

Implementing Value Based Management

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ABSTRACT: Implementing Value Based Management

We identify four alternative performance metrics used in value based management (VBM). (1) Basic is an intrinsic value analysis (IVA), the discounted cash flow (DCF) methodology. (2) We show that this framework will be consistent with returns to shareholder (RTS, capital gains plus dividends) measured over appropriate time horizons. (3) Economic profit (EP) [also called economic value added (EVA[®])] takes from the DCF free cash flow valuation, net operating profits after taxes (NOPAT), divided by invested capital to obtain the return on operating invested capital (ROIC) less a cost of capital estimate (k); the difference multiplied times operating capital. (4) The relationship between the market value of the firm's financial instruments and the book value of the firm's operating assets can be expressed equivalently as market value added (MVA), the q ratio, and the market-to-book ratio.

We test the relationships of alternative financial accounting performance metrics versus market metrics on a historical basis as well as on a prospective basis. We find that the alternative financial performance metrics – discounted cash flow valuation, returns to shareholders, economic profit, the market to book ratio [equivalently, the q ratio and market value added (MVA)] are highly correlated. We also find that standard financial ratio analysis as expressed in the DuPont formulation are also significantly related to market performance metrics and in the implementation of VBM.

In implementation, each approach to value based management (VBM) starts with strategic planning processes, ties performance to incentive compensation, requires top management involvement, as well as information and training programs for employees. The four approaches to VBM also take into account other stakeholders (employees, consumers, community). VBM must also evaluate changing economic, cultural, and political environments. The strategic planning process analyzes long term trends, cyclical economic changes, competitive forces, and effective development of managerial capabilities and other resources. Our clinical analysis centers on Hershey Foods Corporation.

Implementing Value Based Management

The literature on value based management contains many unsettled issues, particularly alternative performance measurement theories (Martin and Petty, 2000; Rappaport, 1998; Stewart, 1991; Young and O'Byrne, 2001; Copeland et al, 2000). Divergent views are also reflected in the extensive bibliography developed by Korajczyk (2001).

This paper seeks to illuminate the nature of value based management (VBM) by describing its implementation at the level of the firm. Its central elements are portrayed in Figure 1. The overview of relationships presented demonstrates that VBM is a continuous process. It begins with strategic planning to achieve competitive advantages which produce superior growth in economic profits and returns to shareholders. Strategic planning guides the firm's choice of a product-market scope and its resource requirements. The economic nature of the industry or industries in which the firm operates determines the patterns of its financial statements reflected in traditional financial ratio analysis. Based on a business economic analysis of the industry and the firm's competitive position, projections of financial relationships provide a basis for valuation estimates. Since these are subject to error and change, further analysis based on identification of the key drivers of value are made. This facilitates study of the impact of operating performance on the value driver levels and the resulting valuations. Periodic reviews lead to strategy revisions as well as to changes in policies and operations. Repeated iterations of the process shown in Figure 1 are made.

Four performance measurements are widely used in the literature. They are: (1) discounted cash flow (DCF) valuation using fundamental value analysis (FVA); (2)

returns to shareholders (RTS); (3) economic profit (EP); (4) the relationship between the market value of the firm's financial instruments and the book value of the firm's operating assets. This relationship has been variously called market value added (MVA), the q ratio, and the market-to-book ratio.

This paper will compare the strengths and limitations of each performance measure. We use data for Hershey Foods to quantify the comparisons and relationships. In the third edition of Copeland et al (2000), data for Hershey was also used; we extend their study. Martin and Petty (2000) also made illustrative calculations for different companies for different measures; by using one company we can more directly compare alternative performance measures. Ittner and Larcker (1998, 2001) provide useful reviews of the current state of the literature. Our aim is to lay a foundation for additional company samples or generalized research. We discuss each of the four measures in turn, followed by comparisons between them as a basis for our conclusions.

Valuation Measurements

To overcome the sluggish growth of its chocolate business, Hershey embarked on a program of diversification. In 1966 Hershey entered the pasta business by purchasing the San Giorgio Macaroni Company. It purchased other pasta companies over the years, culminating with the acquisition in 1990 of Ronzoni which made Hershey the number one pasta company in the United States. During this time period Hershey also acquired some restaurant chains and an ice cream chain. Neither of these two major diversification efforts utilized Hershey's manufacturing or distribution core competencies.

As a consequence of its unsound diversification efforts, Hershey's stock price closed at the end of 1990 at \$18.75. Its growth record was unimpressive. The poor performance resulted in management changes and major restructuring activities. The pasta and restaurant business were unrelated to Hershey's core chocolate business so were divested. Hershey also divested some foreign operations that it had not been managing effectively. It formulated some strategic objectives: (1) Broaden the scope of its chocolate products. (2) Further develop its lines of non-chocolate candy, chewing gum, and other confectionery products. (3) Make entries into high growth segments of other related snack products.

Divestitures of its restaurant and pasta businesses improved Hershey's gross margin. Hershey also sold off its chocolate operations in Germany and Italy to an affiliate of Huhtamäki Oy (based in Finland). Concurrently, it acquired Huhtamäki's Leaf North America (Leaf) confectionery operations. In addition, the parties entered into a trademark and technology license agreement under which Hershey will manufacture and/or market and distribute in North, Central and South America Huhtamäki's strong confectionery brands including *Good & Plenty*, *Heath*, *Jolly Rancher*, *Milk Duds*, *Payday* and *Whoppers*. In December 2000, Hershey completed the purchase of the breath freshener mints and gum businesses of Nabisco, Inc.

As a result of this restructuring, Hershey transformed itself into solely a chocolate and confectionery company while enhancing its domestic market share to 26.8% compared to Mars at 17.0% domestic market share. These strategy changes took Hershey out of two unrelated businesses (pasta and restaurants). Hershey moved from chocolate into broader candy markets. This major strategy shift improved profit margins. It also

initiated some penetration into the broader snack market which grows at a 6% rate per annum compared to a 2% growth rate for the food industry as a whole.

Fundamental Value Analysis

These strategy changes are reflected in the valuation calculations presented in Table 1. The methodology employed is the widely used discounted cash flow (DCF) analysis which could be expressed in spreadsheets or in equivalent formulas (see Copeland et al, 2000; Cornell, 2001; Rappaport, 1998). Table 1 presents a DCF spreadsheet valuation of Hershey Foods as of the end of 2002. The key determinants of value reflected the strategic and operating improvements that began to take effect by 1994. The resulting intrinsic share value was close to its closing price per share for 2002 of \$67.44.

In Table 2 we perform a fundamental value analysis for Hershey over the years 1994 through 2002. In Lines 10 and 11 of Table 2, we compare our estimates of intrinsic value with the actual closing price per share for Hershey over the 1994-2002 period. Our estimates were based on steady improvements of the value drivers over the restructuring activity of Hershey during the 1990s. The actual market prices anticipated future improvements in value drivers more fully than our projections. The market reacted much more severely to the failures of the new inventory and shipping system installed by Hershey in 1999. Because of the glitches, Hershey was unable to ship products during the critical August to October sales opportunities associated with Back-to-School and Halloween. The market appeared to overreact to some temporary bad news.

The calculations reflect both the historical data and projections. Since the number of years of competitive advantage shown in the base year 2002 column is 10 years, the calculations reflect yearly projections for 2003 to 2012 and for the terminal stage. To make the projections for the 17 value drivers, we drew on company presentations, analysts' reports, and our own studies of the economics of the industry and firm.

The behavior of the value drivers in Table 2 reflects the results of the operating and financial restructuring by Hershey during the 1990s. Hershey concentrated its business on its core competency of producing, marketing, and distributing chocolate and confectionery products. Management was able to improve growth, margins, and the period of competitive advantage while reducing investment needs (both working and fixed capital) and the cost of capital. These effects achieved a rising intrinsic value per share.

A major strength of the DCF models is that they seek to identify the underlying determinants of value. Since the expectations or projections inherently are subject to errors, the framework can be used as a valuable management planning and control system. An ongoing monitoring of expectations compared with changing estimates of the value drivers can be used in an information flow system. Policies and decisions can be revised in a feedback process to improve performance, as illustrated in Figure 1. The DCF estimates of intrinsic value can be used as a part of strategic planning processes to estimate the valuation consequences of alternative strategic plans.

Returns to Shareholders

Returns to shareholders (RTS) are measured by annual capital gains plus dividend yields. The logic of this performance metric is that it calculates the economic income to investors for specified time periods. In Table 3 we make these calculations for Hershey based on the yearend closing prices, shares outstanding, and dividend yield for the years 1980-2000. Because of Hershey's unsound diversification efforts, the results behave erratically. Two methods are employed to deal with this instability.

One is to calculate averages over longer time periods. In Table 4 we calculate the unweighted arithmetic average annual returns for 5- and 10-year time segments. We also calculate the compounded annual returns to shareholders using the endpoints of each time segment. We obtained similar results. For the entire period 1982-2002, the compound annual return was 16.8% per annum.

The most meaningful use of returns to shareholders involves comparisons with benchmarks. Table 5 compares the RTS measures for Hershey against the S&P500 and the Value Line food processing index for the years 1994-2002. For the entire time period, the RTS for Hershey shareholders averaged 6.41% above the S&P500. Benchmarked against the food processing index, the RTS for Hershey shareholders was 1.73% lower. (The beta risk measures of the food processing industry are similar to those of the chocolate and confectionary product industry).

The use of the RTS measure permits a reasonably firm conclusion. Hershey's performance was comparable to the broader industry segment of which it is a part. It was superior to the broader S&P 500 index. It would be useful to make a similar comparison with four or five firms with products more closely comparable to Hershey's. However,

there are no other major public chocolate companies in the U.S. Mars is privately held. The RTS measure is a useful indicator of performance. It can readily be applied by using appropriate benchmarks, groups of firms, or indexes. As a performance metric, it compares the economic returns to investors in a firm relative to alternative benchmark investments. Hershey competes for the consumer's dollar; it also competes for the investor's dollar.

Economic Profit Measures

Economic profit has been distinguished from accounting measures of net income by deducting a charge for the use of capital invested. For example, suppose the accounting net income is \$120. If the firm has a book total investment of \$1000 and a cost of capital of 10%, the deduction would be \$100. The net \$20 would represent economic profit or residual income. This concept was applied by Donaldson Brown, the senior officer of General Motors, in the 1920s as a guide to allocating resources among the multiple divisions. It also began to be applied by General Electric in the 1950s. The consulting firm, Stern Stewart, has employed the concept in a measure called economic value added whose abbreviation EVA[®] has been copyrighted. In applying the concept, Stern Stewart makes adjustments to NOPAT and to the measurement of the invested capital base. Adjustments to NOPAT seek to capitalize expenses such as R&D and advertising over the estimated lives during which they contribute to revenues. A recent survey of 29 EVA[®] users revealed that all 29 calculated NOPAT and Invested Capital in different ways (Weaver 2001). We have chosen a standard approach that excludes non-US GAAP adjustments such as capitalizing advertising and R&D.

In Table 6, the measure of economic profit is calculated for Hershey for the years 1983-2002. First, NOPAT (Line 3) is calculated as in the FVA procedures. Next the invested capital (IC, Line 7) is calculated as the sum of operating working capital, net property plant and equipment, and other assets net. Invested capital could also be measured as total assets less non-interest bearing liabilities or the book value of equity plus all interest bearing debt. The average of the beginning and ending invested capital figures are used in subsequent calculations. The return on average invested capital (ROIC, Line 9) is defined as the ratio of NOPAT to average invested capital. We use an average in the denominator since NOPAT is received throughout the year.

The WACC is specified in Line 10 and estimated to have declined over this twenty year period. The difference between ROIC and WACC is multiplied times the average invested capital in Line 8 to obtain the average economic profit numbers in Line 12. The measures demonstrate that Hershey's economic profits were small until after the restructuring activities during the 1990's. For sensitivity analysis, alternative costs estimates can be employed.

The Properties of Economic Profits (EP)

In his book on EVA[®] or EP, Stewart (1991) states that "MVA marches in lockstep with EVA, thus confirming the usefulness of EVA as a measure of corporate performance" (p. 209). He defines market value added (MVA) as the excess of the market value of the firm (V) over its book capital.

The nature of the relationship between EP and MVA is facilitated by a simple example in which:

$$\begin{aligned}
 r &= \text{return on invested capital (ROIC)} &= 12\% \\
 k &= \text{cost of capital (WACC)} &= 10\% \\
 C_o &= \text{capital investment} &= \$1,000
 \end{aligned}$$

This firm was created by a capital investment of \$1000, so for this example the investment also represents the total capital of the firm. The net present value (NPV) is calculated by subtracting the investment from the gross present value (GPV):

$$\begin{aligned}
 NPV &= GPV - \text{Investment Outlay or Capital} \\
 &= \frac{rC_o}{k} - C_o = \frac{0.12(1,000)}{0.10} - 1,000 = 1,200 - 1000 = \$200
 \end{aligned}$$

EP or EVA[®] is defined as before and calculated as:

$$EP = (r - k)C_o = (0.12 - 0.10) 1,000 = \$20$$

NPV is the discounted value of EP (\$20/0.10) which equals \$200. Grinblatt and Titman (2002) prove the same result for the finite period case (pp. 341-342). In both the finite and infinite period examples, certainty is implicit. The value of the firm (V) is the book capital of \$1000 plus the NPV of \$200 which total \$1200. Recall that MVA is ($V - C_o$) which is the NPV of \$200 (\$1200 - \$1000). Thus, in application, market value added (MVA) reflects expectations of future cash flows and discount rates.

Since economic profit (regardless of how it is named) is equivalent to an NPV measure, it is a sound guide to investment decisions as is traditional discounted cash flow analysis. Both economic profit and traditional intrinsic value (or fundamental value analysis) can be used to measure the effectiveness of investment decisions at the level of the firm or to segments such as divisions or plants.

Tests of EP Measures

Economic profit or economic value added has been widely evaluated and tested. Rappaport (1998) argues that even after adjustments for multi-year effects of R&D, as well as advertising and reversing cumulative goodwill amortization, the “shortcomings of EVA” remain those of “a historical, sunk-cost measure” (p. 226). Young and O’Byrne (YO) (2001) argue that with appropriate accounting adjustments such as sinking-fund depreciation which makes ROIC equal to the economic return, the criticisms of EVA[®] no longer hold. They also question the empirical study of Biddle, Bowen, and Wallace (1997) which found that earnings data have more explanatory power for changes in stock prices than EVA[®] (YO, pp. 263-267). Wallace (1997) studied the internal incentive effects of adopting performance measures based on residual income. He found that firms do get what they measure and reward. Managers make decisions consistent with the performance measures adopted. Hogan and Lewis (2000) studied 51 firms adopting economic profit plans. They have a control group of firms based on industry, size, and pre-event performance. They found significant performance improvements for firms which adopt economic profit plans. They also found similar performance improvements for control firms. They conclude that alternative performance measurement plans perform equally well in improving shareholders’ wealth.

Market Valuation Ratios

Other studies of performance, particularly academic research studies, have a measure of market value in the numerator. The q (or Tobin’s q) ratio has been widely used to analyze the sources of differential firm efficiency related to variables such as

diversification, percentage of equity ownership by top management, etc. In theory, the q ratio is defined as the market values of equity and debt divided by the current replacement value of assets. In practice, the denominator is difficult to calculate. In their early use of the q ratio at the firm level, Lindenberg and Ross (LR) (1981), arbitrarily select a beginning date on which the replacement costs of fixed assets and inventories are assumed to be their book values. For each subsequent year, the previous year estimate is adjusted for general price level changes and for technological changes plus the increase in investments less deductions for depreciation. Subsequent refinements in the LR estimates were made by Chung and Pruitt (1994), Howe and Vogt (1996), Lewellen and Badrinath (1997), Lee and Tompkins (1999), and Howe, Vogt, and He (2003).

Whited (2001) measures Tobin's q as the ratio of the market value of assets divided by the book value of assets, "following the literature on corporate diversification." (p. 1670) The market value of assets is obtained "by adding to the book value of assets the market value of common equity and subtracting the book value of common equity and balance-sheet deferred taxes" (p.1671). This is equivalent to adding to the book value of assets the difference between the market and book value of equity. The denominator would be equivalent to the book values of equity plus debt. Whited observes that constructing q using the algorithms of Lewellen and Badrinath in estimating the replacement costs of assets would have reduced the number of observations without significant change in the qualitative results (p. 1670, fn 2).

We use the Whited definition of the q ratio in Table 7 since it is highly correlated with the other measures of q and does not require the complex estimates of the current replacement costs of investments. Accordingly, in Table 7, the q ratio as measured by

Whited and the M/B ratio are calculated. The data were obtained from the Hershey financial statements for 1983-2002. Starting from almost equal levels of about 1.6 in 1983, the q ratio rises to 4.58 by 2002 while the M/B ratio rises to 6.52. When the numerator is the market value of equity plus book debt and the denominator is the book value of both equity and debt, the q ratio rises less rapidly because a constant is added to each term of the M/B ratio. Also both measures are inflated by share repurchase accounting practices. When shares are repurchased, the book based equity account is reduced by the market value of the shares repurchased. Since 1993, when Hershey first began share repurchases, book equity was artificially reduced by the extent that its M/B ratio was greater than 1. Hence, share repurchase programs in practice inflate both the q ratio and the M/B ratio.

Further Implementation Considerations

In implementation, operational performance and all the performance measures can usefully be buttressed by financial ratio analysis. Table 8 presents a compact financial ratio analysis in the form of the traditional DuPont system. It analyzes to a more detailed level than the condensed published financial statements. The elements of cost of goods sold are identified. Targets for R&D, marketing, and administration are set. Taxes are managed. Working capital elements are tightly managed. Fixed assets are acquired based on net present value principles. These elements are structured into the relationship between NOPAT and invested capital. NOPAT is a key value driver in fundamental valuation analysis (FVA). Invested capital is key in the measurement of economic profit since it is multiplied times (ROIC – WACC). The return on invested capital (ROIC) in

application emphasizes costs controls in the income statement and effective use of economic resources from the asset side of the balance sheet. ROIC is depicted as a relationship between the NOPAT margin and the effective utilization of operating total assets measured by the turnover ratio. Note that the data in Table 8 and in the Table 6 measures for 2002 are consistent.

Table 8 provides a basis for a control system to monitor and assure that the value drivers inherent in the valuation are established, communicated, and targeted. An effort is made to continuously improve ROIC by the use of multiple performance metrics with targets for both the long and short term. Responsibility is assigned both on a primary and secondary basis. These planning and control efforts contribute to improved strategy formulation.

Financial Planning and Control to Improve Strategies

The use of performance measures to improve strategies has a long history. When General Motors was desperately seeking to survive the postwar recession of 1921, it sought to float a bond issue of \$50 million. Investment bankers were unable to underwrite the issue because of the bleak financial outlook for GM. Ultimately, the DuPont Corporation supplied the financing required by the purchase of a 23% equity interest in GM. DuPont installed Donaldson Brown, its top financial executive, as the CFO of GM to help protect its investment. GM acquired a small company to obtain Alfred Sloan as its new president. Sloan recounts in his *My Years with General Motors* (1963) that the financial controls installed by Brown made it possible to revamp the fundamental automobile strategy of GM.

We have already described Hershey's ill advised diversification efforts. Financial analysis revealed the errors of investments in the low margin pasta business in which the chocolate maker had no managerial capabilities or experience. It returned to its core competencies and improved its performance by all four measures.

Similarly in the late 1980s Briggs & Stratton overspent on attempts at automation and began to produce high end air cooled gasoline engines at a loss. By focusing on cost leadership in its traditional core businesses, Briggs & Stratton returned to improvements in its financial performance.

At Herman Miller (office furniture) losses resulted from undisciplined multiple product proliferation. The problems involved strategy, structure, and financial control (Stern et al, 2001). Similar stories for seven companies are told of how adopters of multiple performance metrics including nonfinancial criteria improved their strategic decisions and operating efficiency (Kaplan and Norton, 1996; Eccles et al, 2000).

Conclusions

The implementation of value based management (VBM) identifies multiple approaches. Four have been widely used in practice. One is fundamental value analysis (FVA). Two is returns to shareholder (RTS). Three is economic profit. Four is the relationship between the market value of the firm's financial instruments and the book value of the firm's operating assets (MVA, the q ratio, and the market-to-book ratio). Planning and control analyses of the structure of income, costs, and investments are employed in implementing the previous four approaches.

In implementation, the four approaches to VBM have a high degree of similarity. Each embraces and utilizes the framework we present in Figure 1. The key elements include strategic review and organizational structure related to strategy, performance measurements, implementation, involvement and support of top executives and training throughout the organization, and continuous review and renewal.

Despite the similarities in methodology, each of the proponents of a particular emphasis of VBM argues for its distinctive superiority and for defects or limitations in the approaches of its competitors. Fundamental value analysis (FVA) performs a DCF valuation of cash flows over long time horizons. Changes in value can also be measured yearly by reference to returns to shareholders (RTS) or by market value added (MVA), the market-to-book ratio, and the q ratio.

On conceptual and analytical criteria most writers emphasize the preeminence of fundamental value using DCF spreadsheets or formulas. Intrinsic value measures should relate to returns to shareholders as well as to market value changes. However, market expectations sometimes run ahead of or behind intrinsic value measurements. As a consequence there are no perfect correlations between intrinsic value, returns to shareholders, and changes in market value.

Economic profit or economic value added programs have been effectively promoted. Since they involve a return on invested capital and a discount factor, ROIC and WACC also need to be measured. The intrinsic value measures are most sensitive to estimates of sales growth and the NOI margin. In turn, the NOI margin depends on the control of costs. The return metrics require effective management of working capital and fixed investments which are analyzed in the DuPont chart shown in Table 8.

In theory the four alternative approaches to VBM are somewhat different. In practice, the implementations have similarities in methodology and coverage. They all center on strategic financial planning and appear to make valuable contributions to performance improvement and to value creation. Intrinsic value DCF analysis, returns to shareholders, economic value added, and the market-to-book analysis have all contributed to value improvements. Each of the performance measures has something to contribute. Each also has limitations. Clearly, the use of one measure alone when multiple measures can be readily calculated is unnecessarily self limiting. A combination of performance measures can provide useful information for planning and control systems.

The downturn beginning in 2000 emphasizes that external economic indicators are an important part of value based management. Also indicators of performance in relation to stakeholders such as employees and consumers are useful. If a firm does not score well in these areas, it is not likely to score well in the effort to add to shareholder value. With the aid of computers, multiple performance measures can be employed. This also permits communication of financial goals and performance widely throughout the organization. Continuous information exchange stimulates managers and informs top executives. Value based management requires multiple performance measures with support from top executives who interact over a wide range of managers on an informed basis.

Thus a complete value based management system includes financial measures, indicators of external economic and financial developments, as well as active top management and board involvement on a continuing basis.

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Figure 1
Interaction Between Strategy and Value Based Management (VBM)

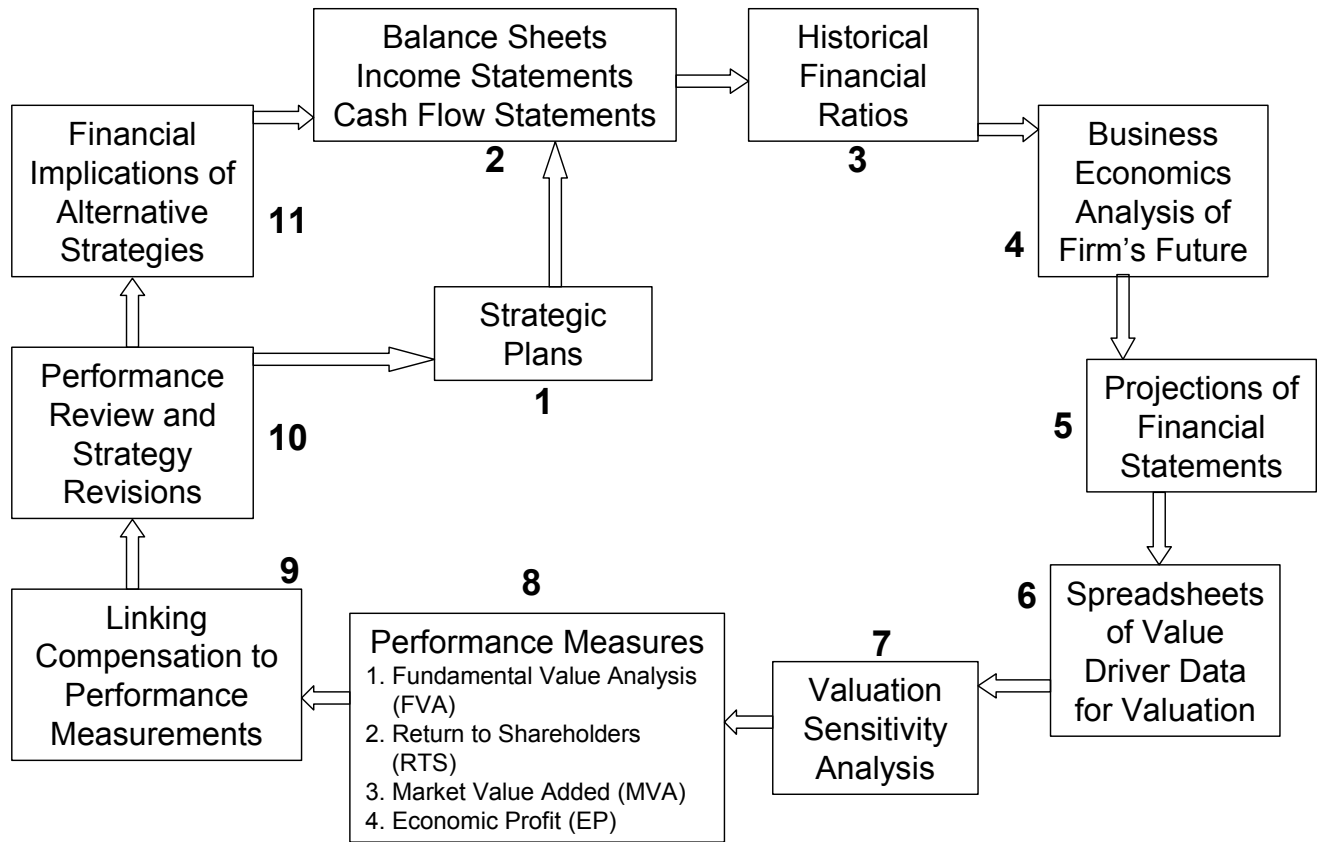


Table 1
DCF Spreadsheet Valuation of Hershey Foods (with Restructuring)
(Dollar Amounts in Millions Except per Share)

	2002	2003E	2004E	2005E	2006E	2007E	2008E	2009E	2010E	2011E	2012E	2013E
<i>Panel A – Inputs for Present Value Calculations</i>												
1. Net revenues	\$ 4,582	\$ 4,765	\$ 4,955	\$ 5,154	\$ 5,360	\$ 5,574	\$ 5,797	\$ 6,029	\$ 6,270	\$ 6,521	\$ 6,782	\$ 6,985
2. Revenue growth rate		4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	3.0%
3. NOI		\$ 715	\$ 743	\$ 773	\$ 804	\$ 836	\$ 870	\$ 904	\$ 941	\$ 978	\$ 1,017	\$ 1,020
4. Cash tax rate		38.0%	38.0%	38.0%	38.0%	38.0%	38.0%	38.0%	38.0%	38.0%	38.0%	38.0%
5. Income taxes		272	282	294	306	318	330	344	357	372	387	388
6. NOPAT		\$ 443	\$ 461	\$ 479	\$ 498	\$ 518	\$ 539	\$ 561	\$ 583	\$ 606	\$ 631	\$ 632
7. + Depreciation		143	149	155	161	167	174	181	188	196	203	203
8. – Change in working capital		10	10	10	11	11	12	12	13	13	14	14
9. – Capital expenditures		133	139	144	150	156	162	169	176	183	190	196
10. – Change in other assets net		5	5	5	5	6	6	6	6	7	7	7
11. Free cash flows		\$ 438	\$ 456	\$ 474	\$ 493	\$ 513	\$ 533	\$ 555	\$ 577	\$ 600	\$ 624	\$ 618
12. WACC		7.65%	7.65%	7.65%	7.65%	7.65%	7.65%	7.65%	7.65%	7.65%	7.65%	7.65%
13. Discount factor		0.92894	0.86292	0.80160	0.74464	0.69172	0.64256	0.59690	0.55448	0.51508	0.47848	
14. Present values		\$ 407	\$ 393	\$ 380	\$ 367	\$ 355	\$ 343	\$ 331	\$ 320	\$ 309	\$ 299	
<i>Panel B – Operating Relationships (As a % of Revenues)</i>												
NOI		15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	14.6%
NOPAT		9.3%	9.3%	9.3%	9.3%	9.3%	9.3%	9.3%	9.3%	9.3%	9.3%	9.1%
Depreciation		3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	2.9%
Change in working capital		0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
Capital expenditures		2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%	2.8%
Change in other assets net		0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%	0.10%
Free cash flow		9.2%	9.2%	9.2%	9.2%	9.2%	9.2%	9.2%	9.2%	9.2%	9.2%	8.9%
<i>Panel C – Valuation Calculations</i>												
<u>Part I - Cost of Capital Inputs</u>			<u>Part II - Terminal Value (TV)</u>			<u>Part III - Valuation Calculation</u>						
(a) Risk-free rate	5.60%		TV =	Free Cash Flows _{n+1} / (WACC-g)	(1) PV of cash flows, Year 2003-2012	\$ 3,504						
(b) Beta	0.60		=	618 / (0.0765 - 0.030)	(2) PV of terminal value	\$ 6,363						
(c) Equity risk premium	6.00%		=	\$13,298	(3) Marketable securities	-						
(d) Tax rate	38.0%				(4) Total value of the firm	\$ 9,866						
(e) Cost of equity	9.20%				(5) Value of debt	880						
(f) Cost of debt (before-tax)	6.50%				(6) Value of equity	\$ 8,986						
(g) Cost of debt (after-tax)	4.03%				(7) Shares outstanding	133						
(h) Capital structure, % equity	70.00%				(8) Intrinsic share price	\$ 67.79						
(i) Base WACC	7.65%											

Table 2
Fundamental Value Analysis, Hershey, 1994-2002
(Dollar Amounts in Millions Except Per Share)

Panel A – Value Drivers	1994	1995	1996	1997	1998	1999	2000	2001	2002
R_0 = Base year revenues	\$3,606	\$3,691	\$3,989	\$4,302	\$4,436	\$3,971	\$4,221	\$4,557	\$4,582
<i>Initial growth stage</i>									
m_s = Net operating income margin	13.9%	14.3%	14.4%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%
T_s = Tax rate	45.4%	33.8%	38.3%	36.2%	24.0%	37.9%	38.8%	38.8%	38.0%
g_s = Growth rate	5.1%	5.4%	6.0%	6.6%	6.8%	6.8%	7.0%	7.0%	4.0%
d_s = Depreciation	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
l_{ws} = Working capital requirements	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%
l_{fs} = Capital expenditures	3.7%	3.5%	3.4%	3.1%	2.6%	2.6%	2.8%	2.8%	2.8%
l_{os} = Change in other assets net	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
k_s = Cost of capital	10.0%	9.9%	9.8%	9.5%	9.5%	9.5%	9.5%	9.5%	7.65%
n = Number of growth years	5	6	7	9	9	9	10	10	10
<i>Terminal stage</i>									
m_c = Net operating income margin	12.0%	12.2%	14.3%	14.6%	14.6%	14.6%	14.6%	14.6%	14.6%
T_c = Tax rate	38.8%	38.8%	38.8%	38.8%	38.8%	38.8%	38.8%	38.8%	38.0%
g_c = Growth rate	4.0%	4.1%	4.2%	4.3%	4.3%	4.4%	4.5%	4.5%	3.0%
d_c = Depreciation	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%	2.9%
l_{wc} = Working capital requirements	0.10%	0.12%	0.14%	0.15%	0.16%	0.18%	0.20%	0.20%	0.20%
l_{fc} = Capital expenditures	2.4%	2.5%	2.6%	2.6%	2.7%	2.7%	2.9%	2.9%	2.8%
l_{oc} = Change in other assets net	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
k_c = Cost of capital	10.0%	9.9%	9.8%	9.5%	9.5%	9.5%	9.5%	9.5%	7.65%
$1 + h = (1+g_s)/(1+k_s)$	0.9555	0.9591	0.9654	0.9735	0.9753	0.9753	0.9772	0.9772	0.9661
Panel B – Calculating Firm Value									
1. PV of initial growth stage cash flows	\$ 1,038	\$ 1,661	\$ 1,991	\$ 3,110	\$ 4,059	\$ 2,976	\$ 3,383	\$ 3,652	\$ 3,504
2. PV of terminal value	3,805	3,941	5,112	6,090	6,307	5,750	6,047	6,529	6,363
3. Enterprise operating value	\$ 4,843	\$ 5,602	\$ 7,102	\$ 9,199	\$10,366	\$ 8,725	\$ 9,430	\$ 10,181	\$ 9,866
4. Add: Marketable securities	-	-	-	-	-	-	-	-	-
5. Entity value	\$ 4,843	\$ 5,602	\$ 7,102	\$ 9,199	\$10,366	\$ 8,725	\$ 9,430	\$ 10,181	\$ 9,866
6. Less: Total interest-bearing debt	505	796	996	1,317	1,282	1,118	1,136	885	880
7. Equity value	\$ 4,338	\$ 4,806	\$ 6,106	\$ 7,882	\$ 9,084	\$ 7,607	\$ 8,294	\$ 9,296	\$ 8,986
8. Number of shares	173.5	154.5	152.9	142.9	143.1	138.5	136.3	135.6	132.6
9. Intrinsic value per share	\$ 25.01	\$ 31.10	\$ 39.92	\$ 55.15	\$ 63.46	\$ 54.94	\$ 60.86	\$ 68.53	\$ 67.79
10. Actual closing price per share	\$ 24.19	\$ 32.50	\$ 43.75	\$ 61.94	\$ 62.19	\$ 47.44	\$ 64.38	\$ 67.70	\$ 67.44
11. Percent difference from closing price	3.4%	-4.3%	-8.7%	-11.0%	2.0%	15.8%	-5.5%	1.2%	0.5%

Table 3
Hershey, Returns to Shareholders Relationships, 1982-2002
(Adjusted for stock-splits)

	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
1. Closing Price	\$4.70	\$5.27	\$6.44	\$8.58	\$12.31	\$12.25	\$13.00	\$17.94	\$18.75	\$22.19	\$23.50
2. Common Shares Outstanding (millions)	188.0	188.0	188.0	188.0	180.4	180.4	180.4	180.4	180.4	180.4	180.4
3. Dividend per share	\$0.17	\$0.18	\$0.21	\$0.24	\$0.26	\$0.29	\$0.33	\$0.37	\$0.50	\$0.47	\$0.52
4. Dividend yield		3.9%	3.9%	3.7%	3.0%	2.4%	2.7%	2.8%	2.8%	2.5%	2.3%
5. Capital gain		12.2%	22.1%	33.3%	43.4%	-0.5%	6.1%	38.0%	4.5%	18.3%	5.9%
6. Total return to shareholders		16.1%	26.1%	37.0%	46.5%	1.8%	8.8%	40.8%	7.3%	20.8%	8.2%

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
1. Closing Price	\$24.50	\$24.19	\$32.50	\$43.75	\$61.94	\$62.19	\$47.44	\$64.38	\$67.70	\$67.44
2. Common Shares Outstanding (millions)	175.2	173.5	154.5	152.9	142.9	143.1	138.5	136.3	135.6	132.6
3. Dividend per share	\$0.57	\$0.63	\$0.69	\$0.76	\$0.84	\$0.92	\$1.00	\$1.08	\$1.17	\$1.26
4. Dividend yield	2.4%	2.6%	2.8%	2.3%	1.9%	1.5%	1.6%	2.3%	1.8%	1.9%
5. Capital gain	4.3%	-1.3%	34.4%	34.6%	41.6%	0.4%	-23.7%	35.7%	5.2%	-0.4%
6. Total return to shareholders	6.7%	1.3%	37.2%	37.0%	43.5%	1.9%	-22.1%	38.0%	7.0%	1.5%

Data Source: Compustat

Table 4
Average Returns to Shareholders, Hershey (1982-2002)

Period	Average Annual Return	Compound Annual Return
1982-1992	21.4%	20.5%
1993-1997	29.7%	28.5%
1997-2002	5.2%	3.5%
1982-2002	18.3%	16.8%

Table 5
Annual RTS Benchmark Comparisons

Year	Hershey - S&P500	Hershey - Food Index
1994	-0.23%	-6.94%
1995	3.33%	11.51%
1996	13.83%	12.29%
1997	12.80%	-4.88%
1998	-24.92%	-9.16%
1999	-41.96%	-19.23%
2000	49.88%	9.74%
2001	20.16%	-0.54%
2002	24.80%	-8.34%
Average	6.41%	-1.73%

Table 6
Calculation of Average Invested Capital and Economic Profit, Hershey, 1983-2002
(Dollar Amounts in Millions)

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
1. NOI	\$ 205	\$ 220	\$ 245	\$ 271	\$ 294	\$ 266	\$ 310	\$ 351	\$ 390	\$ 428
2. Cash Tax Rate	<u>40.7%</u>	<u>37.4%</u>	<u>35.2%</u>	<u>38.9%</u>	<u>48.7%</u>	<u>36.7%</u>	<u>39.8%</u>	<u>42.6%</u>	<u>33.9%</u>	<u>34.2%</u>
3. NOPAT	\$ 122	\$ 138	\$ 159	\$ 165	\$ 151	\$ 168	\$ 187	\$ 201	\$ 258	\$ 282
4. Operating Working Capital	\$ 207	\$ 210	\$ 241	\$ 203	\$ 256	\$ 358	\$ 319	\$ 385	\$ 382	\$ 409
5. NPPE	575	643	702	793	863	736	830	952	1,146	1,296
6. Other Assets Net	<u>(36)</u>	<u>(39)</u>	<u>(81)</u>	<u>(26)</u>	<u>90</u>	<u>229</u>	<u>221</u>	<u>244</u>	<u>199</u>	<u>320</u>
7. Invested Capital (IC)	\$ 746	\$ 814	\$ 862	\$ 971	\$ 1,209	\$ 1,323	\$ 1,371	\$ 1,582	\$ 1,726	\$ 2,025
8. Average Invested Capital (AIC)	\$ 719	\$ 780	\$ 838	\$ 916	\$ 1,090	\$ 1,266	\$ 1,347	\$ 1,476	\$ 1,654	\$ 1,876
9. AROIC = NOPAT/AIC	16.9%	17.6%	18.9%	18.0%	13.8%	13.3%	13.9%	13.6%	15.6%	15.0%
10. WACC	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	12.0%	11.0%
11. AROIC - WACC	4.9%	5.6%	6.9%	6.0%	1.8%	1.3%	1.9%	1.6%	3.6%	4.0%
12. AEP = AIC (AROIC-WACC)	\$ 35	\$ 44	\$ 58	\$ 55	\$ 20	\$ 16	\$ 25	\$ 24	\$ 59	\$ 76

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
1. NOI	\$ 457	\$ 475	\$ 511	\$ 563	\$ 630	\$ 643	\$ 558	\$ 615	\$ 672	\$ 698
2. Cash Tax Rate	<u>39.7%</u>	<u>45.4%</u>	<u>33.8%</u>	<u>38.3%</u>	<u>36.2%</u>	<u>24.0%</u>	<u>37.9%</u>	<u>41.8%</u>	<u>54.1%</u>	<u>15.1%</u>
3. NOPAT	\$ 276	\$ 259	\$ 338	\$ 348	\$ 402	\$ 488	\$ 347	\$ 358	\$ 309	\$ 593
4. Operating Working Capital	\$ 443	\$ 500	\$ 496	\$ 509	\$ 527	\$ 722	\$ 807	\$ 787	\$ 569	\$ 745
5. NPPE	1,461	1,468	1,436	1,602	1,648	1,648	1,510	1,585	1,535	1,486
6. Other Assets Net	<u>42</u>	<u>(23)</u>	<u>(54)</u>	<u>45</u>	<u>(5)</u>	<u>(46)</u>	<u>(101)</u>	<u>(61)</u>	<u>(72)</u>	<u>21</u>
7. Invested Capital (IC)	\$ 1,946	\$ 1,946	\$ 1,878	\$ 2,156	\$ 2,170	\$ 2,324	\$ 2,217	\$ 2,311	\$ 2,032	\$ 2,252
8. Average Invested Capital (AIC)	\$ 1,985	\$ 1,946	\$ 1,912	\$ 2,017	\$ 2,163	\$ 2,247	\$ 2,271	\$ 2,264	\$ 2,171	\$ 2,142
9. AROIC = NOPAT/AIC	13.9%	13.3%	17.7%	17.2%	18.6%	21.7%	15.3%	15.8%	14.2%	27.7%
10. WACC	10.5%	10.0%	9.9%	9.8%	9.5%	9.5%	9.5%	9.5%	9.5%	7.65%
11. AROIC - WACC	3.4%	3.3%	7.8%	7.4%	9.1%	12.2%	5.8%	6.3%	4.7%	20.0%
12. AEP = AIC (AROIC-WACC)	\$ 67	\$ 65	\$ 149	\$ 150	\$ 196	\$ 275	\$ 131	\$ 143	\$ 102	\$ 429

Date Source: Compustat

Table 7
Valuation Ratios, Hershey, 1983-2002
(Dollar Amounts in Millions)

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
1. Yearend Market Value of Equity	\$ 991	\$ 1,210	\$ 1,614	\$ 2,221	\$ 2,210	\$ 2,345	\$ 3,235	\$ 3,382	\$ 4,002	\$ 4,239
2. Book Value of Equity	\$ 596	\$ 661	\$ 728	\$ 728	\$ 832	\$ 1,006	\$ 1,117	\$ 1,244	\$ 1,335	\$ 1,465
3. Interest-Bearing Debt (IBD)	\$ 150	\$ 153	\$ 134	\$ 243	\$ 377	\$ 317	\$ 254	\$ 338	\$ 391	\$ 560
4. IBD + Market Value of Equity = (1)+(3)	\$ 1,141	\$ 1,363	\$ 1,748	\$ 2,464	\$ 2,587	\$ 2,662	\$ 3,489	\$ 3,720	\$ 4,393	\$ 4,798
5. Average Invested Capital = Avg[(2)+(3)]	\$ 719	\$ 780	\$ 838	\$ 916	\$ 1,090	\$ 1,266	\$ 1,347	\$ 1,476	\$ 1,654	\$ 1,876
6. Market Value Added (MVA) = (4) - (5)	\$ 422	\$ 584	\$ 910	\$ 1,547	\$ 1,496	\$ 1,396	\$ 2,142	\$ 2,244	\$ 2,739	\$ 2,923
7. q -ratio* = (4)/(5)	1.59	1.75	2.09	2.69	2.37	2.10	2.59	2.52	2.66	2.56
8. Market-to-Book Equity = (1)/(2)	1.66	1.83	2.22	3.05	2.65	2.33	2.90	2.72	3.00	2.89

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002
1. Yearend Market Value of Equity	\$ 4,293	\$ 4,196	\$ 5,022	\$ 6,691	\$ 8,853	\$ 8,902	\$ 6,568	\$ 8,773	\$ 9,183	\$ 8,940
2. Book Value of Equity	\$ 1,412	\$ 1,441	\$ 1,083	\$ 1,161	\$ 853	\$ 1,042	\$ 1,099	\$ 1,175	\$ 1,147	\$ 1,372
3. Interest-Bearing Debt (IBD)	\$ 534	\$ 505	\$ 795	\$ 995	\$ 1,317	\$ 1,282	\$ 1,118	\$ 1,136	\$ 885	\$ 880
4. IBD + Market Value of Equity = (1)+(3)	\$ 4,827	\$ 4,701	\$ 5,818	\$ 7,687	\$ 10,170	\$ 10,184	\$ 7,686	\$ 9,909	\$ 10,068	\$ 9,819
5. Average Invested Capital = Avg[(2)+(3)]	\$ 1,985	\$ 1,946	\$ 1,912	\$ 2,017	\$ 2,163	\$ 2,247	\$ 2,271	\$ 2,264	\$ 2,171	\$ 2,142
6. Market Value Added (MVA) = (4) - (5)	\$ 2,841	\$ 2,755	\$ 3,906	\$ 5,669	\$ 8,007	\$ 7,937	\$ 5,416	\$ 7,645	\$ 7,896	\$ 7,678
7. q -ratio* = (4)/(5)	2.43	2.42	3.04	3.81	4.70	4.53	3.39	4.38	4.64	4.58
8. Market-to-Book Equity = (1)/(2)	3.04	2.91	4.64	5.76	10.38	8.54	5.98	7.47	8.00	6.52

* Measured as in Whited (2001)

Data Source: Compustat

Table 8
Performance Monitoring – Return on Invested Capital, Hershey, 2002
(\$ millions)

		Performance Metric		Responsibility								
		Objective	Actual	Primary	Secondary							
ROIC 27.7%	NOPAT Margin 12.94%	Sales \$ 4,581.6	Sales \$ 4,581.6	Sales growth	7.00%	Marketing	Sales					
				minus	COGS \$ 2,561.0	Labor \$876.9	% of sales	19.14%	Plant Manager	VP, Production		
					plus	Material \$1,282.8	% of sales	28.00%	Plant Manager	VP, Production		
					plus	Overhead \$401.2	% of sales	8.76%	Plant Manager	VP, Production		
					minus	R&D \$23.4	% of sales	0.51%	VP, R&D	Marketing		
					plus	Marketing \$857.2	% of sales	18.71%	Brands Manager	Marketing		
					plus	Advertising \$324.9	% of sales	7.09%	Sales	Marketing		
					plus	Admin \$116.9	% of sales	2.55%	All Admin Managers	All Vice Presidents		
					minus	Taxes \$105.3	Tax rate	15.08%	Tax Department	CFO		
							% of sales	4.71%	Treasurer	CFO		
							plus	Receivables \$366.4	Days outstanding	29.2	A/R Manager	Marketing
							plus	Inventory \$507.7	Days outstanding	72.4	Inventory Manager	Production
							plus	Other CA \$125.6	% of sales	2.74%	Controller	CFO
							plus	NPPE \$1,510.5	% of sales	32.97%	Engineer	Controller
							plus	Goodwill \$423.7	Dollar amount	\$ 423.7	Controller	CFO
							plus	Other Assets \$ 637.9	% of sales	4.68%	Controller	CFO
							plus	Payables \$148.8	% of sales	3.25%	Payables Manager	Controller
							plus	Accruals \$409.8	% of sales	8.94%	Controller	CFO
							plus	Other LT Liabilities \$361.6	% of sales	7.89%	Controller	CFO
							plus	Deferred Income Tax \$301.9	Dollar amount	\$ 301.9	Tax Department	CFO
						minus	Total Assets \$ 3,364.0					
						minus	Non Interest-Bearing Liabilities \$ 1,222.1					
						divided by	Invested Capital \$ 2,141.9					
						multiplied by	Turnover 2.14					
						divided by	Sales \$ 4,581.6					
						divided by	NOPAT \$592.9					