the accumulated investment cash flows (non-discounted) equal the original investment. How long to get your money back.

Shortcomings and potential usefulness

The timing of cash flows is ignored – treating each equally

Cash flows, after the cut-off period are ignored – the method is biased against longer term investment opportunities

No objective criteria for choosing the cut-off period (arbitrary)

However,

It is easy to apply, promotes liquidity and in highly uncertain situations, it can be useful

* The Average Accounting Return

The average net income (accounting income) attributed to an investment divided by the average book value of the assets

Average net income .

(beginning value – ending value)/2

AAR Rule – an investment is acceptable if the AAR exceeds a specified target level

Example: The Swiss Watch Company has a target AAR of 12% for a 5-year project. The required initial investment is SFr 100,000 and the asset purchased will be fully depreciated and have 0 value at the end of year 5. The projected net incomes are:

Year 1 2 3 4 5

SFr 1,000 3,000 6,000 14,000 11,000

Avg. book value = (100,000 + 0)/2 = 50,000

Avg. net income = (1000+3000+6000+14000+11000)/5 = 35000/5 =

7000

AAR = Avg. net income = 7000 = .14 = 14%

Avg. book value 50,000

AAR deficiencies

The method uses accounting income and book value data – and these are not so closely related to cash flow necessary for financial decision making

AAR ignores the time value of money

It is a purely arbitrary measure which is not a return in a financial market sense (not cash flows)

1. A Few Remarks about Opportunity Cost

* The Required Rate of Return (The Discount Rate)
  + The rate of return on an investment that the investor can earn elsewhere in the financial markets on investments of similar risk – this is his/her “opportunity cost”
  + It’s all about risk level – the higher the risk the greater the required return

Systematic Risk - non-diversifiable

Non-Systematic Risk - diversifiable

* The Investment Mix Often Includes Both Debt and Equity

Each has a cost, and they are different

RD, the cost of debt = the interest rate on the debt

RE, the cost of equity = opportunity cost of the investor – Equity is not free!

The Cost of Capital (the discount rate) must reflect the capital mix of the investor or the firm – “The Weighted Average Cost of Capital”

* Estimating the Cost of Capital

The Capital Asset Pricing Model and RE, the cost of equity

RE = Rf + β(Rm – Rf) , where Rf = the risk-free rate

β = a measure of systematic risk of the particular investment

Rm = the return on the market average

* The Weighted Average Cost of Capital

WACC = REXE + RDXD(1-t) , where XE and XD are the proportions of equity and debt in the capital mix; t = the tax rate of the corporation

Remember: the WACC is the appropriate discount rate to use on project cash flows.

III. THE CAPITAL INVESTMENT DECISION

A. Project Cash Flows: A First Look

* Relevant Cash Flows

The *Incremental Cash Flows* associated with a project

All changes in the enterprise cash flows that result from doing a project.

In most cases, we use accounting data (accrual basis)

Must change or convert information to cash basis

* The Stand-Alone Principle

Theoretically, we should look at total cash flows of the firm to determine changes resulting from project – but this is impractical.

In most cases, we can view the project as “mini-firms” with their own assets, revenues and costs. Then, evaluate them separately from the firm.

B. Incremental Cash Flows

There are often difficulties in identifying the incremental cash flows of capital budgeting projects

* Sunk Costs – Money already spent or committed, regardless whether the project proceeds or not

Examples: A feasibility study on the project technology was completed before the “accept/reject” decision was made

Some existing equipment, not currently in use, will be used for the new project.

* Opportunity Costs – Any cash flow that is lost or forgone by taking one course of action versus another

Example: Suppose the company had a piece of land that it was thinking about selling. If a new project uses this land, then the foregone selling price must be charged to the project. This is the opportunity cost of using the land for the project, and is an incremental cost to the project.

* Side Effects – The acceptance of a project may have some “spill-over” effects on other products or other assets of the firm, either positive or negative. These side effects must be charged to the project.

Examples: “Erosion or cannibalization” – The introduction of a new product may result in reduced sales of an old product. Filling a gap in a product line with a new product may increase sales of all products in the line.

* Net Working Capital – Cash plus inventory plus accounts receivable, less accounts payable. Projects often require additional investment in inventories, accounts receivable, etc. which can be recovered at the end of the project.

Examples: A new product launch requires additional cash of Ksh.1000, inventories of Ksh.3000 and A/R of Ksh.2500, and results in new trade A/P of Ksh.2100 in the first year. The net working capital, NWC, is: Ksh.1000+Ksh.3000+Ksh.25000-Ksh.2100 = Ksh.4400.

If in the second year, NWC goes up to Ksh.5200, then project cash flows must be charged Ksh.800 (Ksh.5200-Ksh.4400).

If after 8 years, the product is discontinued and has NWC of Ksh.10,800, of which Ksh.7600 is recoverable, then this amount is added to project cash flows.

* Financing Costs – These are completely separate from the investment decision; they result from the financing decision and do not belong in project cash flows. This is a common mistake made by companies doing Discounted Cash Flow (DCF) analysis.

Interest and principal repayments are handled with the discount rate.

Our primary interest is in the operating performance of the project, based on the capital employed, regardless of its source.

1. Pro-Forma Financial Statements and Project Cash Flows
   * Getting Started: Pro-Forma Financial Statements

Treat the project as a “mini-firm.” Construct pro-forma income statements and balance sheets. Determine sales projections, variable costs, fixed costs and capital requirements.

* Project Cash Flows

From the Pro-forma statements, compute:

* 1. Operating Cash Flow – This is defined as:

Earnings before Interest and Taxes (EBIT) less taxes plus depreciation and amortization

* 1. Cash Flow from Assets – This is defined as:

Operating Cash Flow less capital spending less additions to NWC

Then tabulate:

Net Present Value (NPV)

Internal Rate of Return (IRR) – if practicable

Any other needed measures

D. Detailed Capital Budgeting Example

The Majestic Mulch and Compost Company

MMCC is investigating the feasibility of a new line of power mulching tools aimed at the growing number of home composters. Based on exploratory conversations with buyers for large garden shops, we project unit sales as follows:

Year Unit Sales

* + 1. 3000
    2. 5000
    3. 6000
    4. 6500
    5. 6000
    6. 5000
    7. 4000
    8. 3000

The selling price: Ksh.120/unit for 3 years, then Ksh.110/unit with competition

Starting NWC: Ksh.20,000 initially plus 15% of sales

Variable costs: Ksh.60/unit

Fixed costs: Ksh.25,000/year

Capital equipment costs: Ksh.800,000

Depreciation rate: ACRS; 7 year property (see note about depreciation)

Equipment salvage value: 20% or Ksh.160,000 in year 8

Note: ACRS refers to the Accelerated Cost Recovery System. ACRS places assets into one of six classes each of which has an assumed life, ranging from 3-20 years, with a designated depreciation rate for each year. Since depreciation is deducted before calculation of income tax, it creates a tax shield equal to (depreciation x tax rate).

Is this a good project and should we do it?

1. The first thing we need are the pro-forma income statements

Start with revenue projections

Year Unit Price Unit Sales Revenues

1 Ksh.120 3000 Ksh.360,000

2 Ksh.120 5000 Ksh.600,000

3 Ksh.120 6000 Ksh.720,000

4 Ksh.110 6500 Ksh.715,000

5 Ksh.110 6000 Ksh.660,000

6 Ksh.110 5000 Ksh.550,000

7 Ksh.110 4000 Ksh.440,000

8 Ksh.110 3000 Ksh.330,000

We also need the tax-basis depreciation

Year ACRS % Depreciation Ending Book Value

1 14.29% .1429 x Ksh.800,000 = Ksh.114,320 Ksh.685,680

2 24.49 .2449 x Ksh.800,000 = Ksh.195,920 Ksh.489,760

3 17.49 .1749 x Ksh.800,000 = Ksh.139,920 Ksh.349,840

4 12.49 .1249 x Ksh.800,000 = Ksh. 99,920 Ksh.249,920

5 8.93 .0893 x Ksh.800,000 = Ksh. 71,440 Ksh.178,480

6 8.93 .0893 x Ksh.800,000 = Ksh. 71,440 Ksh.107,040

7 8.93 .0893 x Ksh.800,000 = Ksh. 71,440 Ksh. 35,600

8 4.45 .0445 x Ksh.800,000 = Ksh. 35,600 Ksh. 0

We can now prepare the projected pro-forma income statement. We will use a tax rate of 34%

Projected Income Statement

Year

1 2 3 4 5 6 7 8

Unit Price Ksh. 120 Ksh.120 Ksh.120 Ksh.110 Ksh.110 Ksh.110 Ksh.110 Ksh.110

Unit Sales 3000 5000 6000 6500 6000 5000 4000 3000

Revenues Ksh.360,000 Ksh.600,000 Ksh.720,000 Ksh.715,000 Ksh.660,000 Ksh.550,000 Ksh.440,000 Ksh.330,000

Variable Costs Ksh.180,000 Ksh.300,000 Ksh.360,000 Ksh.390,000 Ksh.360,000 Ksh.300,000 Ksh.240,000 Ksh.180,000

Fixed Costs Ksh.25,000 Ksh.25,000 Ksh.25,000 Ksh.25,000 Ksh.25,000 Ksh.25,000 Ksh.25,000 Ksh.25,000

Depreciation Ksh.114,320 Ksh.195,920 Ksh.139,920 Ksh.99,920 Ksh.71,440 Ksh.71,440 Ksh.71,440 Ksh.35,600

EBIT Ksh.40,680 Ksh.79,080 Ksh.195,080 Ksh.200,080 Ksh.203,560 Ksh.153,560 Ksh.103,560 Ksh.89,400

Taxes (34%) Ksh.13,831 Ksh.26,887 Ksh.66,327 Ksh.68,027 Ksh.69,210 Ksh.52,210 Ksh.35,210 Ksh.30,396

Net Income Ksh.26,849 Ksh.52,193 Ksh.128,753 Ksh.132,053 Ksh.134,350 Ksh.101,350 Ksh.68,350 Ksh.59,004

We need two additional elements: additions to working capital and net salvage value of the equipment

Year Revenues Net Working Capital Increase

0 Ksh.20,000

1 Ksh.360,000 Ksh.54,000 Ksh.34,000

2 Ksh.600,000 Ksh.90,000 Ksh.36,000

3 Ksh.720,000 Ksh.108,000 Ksh.18,000

4 Ksh.715,000 Ksh.107,250 - Ksh. 750

5 Ksh.660,000 Ksh.99,000 - Ksh. 8,250

6 Ksh.550,000 Ksh.82,500 - Ksh.16,500

7 Ksh.440,000 Ksh.66,000 - Ksh.16,500

8 Ksh.330,000 Ksh.49,500 - Ksh.16,500

8 NWC Recovery - Ksh.49,500

Now we calculate the cash flow elements

IV. SOME CONTEMPORARY THOUGHTS ON ACQUISITIONS AND DIVESTITURES

1. Making a Successful Acquisition
   * Far less than half of acquisitions create value of the acquirers

An acquisition is, economically speaking, like a capital investment. Remember

NPV = -C0 + ∑ FCFi /(1+r)i , and unless NPV > 0, we made a bad choice

The primary should be: *Creation of shareholder value*

This is too often replaced with secondary objectives, such as:

Use excess resources

Acquire technology

Enter new geographic markets

Revenue growth

* Successful acquisitions require excellence in three areas

1. A well-developed strategy to direct the search for candidates with the greatest potential to create/enhance competitive advantage, shareholder value
2. Management must be disciplined in analyzing acquisition economics and other critical (non-quantifiable) elements like cultural fit
3. The acquisition must be successfully integrated, so that any acquisition premium can be recaptured quickly

* Analyzing the acquisition economics

Most acquisitions will require payment of a premium over market value or stand alone value; i.e.,

P0 > ∑ FCFi / (1+r)i , where FCFi represents Free Cash Flows that the business is expected to generate, on an “as-is” basis, and P0 is the acquisition price

Premiums have averaged about 30-40% over pre-acquisition values in the past decade (but can go as much as 100% over)

The premium is over and above the consensus view of the intrinsic or warranted value of the business, “as-is”

The Acquirer will have to significantly enhance the performance of either the acquisition target, or his own company, to recapture more than the premium and create shareholder value; i.e.,

Certain characteristics in the target company that the acquirer can exploit so that

PVACQ > PVAS-IS

* Premium recapture characteristics fall into five categories

1. Undermanagement – the acquirer identifies correctable underperformance in the target company related to management mistakes
2. Synergy – (a badly overused word) combining products and services in a way that produces more revenue and profits than each product or service will produce separately. Or, eliminating costly overlap in things like procurement, production, R&D, marketing, distribution, administration, etc.
3. Restructuring – (asset sales) “beauty is in the eye of the beholder”, or an asset is worth what somebody will pay for it.
4. Financing and tax considerations – (not stand-alone reasons) the firm may have excess cash or underutilized borrowing capacity; or may have useable tax loss carryforwards.
5. Undervalued assets – private company with no market value may be undervalued by its owners; or you may be acquiring a foreign company with cost of capital differences.

Successful acquisitions usually combine more than one of the above characteristics.

* The hardest part, integrating the newly acquired company

Management must have previously developed, and now must execute, a detailed premium recapture plan – driven by the nature of the recapture economic priorities. The plan must detail the actions to be taken, by when and by whom.

Integrate the two management teams in a way that facilitates the smooth execution of the recapture plan, and makes maximum utilization of the newly acquired human resources.

1. A Few Words on Divestitures

* Principal reasons for divesting a business unit

Unprofitable and not likely to become profitable

Strategic misfit, or non-core business

Need the cash

* Unprofitable Business

Differentiate between economic profitability and accounting profits

Determine the “best” operating strategy for the business

Can we fix the business so that it is profitable? If so, keep and operate it.

If not fixable, estimate intrinsic value under “best” strategy. This becomes the floor selling price or liquidation value.

If you cannot get more than this price in either sale or liquidation, continue to operate

* Strategic Misfit or Need the Cash

First, develop the “best” strategy and operate the business under it

Always remember, the same assets are worth different amounts to different people

Understand how much of an intrinsic value premium the potential buyer can bring to the “as-is” business. We want a “piece” of that!