Part Four
The Wealth Decision

8 Shareholder Wealth and Value Added

Introduction

Financial analysis is not an exact science and many of the theories upon which it is based are even "bad" science. The root cause of the problem is that most theoretical models are characterised by *rational* human behaviour in a *hypothetical* world of "efficient" markets where uncertainty is reduced to *measurable* probability. Thus, the theory itself may be logical but if the basic hypothesis is underpinned by *simplifying assumptions* without any empirical evidence, then its *analytical conclusions* may be invalid.

For example, the English economist J.M. Keynes (1936) writing during the Great Depression pointed to "the extreme precariousness of our estimates of the basis of knowledge on which our estimates of prospective yield have to be made". We have also observed that in their quest for value, today's management have no precise definition of what wealth maximisation means to shareholders, let alone other investors. Is it a dividend stream, future earnings, or some combination of the two that incorporates capital gains? A fundamental problem is whether a firm's decision to distribute profits, rather than to retain earnings for reinvestment and go for growth, has a differential impact on share prices and equity yields. If the answer is yes; then even an *all-equity* firm might find it impossible to model investment decisions that satisfy all shareholders' expectations.

More worrying is that management's perception of income may differ from investors, not simply because they employ different valuation models but because their behaviour is motivated by personal greed, rather than shareholder welfare (think Enron and sub-prime mortgages). So, we should not be surprised that without insider information, markets are periodically fuelled by rumour, speculation and crowd behaviour, which makes them inherently *inefficient* and unstable with a propensity to crash. Certainly, this alternative hypothesis (which also runs counter to *agency theory* outlined in Chapter One) has emerged to explain the financial panic of 2008 and subsequent economic recession.

So, our *final* question is this. Without the *interna*l cash flow data upon which management base their strategic decisions, is it possible for investors to reformulate *external* accounting data to measure the consequences of these decisions? If so, the capital market may have some *control* over managerial behaviour that conflicts with wealth maximising criteria?

8.1 The Concept of Economic Value Added (EVA)

In a perfect capital market, optimum investment-finance decision models employed by management under risk and non-risk conditions should maximise corporate wealth through the inflow of cash at minimum cost. It is a basic tenet of financial theory that the NPV maximisation of all a firm's projects satisfies this objective. However, economists have long advocated the concept of *value added* as an alternative measure for wealth creation. For an excellent exposition see Dunning and Rowan (1968). Since the 1980s the concept has been commercially pioneered, notably by the American management consultants Joel Stern and Bennett Stewart III, so much so that it now has a considerable body of support, as evidenced by select references at the end of this chapter

Economic value added (EVA) represents a company's *periodic* "real" income measured by the difference between its *total* distributable profits and the monetary value of its *overall* cost of capital. The rationale for EVA is best explained by first defining all the components in the following serial equation:

(1) EVA = (EAT + Interest) – C.K = NOPAT – C.K = NOI – C.K

Total distributable profits are defined as annual *de-leveraged* earnings, which equal earnings after tax (EAT) *plus* interest. In the literature, this figure is also termed *net operating profit after tax* (NOPAT) or to introduce American parlance, *net operating income* (NOI).

Overall monetary cost of capital equals the total amount of capital (C) raised by the firm since its inception (through share issues, retained earnings, debt and capitalised expenditure such as R and D) multiplied by an estimate of its WACC (K) using market data..

> So, if distributable profit exceeds overall capital costs (i.e. EVA is positive) management have created wealth by exceeding the returns of all its stakeholders. Conversely, If EVA is negative, value has been destroyed and investors should place funds their elsewhere, unless new management is brought in.

8.2 The Concept of Market Value Added (MVA)

According to Stewart (1991) once investors are aware of a company's EVA, the information should impact on market value. This is best measured by the associated concept of *market* value added (MVA) based on the following equation, where V equals the current total market value of debt plus equity, and C equals the EVA term for total capital raised by the firm since its inception..

(2) MVA = V – C

> The interpretation of MVA is simple. If EVA is positive then the difference between V and C is positive and the company has created wealth (or *vice versa*). Of course, MVA improvements or deterioration also depend on factors apart from EVA, many of which may be beyond management's control (such as a banking crisis). But these need not concern us here. The important point is that within a company's sphere of influence, EVA must be a fundamental driver of market value.

8.3 Profit and Cash Flow

Unlike the earlier *cash driven* analyses of NPV with which you are familiar, EVA is based on *accounting* profits using NOPAT. So, how can the two concepts be equivalent?

From a *financing* perspective, we know that NOPAT is calculated by *de-leveraging* earnings, which entails adding back interest on debt capital to establish total distributable profits. But what of the principal *non-cash* expense customarily added back to accounting profit to derive cash flow, namely *depreciation*.

Depreciation remains deducted from NOPAT because it is the only way that accounting profit recoups the cost of investment. Remember, net cash inflows include depreciation because the cost of investment (I) is subtracted from their present value (PV) to determine NPV using the following formula.

$$NPV = PV - I$$

Of course, there are other anomalies that must be stripped from accounting income to produce a "cash equivalent". But if we are to believe Stewart (*op cit*) once these adjustments are performed, lifetime profit will approximate to lifetime cash surplus because all the accounting conventions will unwind.

8.4 EVA and Periodic MVA

Like EVA, MVA is a residual concept that defines what is left over after the total book value of capital (C) has been deducted from its total market value (V). Recalling Equation (2):

(2) MVA = V – C

Note that unlike *periodic* EVA, however, MVA is a *cumulative* measure of *lifetime* value added.

To measure the change in value over a *one-year* period, an *opening* MVA must be deducted from a *closing* MVA, which also isolates the effect of any new capital issues (I). Thus, our equation of periodic MVA is represented by:

(3) Δ MVA = $MVA_t - (MVA_{(t-1)} + I)$

So, if a firm's market valuation rose from £20 million to £26 million but capital of £9 million was injected during the year; corporate value would have fallen by £3 million overall.

Activity 1

To illustrate the inter-relationship between EVA and MVA consider the following company data.

V	NOPAT	C	K	Opening MVA
£m	£m	£m	%	£m
200	20	100	10%	90

- Calculate *periodic* EVA and *lifetime* MVA.
- Establish whether *periodic* wealth been created or destroyed using MVA.

Calculations for periodic EVA and closing MVA are determined by Equations (1) and (2).

$$EVA = NOPAT - (CK) \quad = £20m - (£100m \times 0.1) \quad = \quad £10m$$
$$MVA = V - C \quad = £200m - £100m \quad = \quad £100m$$

Wealth has also been created without any new investment over the period. Using Equation (3)

$$\Delta MVA = MVA_t - (MVA_{(t-1)} + I) = £100m - (£90m + 0) = £10m$$

Note also the *perfect positive* relationship between the creation of *internal* EVA and the *external* DMVA. Market value of £10m is added to the company because the monetary return on investment exceeds the cost of finance by £10m. Mathematically, Equations (1) and (3) are therefore equivalent

(4) EVA = Δ MVA

8.5 NPV Maximisation, Value Added and Wealth

As a *cumulative* valuation, MVA should represent the stock market's assessment of a company's lifetime NPV. MVA maximisation should therefore be the primary managerial objective for any firm concerned with shareholder welfare. If we also accept our earlier proposition that for capital budgeting purposes, lifetime EVA is equivalent to lifetime net cash flow, it follows that if all future EVA is discounted to a present value using a post-tax WACC, the balance must be equivalent to the NPV of all a firm's projects. Thus we can define MVA using the following serial equality.

(5) $MVA = PV\ (\Sigma EVA) = \Sigma NPV$

To understand the equation implications for management and investors, let us examine it in more detail.

We already know from Equation (2) that MVA equals market value (V) minus book value (C).

(2) $MVA = V - C$

According to Stewart (*op cit*) it is also "a *mathematical truism* that market value is determined by discounting anticipated EVA using a WACC and adding it to the current capital balance, since an EVA summation approximates to lifetime free cash flow". So, we can define:

(6) V = C + PV (ΣEVA)

And taking the difference between Equations (2) and (6)

(7) MVA = PV (ΣEVA)

Because EVA excludes the cost of existing and new capital investments through depreciation adjustments, the balance must represent the equivalent NPV of all a firm's projects when it is discounted using a common WACC. Thus, MVA may be redefined as follows:

MVA = PV (ΣEVA) = ΣNPV

Activity 2

Using the following data and information from Activity 1, generate the appropriate equations to calculate the P V of all future EVA to derive the NPV of all capital projects.

V	NOPAT	C	K	Opening MVA
£m	£m	£m	%	£m
200	20	100	10%	90

As a reminder, first let us recalculate the EVA for Activity 1 using Equation (1).

$$EVA = NOPAT - (CK) = £20m - (£100m \times 0.1) = £10m$$

Using Equation (2) you will also remember that:

$$MVA = V - C = £200m - £100m = £100m$$

Using Equation (6) we can also define market value (V) as follows:

$$V = C + PV\ (\Sigma EVA) = £100m + £10m\ /\ 0.10 = £200m$$

(where PV (ΣEVA) is the present value of a *perpetual annuity*, using a WACC of 10 percent).

Now let us take the difference between the Equations (2) and (6) and review its implications.

$$MVA = PV\ (\Sigma EVA) = £10m\ /\ 0.10 = £100m$$

According to our hypothesis, the PV of all future EVA should also be equivalent to the NPV of all a company's past and future projects. So, returning to Equation (5) it follows that:

$$MVA = PV\ (\Sigma EVA) = \Sigma NPV = £100m$$

The importance of Equation (5) and the pivotal role of EVA as a performance measure linking *external* valuation to *internal* investment should not be underestimated. Because NOPAT can be derived from published company accounts and WACC estimates from stock market data, EVA provides investors with an element of control over dysfunctional management behaviour.

Of course, without more data we had to *assume* that the NPV in the previous Activity was equivalent to MVA and EVA. So finally, let us add to the data set and prove the case.

Assume the information relates to a company launched two years ago for £100m (C). Since then total market value (V) has risen to £200m without further capital issues. In the intervening period annual net cash inflow measured by NOPAT has been £20m per annum and the after tax WACC (K) a constant 10 per cent. Now threatened by takeover, let us use NPV analysis to confirm that predators should add an MVA *premium* of £100m to the £100m book value (C) for a "fair" value.

We know from Part Two that the cash surplus at the end of an investment's life (even a company's) is its *net terminal value* (NTV) or discounted equivalent (NPV). With a post-tax discount rate (K) we can therefore introduce a fourth term into Equation (5).

(8) $MVA = PV\ (\Sigma EVA) = \Sigma\ NPV = \Sigma\ NTV\ /\ (1+K)^n$

The importance of this fourth term is that we are now in a position to derive S NPV and its equivalence to MVA and PV (ΣEVA) independently, using NTV.

From the data we can produce the following cash statement using a bank overdraft formulation (£m) to calculate the company's overall ΣNPV.

Time Period	t_0	t_1	t_2	
Opening Balance	-	(100)	(90)	
Cash Outflows				
Investment (C)	(100)	-	-	
Interest (CK)	-	(10)	(9)	(K = 10 %)
Totals	(100)	(110)	(99)	
Cash Inflows				
NOPAT	-	20	20	
Realised Value (V)	-	-	200	
Totals	-	20	220	
Closing Balance	(100)	(90)	121	= Σ NTV

$$\Sigma \text{ NPV} = \Sigma \text{ NTV} / (1+K)^n = 121 / (1.1)^2 = \mathbf{100}$$

Returning to Equation (8) a serial relationship that equates MVA with NPV using EVA as the *linkage* is now established

Review Activity

Throughout the text we have assumed that the *normative* objective of strategic financial management is to maximise shareholder wealth by maximising the expected NPV of all a firm's projects. Unfortunately, because there is no legal requirement for companies to publish this information, management could be pursuing an entirely different agenda based on self-interest, leading to a catastrophe like the 2008 market meltdown. Fortunately, investors may have a life-line if they care to use it.

Assuming that NPV is financially equivalent to EVA and ultimately MVA (and there is considerable evidence to support this) then the derivation of the latter by investors from publically available information should act as a control on sub-optimal managerial behaviour.

So, finally let us work through a simple numerical example (ignoring growth, issue costs, capital gearing and fiscal policy) that clarifies the inter-relationship between shareholder wealth and investment policy with reference to NPV and the value added concept.

Suppose a company is financed exclusively by ordinary share capital. This generates a net annual cash flow of £1 million in perpetuity that is always paid out as a dividend (*i.e*. earnings per share equals dividend per share). Also assume that the current market yield on equity used as the firm's cut-off rate for investment is 10 percent.

Using the *constant dividend valuation model* from Part Three, we can define market value of the company (V) as its market value of equity (V_E) based on Ke the *perpetual capitalisation* of dividends (D_t).

$V = V_E = D_t / Ke = £1 \text{ million} / 0.10 = £10m$

Now assume the company intends to finance a new project of equivalent risk by retaining the next year's dividend to generate a net cash inflow of £2 million twelve months later, all of which will be paid out as a dividend. The questions we might ask ourselves are:

- How does this incremental investment, financed by dividend retention affect shareholder wealth?
- Can we confirm the investments impact on wealth using NPV analysis?

The managerial investment decision can be presented in terms of the shareholders' revised future dividend stream.

	t_0	t_1	t_2	t_3	…	t_∞
£ million	£	£	£	£		£
Existing dividends		1	1	1		1
Project cashflows		(1)	2	-		
Revised dividends		-	3	1		1

If we now compare market values (V) with or without the new investment using the PV of each dividend stream (V_E):

$V = V_E$ (revised) = £3 million / $(1.1)^2$ + [(£1 million / 0.10)] / $(1.1)^2$ = £10.744m

$V = V_E$ (existing) = £1 million / 0.10 = £10m

ΔV = MVA = £0.774m

Thus, if the project is accepted management creates MVA because the PV of the firm's equity capital (V_E) will rise and shareholders will be £744,000 better off.

Turning to NPV analysis, we can also confirm this wealth maximisation decision without even considering that the dividend pattern has changed.

You will recall that *external* MVA is equivalent to the creation of *internal* EVA, which also corresponds to the NPV of new investments. Applying the familiar DCF capital budgeting model to the project cash flows, we can prove this as follows

NPV = (£1million) / (1.1) + £2 million / $(1.1)^2$ = £744,000

So, shareholders may relinquish their next dividend but gain an increase in the value of ordinary shares (from £10m to £10.744m overall). In other words, the company has created value (MVA) by accepting a project with a positive NPV of £744,000.

8.6 Summary and Conclusions

Modern finance theory reduces future uncertainty to quantifiable risk so we can estimate an investment's prospective yield using classical probability theory. This approach is based on a fundamental proposition, namely the efficient market hypothesis (EMH) that assumes investor rationality and freedom of information in reasonably perfect markets with few barriers to trade. But if nothing else, geo-political and economic events post-millennium, culminating in global financial meltdown and recession, should convince us otherwise. So whilst the material presented in this text provides a framework for the analysis of investment and finance decisions it remains to be seen whether it is a "castle built on sand".

Part One chronicled why academics and analysts throughout the twentieth century gravitated towards a *normative* objective of strategic financial management based on shareholder wealth maximisation using the opportunity cost of capital concept as an investment criterion.

Part Two focussed on the managerial investment decision with only oblique reference to derivation of its cut-off rate. We observed that moving from a world of certainty to uncertainty; corporate wealth maximisation should be equivalent to the expected NPV maximisation of all a firm's projects, using probability and utility theory. Turn to recent world events, however, and serious questions arise as to how far corporate management have embraced wealth maximisation criteria.

Part Three introduced the impact of the finance decisions on investment decisions for *all-equity* firms wishing to fund new projects through retained earnings. We modelled dividends and earnings to derive the market capitalisation of equity as a project cut-off rate under growth and non-growth conditions and explained their equivalence. Moving on to firms financed by a *miscellany* of funds, the objective was to derive an *overall* marginal cost of capital (WACC) as an appropriate cut-off rate. We concluded that the use of WACC for project appraisal must satisfy three conditions. New projects must be *homogenous* with respect to the firm's current business risk (otherwise investor returns will change). The capital structure must remain *stable* (otherwise the weightings applied to investor returns will change. The project must be *marginal* relative to the scale of the firm's existing operations to minimise possible losses.

Part Four modelled an alternative to NPV maximisation using the value added concept based on *freedom of information*. We confirmed that if a company creates EVA from project investment then total market value should increase by an equal amount (MVA) which is equivalent to project NPV. Because negative EVA means wealth is destroyed it should alert investors to negative NPV associated with unacceptable decisions taken by management on their behalf. Value added therefore represents an external control on the consequences of managerial action that companies ignore at there peril.

Finally, if you wish to visualise all the pieces of the puzzle put together, take a look at the diagram below. Reproduced from Chapter One, it should be familiar but hopefully, it should now make more sense.

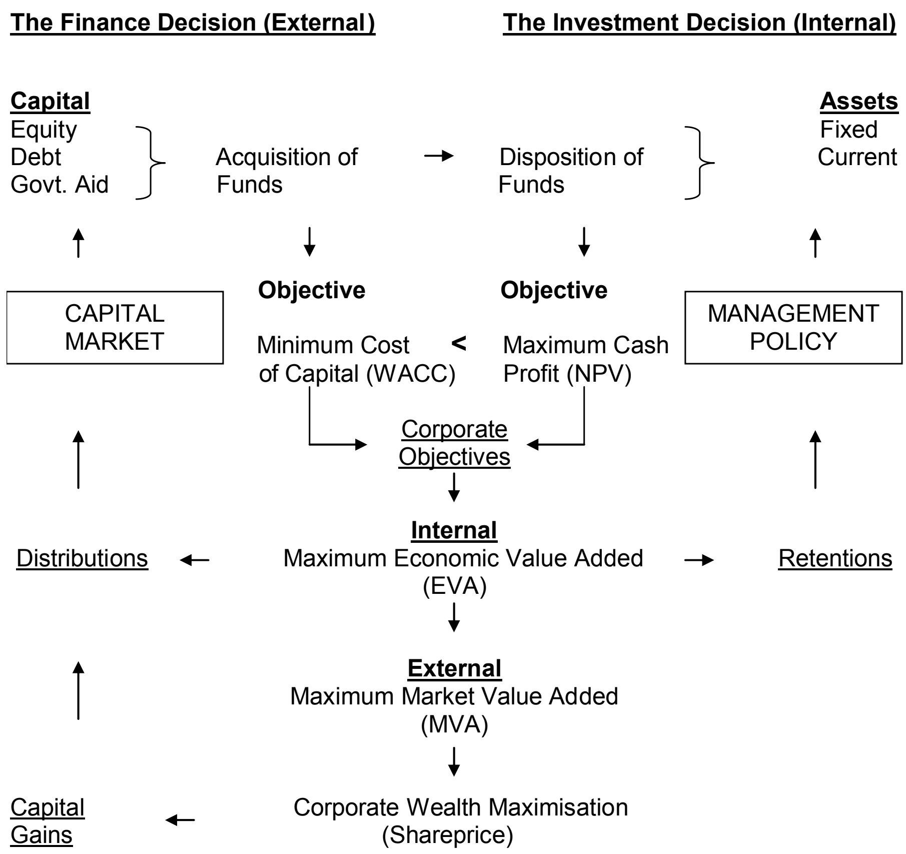

Figure 1.3: Strategic Financial Management

8.7 Selected References

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