Recognizing Macroeconomic Fluctuations in Value Based Management

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December 2001

Abstract

Value Based Management (VBM) has become a common tool for ex ante and ex post evaluation of corporate strategies and projects from the perspective of shareholder wealth maximization (SWM). VBM-frameworks are designed to support investment and divestment decisions, ex post evaluation of management and their major strategic decisions, and bonus-systems. Traditional VBM frameworks make no distinction between sources of temporary changes in performance, and sources of performance reflecting the intrinsic competitiveness of the firm. Temporary changes in performance are often caused by macroeconomic fluctuations. In this article we develop an approach for "filtering" the impact of macroeconomic fluctuations from measures of performance in order for management to obtain better information for purposes of investment, divestment, and exposure management decisions. We focus on filtering for purposes of performance assessment employed in compensation schemes. A case study illustrates the approach, and shows the potential magnitude of effects from macroeconomic events.

JEL classification: D81, G31, M22

Key words: Value Based Management (VBM), Shareholder Value Analysis (SVA), Economic Value Added (EVA), performance measurement, macroeconomic fluctuations, bonus system

Recognizing Macroeconomic Fluctuations in Value Based Management

Value Based Management (VBM) has become a common tool for ex ante and ex post evaluation of corporate strategies and projects from the perspective of shareholder wealth maximization (SWM). VBM-methods are designed to support, for example, investment and divestment decisions, and ex post evaluation of major strategic decisions. Measures of performance of management are another important component of VBM. The performance measures are used in bonus systems in order to align managerial incentives with those of shareholders.

There are a number of VBM frameworks. Shareholder Value Analysis (SVA), developed in Rapaport (1986) and Economic Value Analysis (EVA) developed by Stern Stewart (1990) are the two most well-known ones. However, there exist many challengers as described in Black, Wright, and Backman (2001). Cash Value Analysis (CVA) developed by Ottoson and Weissenrieder (1996), and Cash Flow Return on Investment (CFROI), (Madden, 1999) are two offering serious alternatives to the different versions of EVA.

All the mentioned VBM frameworks have in common that they do not make a distinction between changes in cash flows that reflect a firm's competitive position, and changes caused by relatively short term influences from the firm's macroeconomic environment. A firm's competitive position may be attributed to its (and its management's) specific skills and knowledge relative to the market and competitors. Short-term influences on the other hand, are often caused by macroeconomic events, and observed as changes in exchange rates, interest rates and aggregate price levels domestically and abroad. Macroeconomic factors have in common that they are completely beyond management's control although the cash flow effects of such factors may be affected by managerial actions. Thus, management may gain useful information about current and future prospects of the firm by "filtering" out macroeconomic influences on current performance measures. Such "filtering" would allow management to estimate performance "under neutral macroeconomic conditions"

If cash flow forecasts for a new project are generated without distinguishing between sustainable demand and cost conditions, and temporary demand and cost conditions generated by macroeconomic events, an estimated positive project value may not be sustainable under normal macroeconomic conditions. Alternatively, if forecasts are generated based on observations under unfavorable macroeconomic conditions, then project values may be underestimated and the project abandoned prematurely. For instance, an undervalued currency can lead the management of an exporting firm to believe that the company is

competitive whereas its profits "filtered" of the under-valuation may be decreasing. An unsustainable good performance may lead to demand for wage and dividend increases that are not motivated by the firm's longer term competitiveness. Hence, the cost to shareholders of ignoring or remaining uninformed about the temporary impact of macroeconomic fluctuations may be very high at the end of the day.

In this paper we focus on correcting performance measures for influences of macroeconomic events. From the point of view of performance evaluation macroeconomic effects on cash flows and value could be considered noise to the extent they are not predictable. It is well known in the incentive contract literature that if risk-averse managers' remuneration is linked to noise factors beyond their control without strong linkage to shareholder value, then their incentive to exert effort on behalf of shareholders may be weakened.[1] Thus, from a SVM perspective it could be desirable to "cleanse" performance measures of macroeconomic influences with the aim of strengthening the incentives of managers.

An additional argument for filtering out macroeconomic influences on measures of firms' performance is that they represent a possible explanation for large observed differences between economic values as measured by EVA-analysis and market values (O'Byrne, 1997). Such differences could occur if market participants were better able to identify macroeconomic influences than the EVA-analyst.

Oxelheim and Wihlborg (1997) discuss how management can develop a Macroeconomic Uncertainty Strategy (MUST) - analysis to manage exposure caused by macroeconomic events observed in, for example, exchange rates. A key component of this analysis is the estimation of exposure coefficients for the impact of macroeconomic price variables on commercial (non-financial) cash flows, or on the value of the assets generating such cash flows. Here we argue that these exposure coefficients can be useful for purposes of performance assessment as well. Changes in a firm's cash flows or value from one period to another can be "cleansed" from some or all macroeconomic influences once exposure coefficients are known. Thereby sustainable changes in cash flows or value that should be attributable to a firm's inherent competitiveness would be identified.

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The basic framework for decomposing changes in cash flows and value using exposure coefficients is laid out in Section 2. As an illustration of the decomposition procedure and the magnitude of macroeconomic influences the case of Electrolux is presented in Section 3. In Section 4 we turn to decomposition for purposes of performance assessment. The appropriate

decomposition depends on flexibility in a firm's operations, and on the existence of real options. Conclusions follow in Section 5.

2. VBM and macroeconomic fluctuations – A framework

Value Based Management springs from the measure of firm value employed in conventional corporate finance. According to this measure the value of corporate assets (V_A) is the net present value of cash flows generated by those assets:

$$V_{A,t} = \sum_{j=0}^{\infty} \delta^j E[X_{t+j}] + PVRO \quad (1)$$

where δ^j is the discount factor for j periods, X_{t+j} refers to cash flows in period t+j, and PVRO represents the value of real options that cannot be captured in conventional present value analysis. The value of equity, $V_{S,t}$, is the value of assets minus the value of debt $V_{D,t}$. Thus,

$$V_{S,t} = V_{A,t} - V_{D,t} \quad (2)$$

In VBM the objective of management is commonly to maximize the value of equity, $V_{S,t}$. If markets for debt are well-functioning, then maximization of the value of assets, V_A, leads to the maximization of the value of equity, V_S. In the following, we focus on the value of non-financial assets that depends on expected cash flows and the risk adjusted cost of capital, δ. SVM implies a concern with cash flows, as well as with the minimization of the cost of capital. Investments in real options also increase a firm's value by increasing the average level of cash flows.

Cash flows in any period can be decomposed into two components. One component is cash flows that would occur in the absence of macroeconomic fluctuations under hypothetical "neutral" or "normal" macroeconomic conditions in countries of relevance for any particular firm. These cash flows for any individual firm vary as a result of changes in the firm's competitiveness in the market place and the growth rate of demand for the firm's output. Given a firm's technology, knowledge among employees, managerial competence, and demand, there is at any time a level of cash flows that may be called the sustainable level of cash flows for the period. This sustainable level, denoted X_L, occurs under "neutral"

macroeconomic conditions. It may not usually be observed, and it is not constant. It is independent of influences of macroeconomic events, however, and reflects the ability of management to employ resources productively. The fact that the sustainable level is not directly observable does not mean that it lacks practical significance. On the contrary, we argue that management should estimate it and use it as input in major business decisions.

The cash flows during a period that depend on macroeconomic conditions in countries where the firm has a presence are denoted $X_{M.}$ These cash flows may be positive or negative and more or less transitory. They are by definition never permanent. Thus:

$$X_{t+j} = X_{L,t+j} + X_{M,t+j} \qquad (3)$$

The pattern of both components in (3) can be influenced by investments in real options. We defer the discussion of this issue to Section 4.

Macroeconomic events, causing fluctuations in a firm's cash flows and economic value, may be caused by a variety of policy and non-policy shocks originating at home or abroad. Monetary and fiscal policy shocks are the policy shocks most commonly referred to, while non-policy shocks may be caused by changes in private sector aggregate demand and supply. The cash flows caused by macroeconomic shocks may have a substantial effect on a firm's value in a period t.

Most directly and immediately macroeconomic events are observed as changes in macroeconomic price variables among which exchange rates, interest rates, and price levels are most prominent. Underlying macroeconomic events are usually not directly observed, however. In most macroeconomic models different shocks affect these particular price variables in different combinations. The price variables are essentially signals of macroeconomic conditions. Economic models differ about the magnitude and duration of change in the price variables in response to different macroeconomic shocks but most open economy models have in common the mentioned price variables. The "market return" on stocks could be added in order to cover price responses to macroeconomic shocks more completely but this variable seems to be less systematically related to macroeconomic shocks. We need not link the discussion here to any specific macroeconomic model. The main point is that there is a set of price variables that serve as indicators of macroeconomic conditions.

The correction to commercial cash flows that would be made to arrive at "sustainable" cash flows under neutral macroeconomic conditions in a particular period can be expressed in

the following way when macroeconomic conditions are observed in exchange rates, interest rates, and prices:

$$X_{M,t} = \frac{dX_M}{de}(e - \bar{e})_t + \frac{dX_M}{di}(i - \bar{i})_t + \frac{dX_M}{dp}(p - \bar{p})_t \qquad (4)$$

In (4) $(e - \bar{e})_t$, $(i - \bar{i})_t$, and $(p - \bar{p})_t$ represent deviations from the exchange rates, interest rates, price levels that correspond to neutral macroeconomic conditions in period t. Each of these variables can be seen as a vector of domestic and foreign variables of relevance to a firm. The partial derivatives represent sensitivity or exposure coefficients.

The coefficients in (4) capture not only the direct impact of each variable on cash flows. Each coefficient depends on correlations between the variable and all other macro-effects of the event, as well as between these effects and cash flows. In contrast, exposure management in most firms seems to presume that changes in exchange rates, interest rates, and price levels as shocks occurring independently of each other and other variables affecting a firm's cash flows. We have discussed problems with this view of macroeconomic exposure in Oxelheim and Wihlborg (1987, 1997), and recommended that firms measure coefficients as those in (4) above for the three mentioned macroeconomic variables for relevant countries employing multivariate regression or scenario analysis.

The functional specification of (4) describes a linear relationship among the variables. Practical and econometric considerations dictate whether the coefficients should be estimated for levels or changes in cash flows and price variables. Other functional forms are also possible but the principles for decomposition are the same in either case.

Macroeconomic shocks may not be random but serially correlated to a substantial extent. Each of the market price variables in (4) may accordingly be expressed as a function of lagged and current changes in it. For example, for the exchange rate the current deviation from its long run values could be written as:

$$e_t - \bar{e} = r_e(e_{t-1} - \bar{e}) + s_t \qquad (5)$$

where r_e is a serial correlation coefficient for the exchange rate and s_t is the unanticipated change in period t. The cash flow adjustment to anticipated changes may or may not be different from adjustment to unanticipated changes. Furthermore, it is possible that there are cash flow effects in period t of exchange rate changes in t-1. Thus, the cash flows in period t

explained by the exchange rate's and the other variables' deviations from their long run values can be written as in the following expression for the exchange rate's effect on cash flows:

$$X^{e}_{M,t} = \frac{dX_M}{d(e_{t-1} - \bar{e})}(e_{t-1} - \bar{e}) + \frac{dX_M}{ds} s_t \qquad (6)$$

The first term in (6) includes both the lagged current period effects of exchange rates in t-1, and the current period effects of the anticipated exchange rates deviation from the long run level. The second term incorporates unanticipated (in t-1) cash flow effects of unanticipated exchange rate changes a period t. Similar expression can be written for interest rate and price levels for inclusion in a multivariate formulation of the impact of macroeconomic conditions on a firm's performance.

It is in principle possible to decompose changes in value instead of cash flows along the lines described above. However, most VBM-frameworks use cash flows as the major input to arrive at estimates of project and firm values, as well as to measure performance.

We define the difference between the value of assets in period t and their value under neutral macroeconomic conditions as:

$$\Delta V_{A,t} = V_{A,t} - V_{AL,t} = \sum_{j=1}^{\infty} d^{\,j} E_t\left[X_{M,t+j}\right], \qquad (7)$$

where

$$X_M = X^{e}_M + X^{i}_M + X^{p}_M, \qquad (8)$$

and δ_M is the discount factor for cash flows caused by macroeconomic conditions.[2] Superscripts indicate cash flow effects of different macroeconomic variables in (4). Each of these variables can be expressed as in (6) in terms of an anticipated component and a noise component.

The formulation for value effects of cash flows caused by macroeconomic events in (7) implies that the value of real options, PVRO, is part of the "sustainable" value $V_{AL.}$ The rationale for viewing the value of real options this way is that they are very much the result of managerial activity. We return to this issue in Section 4.

It is also possible to define the difference between the value of equity and the long run sustainable value of equity in the following way using (2):

$$\Delta V_{S,t} = V_{S,t} - V_{SL,t} = (V_{A,t} - V_{AL,t}) - (V_{D,t} - V_{DL,t}) = \Delta V_{A,t} - \Delta V_{D,t} \qquad (9)$$

In (9) V_{DL} is the value of debt under neutral macroeconomic conditions. Thus $\Delta V_{D,t}$ is the value of debt caused by macroeconomic variables' deviations from values corresponding to neutral conditions. These deviations cause financial cash flows and capital gains or losses on financial positions in a period. Corporate financial exposure management can be thought of as adjusting financial positions including derivatives, ΔV_D, in order to create an offset between the sensitivities of ΔV_D and ΔVA--or the corresponding sensitivities for cash flows-- to macroeconomic price variables. (See Oxelheim and Wihlborg, 1997)

Cash flow decomposition and valuation; The case of Electrolux

Electrolux AB is one of the world's largest manufacturers of white goods equipment. Through acquisitions the company has become a truly global player. Its headquarter is located in Sweden, and it is controlled by the so-called Wallenberg group through a holding company called Investor. In spite of widespread Swedish and international ownership of equity, control is held by Investor and the Wallenberg group through a dual-class share system.

The changes in quarterly real operating cash flows for the Electrolux group from 1986 through 1994 were obtained from the firm. The purpose was to decompose the changes into the components described in the previous section.[3] The changes in real operating cash flows were regressed on changes in exchange rates between Sweden and a number of major currencies, interest rates in the same currencies, inflation rates in the same currencies, and total European housing starts to control for changes in the industry's conditions. The cash flows were also seasonally adjusted. Since the number of observations is limited many different combinations of the currencies were used. Exchange rates and interest rates are highly correlated across currencies. Therefore, observations from a few countries capture the combined exchange rate, interest rate and inflation effects.

Regressions were run for the whole period 1986-94, as well as for 1986-92, and 1986-93. The latter regressions made it possible to use coefficients for out of sample analysis. Without

going into econometric methodology and problems we present results of the analysis as an illustration of the decomposition. The following sets of coefficients were obtained using contemporaneous dependent and independent variables:[4]

Table 1 here.

Table 1 shows that the macroeconomic price variables explain about 50% of the fluctuations in seasonally adjusted changes in quarterly operating cash flows. The coefficients were employed out of sample in such a way that the 1986-92 coefficients were used to estimate the impact of macroeconomic events in 1993, and the 1986-93 coefficients were used to estimate the impact in 1994.

Table 2 shows the data and the results of the out of sample analysis. Column (1) shows actual quarterly cash flow changes in 1993 and 1994. Columns (2), (5), (6) and (7) list the changes in the price variables, which are multiplied by the coefficients in Table 1 to obtain the changes in cash flows caused by changes in the macro economy (ΔX_M) in column (8). Changes in "sustainable" cash flows (ΔX_L) are registered in column (9).

A second decomposition in Table 2 is obtained by removing only changes in cash flows caused by unanticipated macroeconomic events. The interest rate differential in the previous quarter is a proxy for the anticipated exchange rate changes in column (3). Unanticipated exchange rate changes follow in column (4). It is assumed that all changes in interest rates are unanticipated in columns (5), (6), and (7). After multiplying unanticipated changes with the coefficients in Table 1, unanticipated cash flow changes caused by macroeconomic events (ΔX_M^U) are registered in column (10). Finally column (11) shows "sustainable" cash flow changes plus cash flow changes caused by anticipated macroeconomic events ($\Delta X_L+\Delta X_M^A$).

The distinction between the two decompositions is particularly important for performance assessments. We turn to this issue in the next section. However, the distinction can also be important for the estimation of changes in the net present value of the firm's assets within a VBM framework. For example within EVA analysis the economic value added for a period is estimated based on the difference between a period's actual cash flows and the cash flows required to cover the cost of capital for the same period.

Assume as an example that Electrolux at the end of 1994 employed a 15 percent cost of capital, and that the expected growth rate of cash flows was 9.33 percent. This figure is the average growth rate during 1993 and 1994 as shown in Table 2. Using the constant growth formula for estimating the present value of a dividend of 1 in 1994 would lead to a present value of 1.0933/(.15-.0933)=19.28.

If instead the true long run growth rate is the average of the growth of "sustainable" cash flow in (8), then the corrected present value is 1.0763/(.15-.0763)=14.60, if the same cost of capital is used. Thus, disregarding the temporary nature of some cash flows, the value of the firm would be exaggerated by 32% in this example. The exaggeration presumes that management has interpreted temporary growth caused by macroeconomic effects in 1993 and 1994 as sustainable growth.

A second source of error in the economic value estimation within a VBM-framework is that the discount rate is assumed to be the same for all cash flows. Most likely the risk-adjustment on the cost of capital for cash flows caused by macroeconomic events should be lower than the risk-adjustment for the sustainable cash flows generated by the business itself. If so, the difference between the present values including and excluding the macroeconomic components of cash flows would be even larger.

4. Performance assessment and real options in VBM

An important aspect of VBM is to link bonus for management to changes in shareholder value or value-enhancing cash flows. In the following it is assumed that either cash flows during a period or changes in the estimated present value of cash flows provide the basis for a bonus for the period. Thus, stock market values do not exist for the entity or are considered excessively noisy to be used as a basis for compensation. In this case the key element of performance is the operating (or commercial) cash flows. These cash flows would provide the information based on which an economic value would be estimated. One issue here is which component or components of operating cash flows should be the major input in performance assessment for the purpose of determining managerial compensation. The choices we have from Section 2 and Table 2 are the total operating cash flows (X, column (1)), the "sustainable" cash flows (X_L, column (9)), or the total cash flows minus those caused by unanticipated macroeconomic events ($X_L + X_M^A$, column (11)). A second issue is whether the coefficients estimated as above in a linear model are appropriate when decomposing cash flows. Real options in particular imply a non-linear relation between shocks and cash flows.

Unanticipated and anticipated cash flow effects from macroeconomic events

If management has no or negligable influence on cash flows caused by macroeconomic events, an efficient compensation scheme should be linked to "sustainable" cash flows alone, or the present value of expected such cash flows. In this case the compensation based on "sustainable" cash flows creates the strongest incentives for management to devote effort towards enhancement of the firm's long run competitiveness, while cash flows beyond its control do not affect compensation. To the extent a bonus system is linked to cash flows and value changes over which management has no control, effort may be diverted towards speculation about macroeconomic developments or towards obfuscation of information about them. Furthermore, the incentives of risk-averse managers to exert effort are weakened, if the variable to which bonus is linked contains noise relative to the variable that is of concern to shareholders as noted above. The link between effort and outcome is weakened.

It could be argued that management should be induced to take advantage of anticipated changes in the macroeconomic environment. Naturally, if the firm's operations in various ways can be adjusted to changes in expectations about macroeconomic events, then management should have the incentive to implement such adjustment in sales effort, production pattern, or where adjustment can be made in time to take advantage of the expectations. In this case the adjustment to total cash flows would be limited to those caused by unanticipated changes such as ε_t in (6) and column (10) in Table 2. The compensation would be linked to cash flows in column (11) of Table 2**.** Evan if cash flows can be adjusted a reason for not linking the bonus to anticipated flows is that these can be affected by managerial decisions to a lesser degree relative to effort, than sustainable flow. In the latter case, scarce managerial time is most productively used to enhance the firm's competitiveness. The ability of management to take advantage of anticipated macroeconomic conditions may vary among industries. Differences in compensation schemes may therefore be observed without any implication that one system is superior to another.

The data presented in Table 2 indicate that a very large proportion of the variability of operating cash flows is caused by macroeconomic fluctuations. Comparing columns (8) for all macro-effects and (10) for unanticipated macro-effects it can be seen that the unanticipated component dominates very strongly over the anticipated component in the particular case presented.

Cash flows and value created by investments in real options

In eq.(1) the present value of real options is one component of the value of a firm. Real options are created by investments in "flexibility". Such investments reduce irreversible costs associated with changes in operations, and enhance a firm's ability to take advantage of positive changes in cost and demand conditions and to reduce the impact of negative changes. By investing in flexibility the firm can narrow the range of conditions within which it cannot adjust its operations to changes in the environment. This range is defined by "trigger levels" for demand and cost conditions beyond which adjustment of operations is profitable (See, for example, Dixit and Pindyck, 1994).

Investments in real options--or "flexibility"--can be motivated by uncertainty about factors affecting "sustainable" cash flows, as well as about macroeconomic conditions. Here we are concerned with the effects of investments in "flexibility" in response to uncertainty about macroeconomic conditions. For example, investments reducing irreversible costs of switching suppliers, location of production, or marketing efforts between countries enable a firm to reduce the cash flow impact of negative changes in real exchange rates, and increase the cash flow impact of positive changes (see Capel, 1997). Another example is that investments in customer relations may enable a firm to pass through large exchange rate or interest rate changes into prices by reducing costs associated with changes in prices. This flexibility could extend even to unanticipated changes.

. The options to change prices, switch suppliers, etc. in response to price incentives of certain magnitudes imply that the cash flow sensitivity coefficients tend to become smaller for large deviations from neutral macroeconomic conditions. A linear relation between cash flows caused by macroeconomic factors, and their deviations from levels corresponding to neutral conditions exists only when there are no real options that management can exercise in response to relatively large price incentives.

Figure 1 illustrates the cash flow effects of unanticipated macroeconomic shocks. The size of the shock is measured along the x-axis. The straight line shows the cash flow effects of the disturbance if there are no real options, i.e. if there is no flexibility in pricing, sourcing, location of production etc. no matter how large the shock is. The broken line shows the cash flow effects of the same shock, when an increasing number of real options are triggered as the magnitude of the shock increases. When the option is triggered, cash flows denoted $X_{R,t}$ arise. They add increasingly to the cash flows as the magnitude of a positive event increases. When

the event is increasingly negative, the cash flows created by the option reduce the impact on cash flow increasingly.

I INSERT FIGURE 1

The framework developed in Section 2 should be expanded to include cash flows, X_R, that occur in a period as a result of previous investments in real options. Total cash flows in period t can be decomposed as in e.q. (3) above into sustainable and macroeconomic components. The latter component, X_M, described above in the linear expressions (4) and (6) must now be extended to include the cash flows from real options. Using M_t to denote the level of a vector of macroeconomic variables describing macroeconomic conditions in period t, the cash flow effects caused by macroeconomic events can be written in the following way:

$$X_{M,t} = \frac{dX^M}{d\left(M_{t-1} - \overline{M}\right)}\left(M_{t-1} - \overline{M}\right) + \frac{dX^M}{dm} m_t \pm X_{R,t}, \qquad (4A)$$

where the first term represents anticipated effects of lagged changes in M, the second term captures unanticipated effects, and $X_{R,t}$ as described in Figure 1 represents cash flow effects of real options triggered by M in period t. As in expression 6 above

$$M_t = r_M\left(M_{t-1} - \overline{M}\right) + m_t, \qquad (6A)$$

where r_M is a serial correlation coefficient and m_t is the unanticipated change in macroeconomic conditions.

The partial derivatives in the first two terms on the right hand side are assumed to be linear coefficients independent of the magnitude of change in M. Estimated coefficients for changes in cash flows were estimated and used in Table 2 to decompose cash flows into "sustainable" cash flows, X_L, and cash flows caused by macroeconomic events, X_M. The nonlinear cash flows created by investments in real options were not accounted for, however.

The issue now is how the last term in (10), $X_{R,t}$, should be treated when estimating the performance of management with the objective of providing incentives for management to maximize shareholder value. Clearly, shareholder wealth maximization includes maximizing the value of real options (PVRO in (1)) whether the options refer to flexibility in responses to

competitive conditions or macroeconomic events. Thus, it is clearly desirable to include the cash flows trigged by real options on macroeconomic conditions, X_R , or the value of real options, PVRO, in measures of managers' performance.

An econometric problem remains. The presence of real options implies that it is no longer appropriate to take a linear relation between cash flows and macroeconomic price-variables for granted, although the linear sensitivity coefficients in expressions like (4) and (6) are the appropriate ones to use for the decomposition of cash flows. If the relationship between cash flows and macroeconomic variables are described by the non-linear broken line in Figure 1, the analyst estimating the linear sensitivity coefficients for macroeconomic effects on cash flows may have to limit the regression to observations of macroeconomic changes within the range bounded by the trigger levels for which the relation can be assumed to be linear. The linear coefficients measured this way apply nevertheless outside this range when cash flows that cannot be affected by management are estimated.[5]

5. Concluding remarks

Value Based Management is a tool that should help management maximize shareholder value in large and small investment and divestment decisions. It should also help shareholders designing bonus-systems based on performance in order to induce managers to have shareholder value as their prime objective. As mentioned in the Introduction there is a number of competing Value Based Management frameworks. One difference among them is how they arrive at cash flow estimates. For example, EVA starts from accounting data for income and makes a large number of adjustments to arrive at a proxy for cash flows. On the other hand, CVA and CFROI take actual cash flows as starting point for analysis. These frameworks are therefore more easily adjusted to take into account and filter performance measures of macroeconomic influences.

Macroeconomic fluctuations affect firms' cash flows as well as market values. Such fluctuations are beyond management control. Cash flow effects of such fluctuations can sometimes be influenced by management to the extent macroeconomic developments can be forecast, or if firms can invest in flexibility with respect to sourcing, pricing, location of production, or location of sales in response to anticipated and/or unanticipated macroeconomic development.

We have argued that for purposes of exposure management, project evaluation, ex post analysis of projects, and performance assessment it is valuable to decompose cash flows of

firms into "sustainable" cash flows under neutral macroeconomic conditions, and cash flows caused by macroeconomic fluctuations around these conditions. The latter flows can be decomposed further into anticipated and unanticipated cash flows. We have here suggested that sensitivity- (exposure) coefficients describing the impact of key macroeconomic price variables on cash flows should be estimated and used as input to filter out the cash flow effects of macroeconomic fluctuations. The data used as input in investment decisions, ex post analysis of projects and strategies, and performance measures for compensation-systems could be substantially improved if cash flows were decomposed each period as suggested above. Inclusion of this type of analysis as a key component of Value Based Management would improve conditions for shareholder wealth maximization. In particular, it would be possible to base compensation systems on measures of performance under the actual control of management.

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Table 1: Coefficients for percent changes in seasonally adjusted real operating cash flow, Electrolux Group.

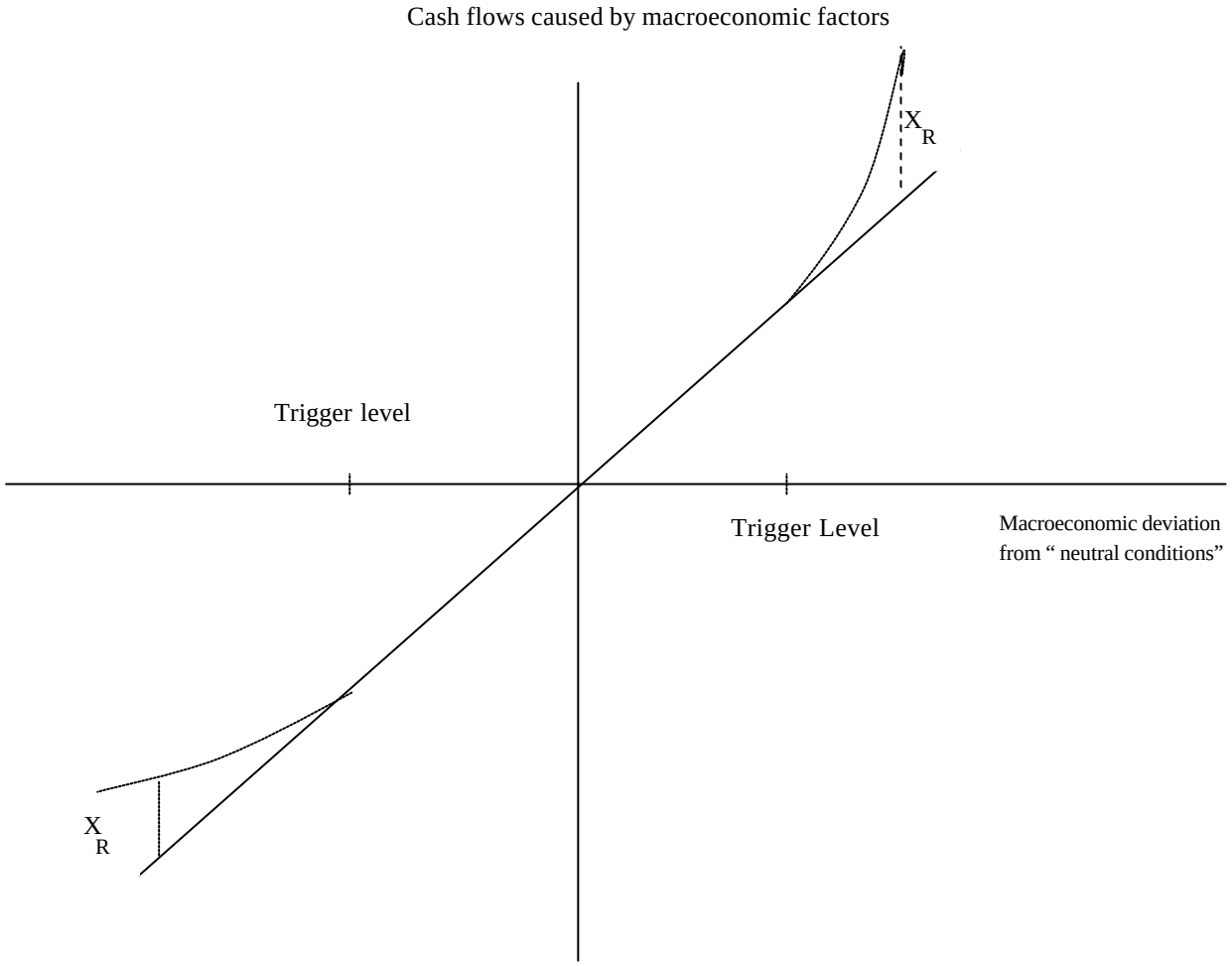
	1986-92	1986-93
SEK/GBP*	.55	.92
Long DEM interest rate*	.471	.43
Short GBP interest rate*	.24	.33
Short Swedish interest rate*	-.28	-.29
$\bar{R}^2$	.46	.51
D.W.	2.1	2.3
* All variables are measured in percent rate of change.		

Table 2. Decomposing Electrolux' cash flows out of sample

Year		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Real Group operating cash flow % Change from previous quarter ΔX	Actual SEK/GBP % Change	Anticipated SEK/GBP (interest rate differential) % Change	Unanticipated SEK/GBP % Change	10 Year German Interest rate % Change	Three month Great Britain Interest Rate % Change	Three month Swedish Interest % Change
1993	1	**27.18%**	11.47%	0.79%	10.68%	-7.78%	-14.02%	-22.94%
	2	**5.39%**	1.96%	0.71%	1.25%	-2.09%	-6.59%	-7.82%
	3	**9.36%**	5.92%	0.56%	5.37%	-5.07%	-1.01%	-7.84%
	4	**9.74%**	1.89%	0.40%	1.49%	-8.55%	-6.33%	-12.55%
1994	1	**0.03%**	-4.27%	0.42%	-4.69%	5.72%	-4.83%	-2.62%
	2	**2.78%**	-0.48%	0.47%	-0.96%	13.54%	-2.73%	1.10%
	3	**1.42%**	1.06%	0.50%	0.56%	5.64%	8.80%	8.40%
	4	**18.74%**	-0.88%	0.47%	-1.35%	3.92%	11.56%	6.61%
Mean		**9.33%**						
Std.dev		**9.37%**						
Mean/Std.de		**99.56%**						

Year		(8)	(9)	(10)	(11)
		Operating cash flow effect of all macro variables % change ΔX_M	Operating cash flow net of all macro variable effects % Change ΔX_L	Operating cash flow effect of unanticipated changes in macro variables % Change; ΔX_M^U	Cash flow change after hedging unanticipated changes in macro variables % Change; $\Delta X_L + \Delta X_M^A$
1993	1	13.04	14.14%	12.60%	**14.57%**
	2	2.68	2.71%	2.29%	**3.09%**
	3	7.58	1.78%	7.28%	**2.09%**
	4	7.08	2.66%	6.86%	**2.87%**
1994	1	-5.43	5.46%	-5.66%	**5.69%**
	2	-7.60	10.37%	-7.85%	**10.63%**
	3	-2.35	3.78%	-2.63%	**4.05%**
	4	-1.43	20.18%	-1.69%	**20.43%**
Mean			7.63%		**7.93%**
Std.dev			6.66%		**6.66%**
Mean/Std.de			114.72%		**118.97%**

Figure 1.Cash flows caused by macroeconomic factors when real options are present.



Endnotes

[1] See for example, Milgrom and Roberts (1992), Ch.5

[2] The risk premium for cash flows caused by macroeconomic fluctuations may differ from the risk premium for cash flows at "neutral" conditions. See below.

[3] The procedures and results were presented in a Masters degree thesis by Henrik Dahl and Ulrika Linden (1996) in the department of economics, University of Gothenburg. The thesis implements procedures described in Oxelheim and Wihlborg (1995).

[4] Lagged variables were introduced but without substantial changes in results

[5] The regressions resulting in the coefficients presented in Tables 1 and 2 did not reveal errors that could be interpreted as non-linearities of the type discussed here.