CHAPTER 5: CALCULATING EVA

5.1 How is EVA Calculated?

A necessary starting point for understanding the mechanics of EVA is the related concept of Market Valued Added (MVA). MVA is the difference between the total value of the firm (including equity and debt) and the total capital invested in the firm:

MVA = Total Value minus Invested Capital

In the logic of value creation, the aim of the firm's managers is to maximize MVA. The aim is not to maximize the value of the firm, which is accomplished easily enough by investing ever increasing amounts of capital. For example, if a company raises RM20 million in capital, and invests the capital in projects that are expected to earn the cost of capital, both total value and total capital increase by RM20 million, and MVA is unchanged. MVA increases only when invested capital earns a rate of return greater than the cost of capital. When newly raised capital is invested in value-creating projects (i.e. those with a positive net present value), MVA increases. When that capital is invested in value-destroying projects (i.e. those with a negative net present value), MVA decreases.

By emphasizing MVA, the growth for its own sake does not create value. The firm can grow, but the growth does not necessarily create value. When Coca-Cola's former boss, the late Roberto Goizueta, said, "The curse of all curses is the revenue line," he meant that an obsession with growing sales is the surest route to value destruction. Growth creates value only when the growth strategy's incremental value exceeds the incremental capital invested. In other words, the net present value (NPV) of the strategy must be positive. Otherwise, value is destroyed. This discussion reinforces one of the most important lessons of financial management: Managers create value by investing in capital projects

with positive NPVs. MVA is just the aggregate NPV of all of the firm's activities and investments.

How does EVA relate to MVA? MVA is the present value of the firm's expected future EVAs. EVA generates more attention, because it measures performance annually. MVA is a stock (or wealth) measure that reports on the sum total of the company's value creation as of the date MVA is calculated, and is less amenable than EVA as a measure for evaluating and rewarding managerial performance. Very simply, EVA is *a device for turning the stock measure of MVA (or NPV) into a flow.*

EVA is calculated as follows:

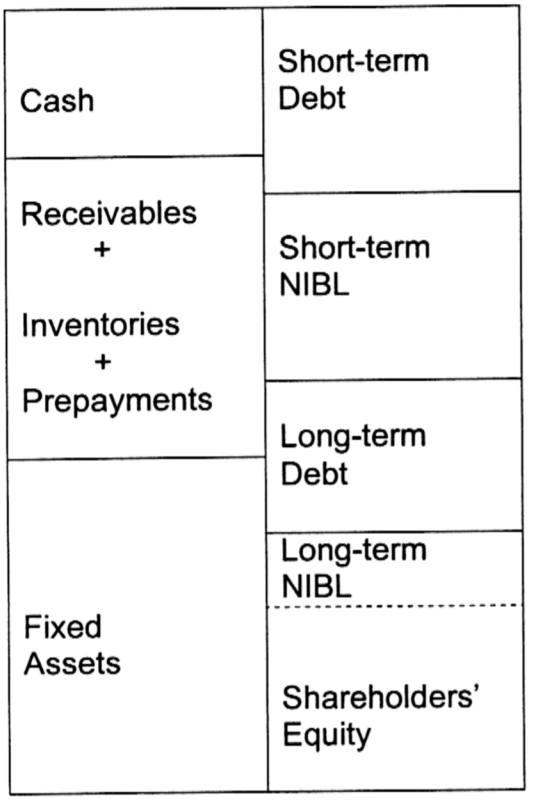
	Net Sales
minus	**Operating Expenses**
=	**Operating Profit (or Earnings before Interest and Tax, EBIT)**
minus	**Taxes**
=	**Net Operating Profit After Tax (NOPAT)**
minus	**Capital Charges (Invested Capital x Cost of Capital)**
=	**EVA**

(NOPAT is the company's operating profit, net of tax, and measures the profits the company has generated from its ongoing operations.)

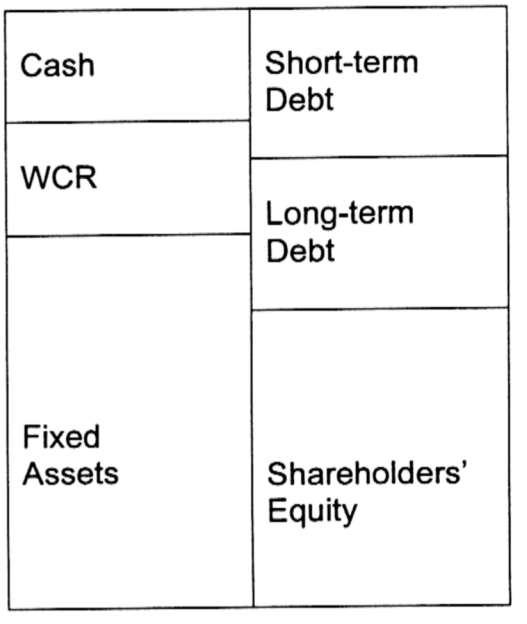
Capital charges equal the company's "invested capital" (also called "capital" or "capital employed') times the weighted average cost of capital (WACC). The WACC equal the sum of the cost of each component of capital – short-term debt, long-term debt, and shareholders' equity--weighted for their relative proportions, at market value, in the company's capital structure.

"Invested capital" is the sum of all of the firm's financing, apart from short-term non-interesting bearing liabilities, such as accounts payable, accrued wages, and accrued taxes. That is, invested capital equals the sum of shareholders' equity

and all interest-bearing debts, both short-term and long-term. In the calculation of EVA, long-term non-interest bearing liabilities are considered equity equivalents and are included in shareholders' equity.



Regular Balance Sheet



The EVA Balance Sheet

NIBL = non-interest-bearing liabilities
WCR = working capital requirement

The balance sheets above clarify how capital is defined in EVA. The balance sheet on the left is a normal balance sheet. On the right is an EVA balance sheet, in which short-term non-interest-bearing liabilities are netted against short-term operating assets - inventories, receivables, and prepaid expenses. The left side of this balance sheet is referred to as "net assets," "invested capital" appears on the right side. The short-term non-interest bearing liabilities are deducted from assets and capital returns are not expected on the amounts owed. For example, employees do not expect an investment return on accrued wages, nor do most governments on unpaid taxes. The situation with supplier finance is

more complicated, but for analytical purposes it is assumed that suppliers earn their profits from the difference between selling price and operating costs, and not on interest from the credit they extend to their customers. This assumption is less valid, of course, when the payment period for suppliers is long (say, more than 3 months).

As long as the return generated from the use of "net" assets exceeds the cost of the invested capital, EVA is positive. The Return on Net Assets (RONA) is calculated as follows:

RONA = NOPAT divided by Net Assets

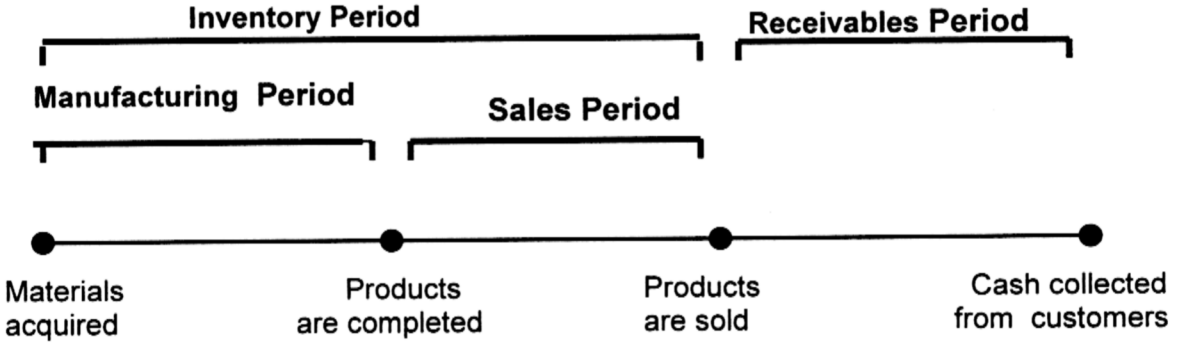
When RONA > WACC, EVA is positive, and when RONA < WACC, EVA is negative, because

EVA = (RONA minus WACC) multiply Invested Capital

When EVA is framed in this way, an important question emerges: Why not use RONA by itself? Why do we need EVA? The risk to companies of using RONA without considering WACC is that divisional managers might bypass value-creating projects because they would lower RONA (a risk whenever RONA is greater than WACC) or they might undertake value-destroying projects because they would increase RONA (which can happen when RONA is less than WACC). Either way, reliance on RONA alone can lead to sub optimal behavior.

Net assets - the sum of cash, the working capital requirement, and fixed assets—are investments for which the firm's capital providers expect, and managers must deliver, a competitive return. Although everyone understands fixed assets and cash, the working capital requirement requires some explanation.

Consider a typical manufacturing company. As shown in the diagram below, its operating cycle begins with the acquisition of the materials, parts, and components that are used in the company's products. These materials are then transferred from material warehouses to the factory, where workers and various elements of manufacturing overhead combine to convert the materials into the finished product. The time its takes to go from acquisition of materials into a finished product is the *manufacturing period*, or "cycle time." Products must then be sold, which typically requires a *sales period* of several days or weeks after the manufacturing process is complete. Until the product is sold, it resides in the company as inventory of some form--materials, work-in-process, or finished goods. Therefore, the sum of the manufacturing period and the sales period equals the *inventory period.*



The operating cycle does not end with the sale of the product. Most companies extend credit to their customers. The receivables period indicates the length of time it takes for the company to collect cash from customers after the sale has taken place. The length of a company's operating cycle is just the sum of its inventory period and its receivables period. This is called a "cycle" because a portion of the cash collected from customers is used to pay off suppliers and acquire more materials, which in turn enables the process to repeat itself.

The key point to note about this cycle is that it requires investment. The most obvious manifestations of that investment are the amounts that a company has tied up in inventory and receivables. But there may be other types of investment too. For examples, suppose a company needs additional space to store finished products because of recent market growth. It acquires this additional capacity by leasing a warehouse. When it signs the lease contract, it hands the landlord a cheque for say, RM150,000, giving it exclusive rights to use the warehouse for the next 12 months. Accountants treat this transaction as a "prepaid expense," which is classified as a current asset. This prepaid expense is clearly related to the operating cycle, and represents a further investment that the company has made in it. Companies may also have other working capital items, such as non-trade receivables (money owned by employees or suppliers, for example). Finally, companies may need to maintain a particular level of cash to support its day-to-day operations. For example, retailers need to keep some cash in their cash tills. This type of investment is termed "operating cash" to distinguish it from more discretionary balances, or "excess cash." Therefore, we can think of the total investment in a company's operating cycle as:

Inventories

plus

Receivables

plus

Prepaid expenses and other current assets

plus

Operating cash

It is crucial to note, however, that this amount does not represent the company's own investment in the cycle, but rather the total investment made by the company and others. What others? Its suppliers, employees, and the government, for starters. The extent to which other parties invest in the

company's operating cycle is the extent to which the company itself, and by extension its shareholders, does not have to.

When suppliers grant credit to a company they are really investing in its operating cycle. The same can be said for employees when they have not yet been paid for work already performed; for the government, in the form of owed, but unpaid taxes; and for customers when they make advance payments. The company's (and its shareholders') estimated net investment in the operating cycle is derived by subtracting the sum of accounts payable (supplier finance), accrued expenses (which include unpaid wages and taxes) and advance payments from the total investments in the operating cycle. This net investment is termed as the Working Capital Requirement (WCR):

WCR =

(Inventories + receivables + other current assets + operating cash)

minus

(Accounts payable + accrued expenses + advances from customers)

EVA measurement compels management to generate returns on this investment, just as it does for excess cash and fixed assets.

5.2 An Example of MVA and EVA Calculations

Table 1 provides a template for estimating EVA for any company or segment of a company. The use of the template is illustrated with the financial statements of Harnischfeger, an American manufacturer of mining, pulp, and papermaking machinery. Harnischfeger's financial statements are shown in Table 2.

It is assumed Harnischfeger needs operating cash balances equal to 1% of total sales (which were $2.887 billion in fiscal year 1996) which amounts to $28.87 million. The total investment in the company's operating cycle is thus:

$547.115 million (inventories)

plus

$667.786 million (receivables)

plus

$158.413 million (other current assets)

plus

$28.87 million (operating cash)

which equal **$1,402.184 million**. Simply put, about $1.4 billion was tied up in Harnischfeger's operating cycle. The formula for WCR equals (Inventories + receivables + other current assets + operating cash) minus (Accounts payable + accrued expenses + advances from customers). Therefore, Harnischfeger's WCR as of the end of fiscal year 1996 is:

($547.115 million + $667.786 million + $158.413 million + $28.87 million)

minus

($346.056 million + $526.239 million + $155.199 million)

which equals **$374.69 million**.

Invested capital equals:

Excess cash

plus

WCR

plus

Fixed assets

The excess cash is the difference between the balance in cash and cash equivalents, $36.936 million and operating cash RM28.87 million which is $8.066 million. Fixed assets, which include all of the company's long-term assets, amounts to $1,279.779 million ($634.045 million for net property, plant and equipment, and $645.734 million for other long-term assets, including goodwill). Total invested capital for Harnischfeger, as of October 31st , 1996 is:

$8.066 million
plus
$374.69 million
plus
$1,279.779 million

which equals **$1,662.535 million.**

The above figure can be derived at by netting short-term, non-interest bearing liabilities ($1,027.494 million) against total assets ($2,690.029 million), or by summing short-term debt ($49.633 million), long-term debt ($657.765 million), provisions for pensions and other long-term non-interest-bearing liabilities ($133.08 million), deferred taxes ($54.92 million), minority interest ($93.652 million), and shareholders' equity ($673.485 million). This can be summarized as follows:

Invested Capital = Excess cash plus WCR plus Fixed assets

= Total assets minus Short-term non-interest bearing liabilities

= Short-term debt plus Long-term debt plus Long-term non-interest bearing liabilities plus Shareholders' equity

Defining capital as the sum of excess cash, WCR, and fixed assets is known as the "operating approach," while summing up the different forms of finance is known as the "financing approach." The important point here is that it does not matter which definition is used, at least at the company-wide level, the measure of invested capital (and, therefore, of EVA) should be the same.

Harnischfegers' MVA. The company had 51,407,000 shares of common stock outstanding, selling for $40 per share, at the end of fiscal year 1996. This yields a capitalized market value for Harnischfeger's equity of $2,056.280 million. The market value of the firm equals the market value of all claims against the company's assets, including equity, minority interest, and all debts. Because Harnischfeger does not report market values for its debt, the accounting book values are used and the same for minority interest. The market value of the company on October 31", 1996 is:

	Common shares	**$2,056.28 million**
plus	**Minority interest**	**93.652 million**
plus	**Short-term debt**	**49.633 million**
plus	**Long-term debt**	**657.765 million**

which equals **$2,857.330 million, or about $2.8billion**.

MVA is calculated as follows:

MVA = Market value minus Invested capital

= $2,857.330 million minus $1,662.535 million

= $1,194.795 million

This figure means that as of October 31st , 1996 Harnischfeger had created slightly more than $1 billion of value for its capital providers. Because MVA is the present value of future EVAs, discounted at the company's cost of capital, the MVA can be taken as an indication that the market expects Harnischfeger's management to generate positive EVA in the future.

Harnischfegers' EVA. Calculated by the simplified "short-cut" approach summarized in Table 1. Operating profit equals sales, net of operating expenses,

including cost of sales, and selling, general, and administrative expenses. NOPAT is calculate as follows:

Operating profit	**$**	**244.019 million**
Interest income		**6.505 million**
Income Taxes		**(63.600) million**
Tax shield on interest		**(24.067) million**
Net Operating Profit After Tax (NOPAT)	**$**	**162.857 million**

Capital charges equal the company's invested capital times the WACC. Harnischfeger estimates its WACC to be 12%.

The invested capital at the end of fiscal year 1996 is known. To calculate capital charges for the year, the invested capital at the beginning of the year (i.e. the end of the previous fiscal year) has to be worked out. This figure can be obtained by subtracting short-term non-interest bearing liabilities of $700.501 million from total assets of $2.040.767, which equals $1,340.266 million. This figure yields average invested capital for the year of $1,501.446 million (beginning invested capital of $1,340.26 million plus ending invested capital of $1,662.535 million, divided by 2). Assuming, a 12% cost of capital; EVA equals to

NOPAT	**$162.857 million**
minus Capital charges	**180.174 million**
EVA	**($ 17.317 million)**

Hamischfeger's financial costs exceeded its operating profits by about $17.317 million, hence the negative EVA. Some analysts prefer to calculate EVA based on beginning invested capital instead of the average invested capital for the year. In this case, capital charges for 1996 equal $160.832 million ($1,340.266 million multiplied by the 12% WACC), yielding a positive EVA of $2.025 million. In this

case, the choice of which invested capital figure to use determines whether EVA is negative or positive.

These figures suggest that Harnischfeger was approximately a value-neutral company in 1996, which contrasts sharply with the $1 billion MVA. This discrepancy indicates that the market is expecting the company's future EVAs to be much higher than 1996's figure. In other words, the market's verdict on Harnischfeger's management and its ability to deliver shareholder value is favorable despite near-zero EVA performance in 1996.