CVA

Cash Value Added - a new method for measuring financial performance

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Shareholders have financial requirements on management's strategic decisions, i.e. strategic investments. Those are the decisions in corporations that create value. It should therefore be obvious that those investments are the ones that should be financially evaluated - from the shareholders' perspective.

In the last decade both scholars and practitioners have started to emphasize the importance of non-financial performance measurements such as the "Balanced Scorecard" proposed by Kaplan and Norton[i]. Despite their focus on non-financial measurements, they emphasize the importance of measuring company success also in financial terms; "A failure to convert improved operational performance, as measured in the Scorecard, into improved financial performance should send executives back to their drawing boards to rethink the company's strategy or its implementation plans". The fundamental problem is that corporate management has no accurate method of measuring financial performance. As shown by Salomon[ii] already 30 years ago traditional measurements such as the ROI do not give management correct guidance when evaluating the financial outcome of their investment strategies.

The biases in accounting causes management to choose inappropriate investment strategies since management is influenced by their inaccurate perception of successful and unsuccessful businesses. It is not an acceptable situation that enormous values could be destroyed due to incorrect management information. Management needs a model that bridges the gap between measurements of historic financial performance and investment evaluation, in order to make better strategic choices. The model must have the Value Based Management approach i.e. it has to measure discounted cash flow, since cash flow and time value of money determines value.

In this paper we present a new model that introduces a relevant cash flow benchmark which will make it possible to measures historic financial performance based on discounted cash flow.

Measure the value of strategies using discounted cash flow models

Most companies realized years ago that methods based on discounted cash flow must be used for investment analysis or when valuing the future. However, for ongoing financial performance measurement the investor's cash flow based perspective is substituted with the accountant's accrual accounting perspective. This is not an acceptable situation for management. Management must be able to consistently evaluate the company from the investor's perspective. From the investors' perspective, profitability and value creation in companies are a function of the funds initially invested in one or many ventures, their operating cash flows, the economic lives of those, and their capital costs.

Shareholders want to make money on the company's ventures and therefore have financial requirements on management's strategic decisions, i.e. strategic investments. All additional, non-strategic outlays with the purpose of *maintaining* the original value of the venture should be considered as "costs". To measure the financial outcome of the strategic investment decisions should be the foundation for any model measuring financial performance. A focus on strategic investments will give managers a better chance to form the future of their companies. Figure 1 below illustrates the logic. The initial strategic investment will generate a cash flow over its economic life, corresponding to a present value of "A". The size of the initial investment, "I", in relation to "A" will determine the project's profitability. The lines "B1" to "B5" indicate non-strategic investments with the purpose of preventing the expected cash flows to drop according to "C1" or "C2" etc. I.e., non-strategic investments made to defend the initial value of the strategic investment - the value that the strategy was supposed to have according to the initial strategic investment's request. Hence, non-strategic investments are not intended to create new value. Note that the non-strategic investments in accounting terms would nor-

mally be capitalized if the economic life of the specific investment would be longer than one year. In the CVA-model they would instead be treated as costs since they are made to maintain the value of the strategic investment. The dotted line "D" represents a strategic marginal investment, i.e. the investment "D" changes the fundamental value of the initial strategic investment by extending its economic life combined with e.g. a capacity increase.
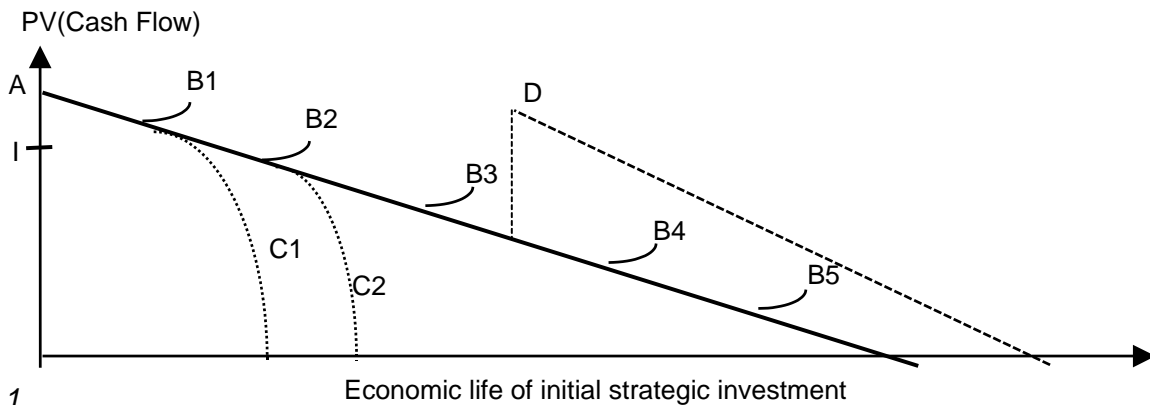

Figure 1

It is crucial for management to understand and decide what to treat as strategic investments since this should impact all strategic planning and control processes in a company. What investments to consider as value creating strategic investments has to be industry specific and can not be left to accountants or auditors to decide.

Traditional management accounting causes management to waste valuable time on controlling and evaluating non-strategic investments, which are more or less a result of past strategic investment decisions. To spend time on non-strategic investment decisions also distorts management's business understanding, since the return on non-strategic investments are often very different from the overall return on the strategic investment (which is the return that matters to investors). Focusing on non-strategic investments also distorts management's perception of the underlying pace of the business since the frequency of non-strategic investment decisions will be much higher than the frequency of strategic investment decisions. Management should instead focus on the strategic investments and the resulting long-term investment pattern of non-strategic investments that the strategic investments will create. This could e.g. greatly improve management's ability to understand whether the most profitable investment strategy is to extend the economic life of their existing plants and machinery by many strategic marginal investments (investment "D" in the graph) or whether the most profitable strategy is to avoid strategic marginal investments and instead run existing assets down in order to make new major strategic investments (investment "A" in the graph) in completely new machinery thereafter.

The model presented in this paper allows management to focus on a more limited number of relevant strategic investments. Management's time will be used more efficiently. The model will provide management with relevant feedback on the financial outcome of past investment decisions, helping them in avoiding to repeat poor investment decisions in the future and to identify the truly profitable investments.

Pre strategy value and strategy value

The positive effect on a company's stock market value from being able to identify the truly profitable investments in the future should not be underestimated. Some would say that history does not matter for the future. We do not believe that one can disregard or forget historic performance that easily. A company that has had a poor shareholder return over a period of several years has probably failed to learn from its past. Not learning from the past means making the same poor strategic investment decisions over and over again. The model presented in this paper will help management to more easily learn from past mistakes. When a company starts to make the connection between historic and future development on the stock market and management's historic strategic investment decisions and plans for future strategic investments, the possibility occurs to actually improve the situation for the stockholders.

A stock price can be said to be the sum of two values. First, the Pre Strategy Value which is the present value today of the remaining operating cash flow from the company's business as it is today, without any further strategic investments (e.g. $200 per share). This Pre Strategy Value can probably be fairly well calculated and is probably well managed in most companies. The *profitability of past investments*, i.e. the operating cash flow in relation to the strategic investment that was historically made to produce this operating cash flow, does not affect the stock price. Only the *value* of the remaining operating cash flow from the company's business as it is today matters to the stock price.
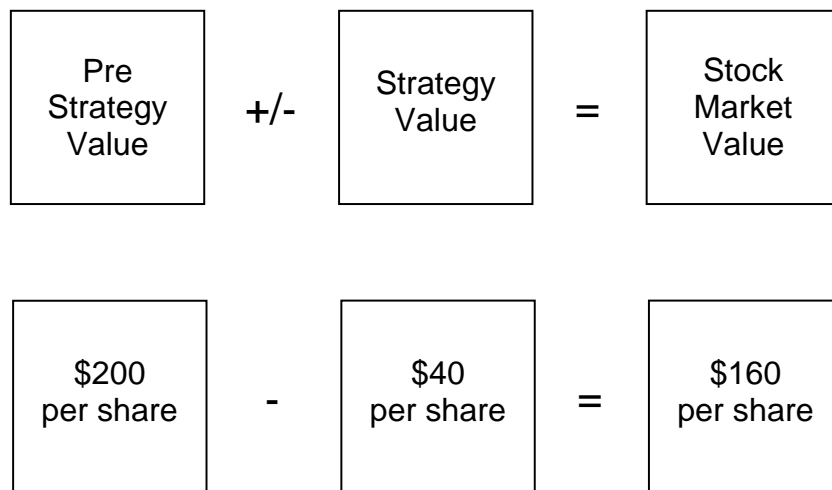
<table>
<tr><td>Pre
Strategy
Value</td><td>+/-</td><td>Strategy
Value</td><td>=</td><td>Stock
Market
Value</td></tr>
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E.g.:

<table>
<tr><td>$200
per share</td><td>-</td><td>$40
per share</td><td>=</td><td>$160
per share</td></tr>
</table>

Figure 2

The second element of the Stock Market Value is the Strategy Value which is the present value of the cash flow from the strategic decisions and investments that lie ahead of us (e.g. -$40 per share implying that the stock market believes the company will make more investments with negative net present values (NPV) than with positive NPV). Here, the *profitability* of the strategic investments, i.e. the anticipated future operating cash flows in relation to the cost of each future strategic investment, determines the strategy value. This is where the importance of knowing a company's historic performance comes in. Understanding ones historic profitability gives an understanding of how the stock market might value this Strategy Value. It cannot be assumed that companies that have had a poor development on the stock market are likely to perform better in the future. We therefore believe that the Strategy Value in many cases is much overestimated by management. Most companies, because they assume they will be profitable in the future, believe that this value is positive in their companies, which is often not the case. Half of all companies (by definition in theory[iii]) have positive strategy values and the other half have negative strategy values. If management cannot evaluate historic profitability consistent with how they evaluate future profitability they have little ability of objectively evaluate whether their plans for the future creates or destroys value.

A company that has had a poor development on the stock market during a period of time is likely to have had negative Strategy Values during that period. If the stock consistently under performs it is not unlikely that the stock market believes that future strategic investments will also have negative NPV. Why should the stock market react any differently unless management has changed their behavior? The stock market is therefore likely to deduct a negative Strategy Value from the Pre Strategy Value

(instead of adding a positive Strategy Value which is the case in companies that create wealth) and the stock will be further depressed.

Not many managers would continuously and intentionally chose strategies with negative NPVs. Our conclusion is that managers often overvalue their historical profitability and therefore erroneously believe that repeating past performance when making new strategic investments will be sufficient to create value.

Traditional profitability measurements have left managers at a loss when trying to detect this situation. This has potentially caused many managers to choose inappropriate actions to reverse a poor stock market performance.

The Cash Value Added method

The model presented here is called the Cash Value Added (CVA) model and is, in its design, very simple. It includes only cash items, i.e. Earnings Before Depreciation Interest and Tax (EBDIT, adjusted for non-cash charges), working capital movement and non-strategic investments. The sum of those three items is the Operating Cash Flow (OCF). The OCF is compared with a cash flow requirement, "the Operating Cash Flow Demand" (OCFD). This OCFD represents the cash flow needed to meet the investor's financial requirements on the company's strategic investments, i.e. the capital cost. Instead of measuring the investor's opportunity cost of capital in *percentage* terms the CVA model uses the investor's opportunity cost of capital in *cash* terms. The difference between the OCF and the OCFD is the "Cash Value Added" - CVA. The CVA for a period is a good estimate of the cash flow generated above or below the investor's requirement for that period. Note that this analysis can be done at each level of the company and that the CVA for the company is the aggregate CVA of its Strategic investments.

$$\text{NPV(Investment)} = \text{PV(OCF}_{1..n}) - \text{Investment} = \text{PV(OCF}_{1..n}) - \text{PV(OCFD}_{1..n}) =$$

$$= \left[\frac{OCF_1}{(1 + r)} + .. + \frac{OCF_n}{(1 + r)^n} \right] - \left[\frac{OCFD_1}{(1 + r)} + .. + \frac{OCFD_n}{(1 + r)^n} \right] =$$

$$= \frac{OCF_1 - OCFD_1}{(1 + r)} + .. + \frac{OCF_n - OCFD_n}{(1 + r)^n} = \frac{CVA_1}{(1 + r)} + .. + \frac{CVA_n}{(1 + r)^n} = \text{PV(CVA}_{1..n})$$

The OCFD is calculated in three steps:
1. Identification of the initial outlay for each strategic investment still in use in a strategic business unit.
2. Estimate each strategic investment's economic life.
3. Find which nominal cash flow each strategic investment must produce every period (year/quarter/month) in order to give that strategic investment a NPV[iv] of zero in a nominal calculation. The OCFD is assumed to be the same in real terms each year. Hence the cash flow in the nominal calculation changes only with historic outcome of inflation if the CVA analysis is made on historic data, and future estimated inflation, for the remaining OCFD.

If a CVA analysis is made for future analysis only, i.e. if the strategic investment is to be made now or in the following years, the first year's OCFD for an investment (here with an economic life of *n* years) can also be calculated as (assuming that future inflation is constant):

$$\text{Investment amount} = \frac{OCFD_{Year\,1}}{r - \text{Inflation}} - \frac{\dfrac{OCFD_{Year\,1} \times (1 + \text{Inflation})^n}{r - \text{Inflation}}}{(1 + r)^n}$$

If we solve this equation for $OCFD_{Year\ 1}$ we get the following:

$$OCFD_{Year\ 1} = \dfrac{\dfrac{\text{Investment amount}}{(1 + \text{Inflation})^n}}{\dfrac{1}{r - \text{Inflation}} - \dfrac{r - \text{Inflation}}{(1 + r)^n}}$$

The total OCFD for a company equals the sum of the OCFDs on each strategic investment for any period; in the past, in the present, and in the future. If the company is to add value to its stockholder, the NPV of the CVA must be positive.

The CVA Index

The CVA Index gives another dimension of the CVA-model. The CVA Index is calculated as the OCF divided by the OCFD and is fully in agreement with the Profitability Index[v].

$$Pr\text{ofitability Index} = \frac{PV(OCF_{1..n})}{-\text{Investment}} = \frac{PV(OCF_{1..n})}{PV(OCFD_{1..n})} = CVA\ Index$$

The CVA Index makes it possible to compare different units' profitability in a way consistent with financial theory. A CVA Index above 1 indicates that the strategic investment produces sufficient OCF. The CVA Index can also be split into its four Value Drivers (in relation to sales):

- the Operating Surplus margin,
- the Working Capital Movement (WCM) margin,
- the Non-strategic Investment margin, and
- the OCFD margin

$$\frac{\text{Operating Surplus margin} + \text{WCM margin} + \text{Non-strategic investment margin}}{\text{OCFD margin}} = CVA\ Index$$

The sum of the first three divided by the fourth equals the CVA Index. By further analyzing those four Value Drivers, and the variables that built each Value Driver (Appendix 1), companies can learn more about what in their business that has created value historically. The historic variables, and thereby also the Value Drivers, can easily be adjusted for what can be assumed in the future for a strategy. Management will then have a powerful tool for analyzing the value and profitability of the specific strategy and of new strategies of similar structure.

If management can evaluate whether historic margins have been sufficient or not they can more easily understand whether their plans for the future will bring value to the investors, i.e. if planned strategic investments are likely to have a CVA Index > 1. This knowledge could greatly improve the management decision making process.

Capital costs in accounting vs. capital cost in the CVA model

In industries with long economic life of their strategic investments, accounting ROI often makes businesses look unprofitable in the first years after start-up and profitable in the latter part of their economic life. This occurs when the initial strategic investment is much larger than the following non-strategic investments, resulting in a very low capital employed in the denominator in the late years. If a business generates a constant stream of cash flow in real terms over its economic life, accounting ROI would constantly increase over the economic life of the strategic investment. In this respect accounting *ROI-targets represents moving benchmarks.* This make accounting ROI into a questionable performance measurement, since it will make managers who expand through profitable investments look like poor performers.

A fundamental difference between accounting and the CVA-method is that the CVA-method holds managers responsible for the evaluation of the CVA-information. The CVA-index in a specific year could be compared with temperature. The measurement in itself is fixed and not relative to changing conditions. We believe it should be left to the beholder to judge whether -5' C is good or bad.

It could be argued that most investments should be most profitable in the earlier part of its economic life, i.e. its profitability should deteriorate over time when maintenance costs increase, time efficiency goes down and the competition from new more efficient technology depresses the market price of the product. *The CVA-index will help managers to understand this business logic since it in real terms represents a fixed benchmark.* Most strategic investments will have a CVA-index higher than 1.0 when they are most competitive, i.e. in the earlier part of their economic life. Over time the CVA-index is likely to decrease and when the assets economic life is nearly over the cash generating capacity is likely to be very low, resulting in a poor CVA-index.

A fixed benchmark will help managers to accumulate knowledge about the long-term cash generating capacity of their strategic investments. The CVA-index development can easily be compared to learning curves, product and technology life-cycle curves. Using the CVA-index as a performance measurement, managers have a tool for continuously improve their understanding of the link between financial performance and underlying business realities.

Example:

The example below in Table 1 illustrates the CVA model in its basic form with one strategic investment. The amount of the strategic investment is $100 million. Note that this strategic investment could be an R&D investment or an investment in advertising and promotion building brand equity. It is the strategic decision in itself and what the investment is meant to do (create or maintain value) that determines if it should be considered to be a strategic investment. The initial investment in working capital could be considered as part of the strategic investment.

The economical life is estimated to be 11 years. The strategic investment has in this case been running for 7 out of those 11 years. The historic inflation has been 3% and the same inflation rate is assumed for the future. The pre-tax cost of capital (WACC) is 15%. The OCFD is evenly distributed (in real terms) over the estimated life of the strategic investment. The CVA shows in which periods the strategic investment returns more or less OCF compared to the investor's capital cost, the OCFD.

The "Average discounted CVA Index" is calculated as the PV of the OCFs 1989-1995 divided by the PV of the OCFDs 1989-1995 and is 1.10 for the period. The strategic investment has so far met its capital cost. "Created Value" ("Demanded Value") is the PV of the OCFs (OCFDs) 1989-1995 in 1995's time value of money and amounts to 258 (234) M$ for the period. "Cash Value Added" is the difference between the "Created Value" and the "Demanded Value" or the PV of the CVAs 1989-1995 in 1995's time value of money and amounts to 24 M$ for the period.

M$	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Sales		160	170	250	185	200	215	200				
Costs		-150	-155	-220	-160	-170	-180	-155				
Operating Surplus		10	15	30	25	30	35	45				
Working Capital Movement		0	-1	-6	5	-1	-1	1				
Non-strategic Investments		-1	-3	-1	-3	-12	-4	-3				
Operating Cash Flow		9	11	23	27	17	30	43				
Operating Cash Flow Demand		17	18	18	19	19	20	20	21	22	22	23
Cash Value Added		-8	-7	5	8	-2	10	23				
CVA Index		0.53	0.64	1.29	1.42	0.88	1.51	2.11				
Average discounted CVA Index		1.10										
Strategic Investments	-100											
Cash Flow	-100	9	11	23	27	17	30	43				

			Value Drivers	
Created Value (up until 1995):	225		Operating surplus	0.13
Demanded Value (up until 1995):	204		Working Capital Movement	0.00
Cash Value Added (up to 1995):	21		Non-strategic investments	-0.02
			Operating Cash Flow Demand	0.10
Remaining Value if			CVA Index	1.10
future CVA Index = 0.90	56			
future CVA Index = 1.00	69			
future CVA Index = 1.10	81			

Table 1

"Remaining Value" is calculated as the expected future CVA Index (here 0.90, 1.10, or 1.30) multiplied with the NPV of the remaining OCFDs (1996-1999). This can be done since the future CVA Index tells us the relationship between the future OCF and the remaining OCFD. The future CVA Index can be calculated from what the future Value Drivers could be assumed to be. The variables that the investment's value is most exposed to can be identified and handled through sensitivity analysis.
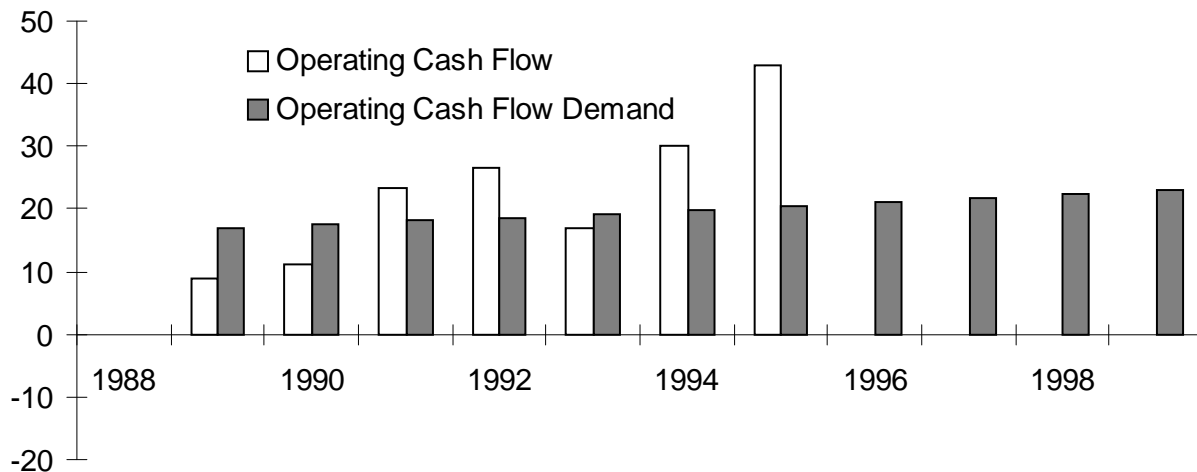

Figure 3; The figure shows the outcome of the OCF compared to the OCFD.

Figure 3 is a simple illustration of the example's generation of cash in relation to the yearly cash flow needed (the "Operating Cash Flow Demand") to eventually reach an NPV of zero.

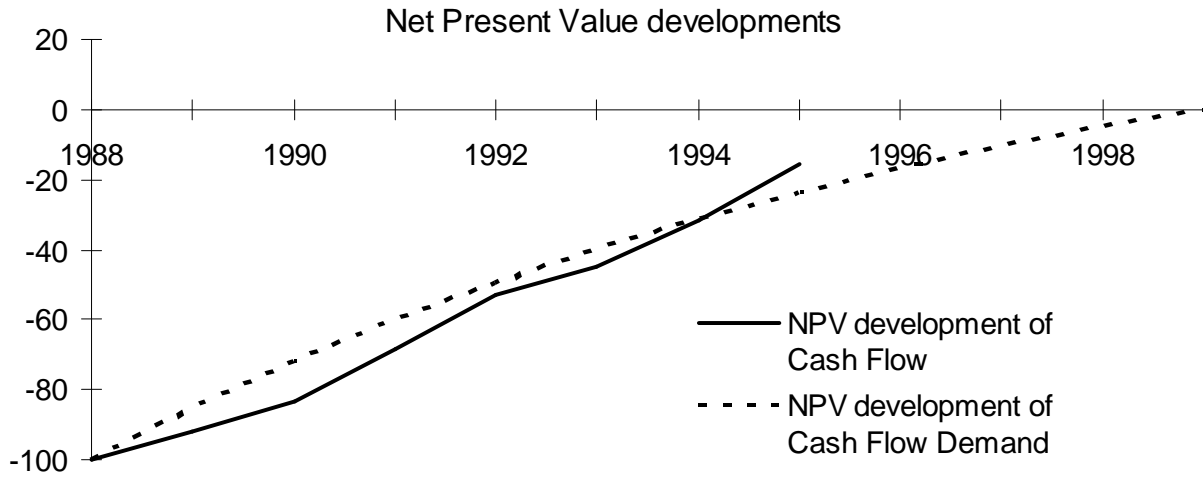## Net Present Value developments

Figure 4; The curves present the Net Present Value development of the example's cash flow and the cash flow demand. They are each calculated as: 1988 includes the first cash flow in the NPV calculation, i.e. the initial investment. 1989 includes the first two cash flows in the NPV calculation, i.e. the initial investment and the first year's cash inflow, and so on. The NPV development of the cash flow demand reaches, by definition, the X-axis (NPV = 0) at the end of the strategic investments economic life.

Figure 4 is an important illustration of strategies value creation. It gives managers a straightforward picture of how strategies perform financially taking time value of money into account to the fullest extent. The figure stimulates management to figure out when and how to make better investments. At what point in the general economy should we invest? When can we expect different strategies to meet the demand? Which strategies produce more value in the beginning of its life cycle and which loose value to begin with and then catch up?
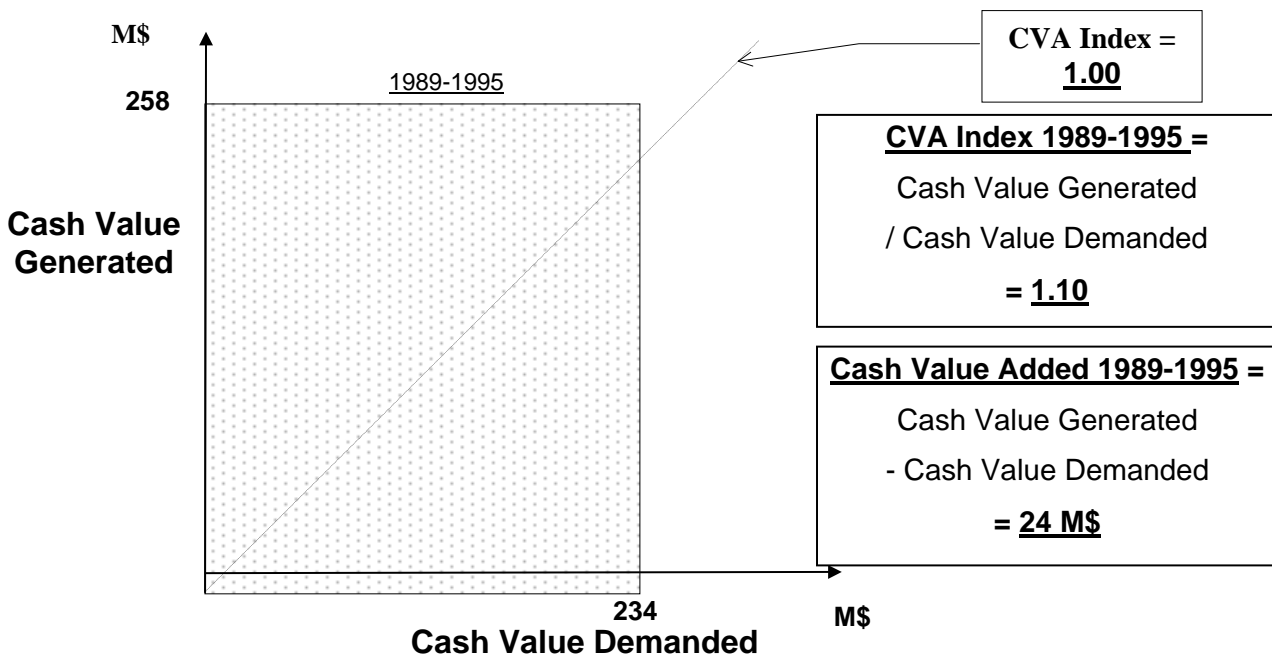

Figure 5; In 1995's value of money and assuming that the operating cash flow generated is reinvested at the Weighted Average Cost of Capital, i.e. 15%, we get the following illustration of the example's value. The values are calculated using the period's discounted CVA Index.

Those illustrations can be made for individual strategic investments or for an aggregate level giving management sufficient value and profitability information.

Focus on components relevant for value

The CVA model includes only topics relevant to discuss for management. Attention is not diverted to discussions about non-value creating accounting issues. The model is simple and tightly linked to the ongoing operations and, therefore, it can be used by managers for understanding and communicating business realities. It is simple because it only measures cash flow and has the focused purpose to show whether strategic investments are profitable or not. Its purpose is not mainly to guide bondholders, tax authorities, auditors, employees or media. Instead, its purpose is to guide managers in every-day business decisions.

It is our impression that companies have little faith in financial information today. If management has little faith they do not act on the financial information at hand which makes it useless. A division that today does not meet their target ROI may not reconsider their plans and strategies. However, if the information given to them comes from a model which is theoretically sound and easy to relate to the underlying business they will more likely act on the financial information.

The activity-based costing models introduced in the 80's caused companies to reassess the profitability of products and customers. We believe that the CVA model could cause companies to reassess not only the profitability of products and customers but of entire businesses. Until now it has not been evident to management when they should "go back to their drawing boards to rethink the company's strategy". With the CVA-model this will become much clearer.

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[i] "The Balanced Scorecard - Measures That Drive Performance" by Robert S. Kaplan and David P. Norton (Harvard Business Review, January-February 1992, page 71-79)
[ii] Ezra Solomon, "Return on Investment: The Relation of Book-yield to True Yield"; Research in Accounting Measurements (Chicago: American Accounting Association, 1966)
[iii] Values are calculated using discounting methods, e.g. the Net Present Value method. A discount rate is used for discounting. This discount rate chosen should be the opportunity cost for the investment. This opportunity cost is derived from the average return on the markets in the future. Hence, by definition, half of the future investments will be profitable while the other half will not.
[iv] An appropriate capital cost should be used. If a pretax capital cost is used obviously the Cash Flow Demand should be compared with a pre-tax cash flow and vice versa.
[v] "Business investment decisions" by Hirst I.R.C. 1988