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The Information That Boards Really Need

The scandals at Enron, WorldCom, Tyco and elsewhere over the past few years have focused a spotlight on corporate boards. Why did directors at so many companies fail to ask probing questions, uncover accounting malfeasance, or raise objections to the siphoning off of funds? Numerous explanations have been offered for these and other failures of board oversight, but critics have argued that they add up to one result: Too many boards do little more than rubber-stamp management analyses without providing independent protection for shareholders.

In response, various suggestions for reforming boards and redefining the role of directors have been put forward. Most are targeted at resolving “agency problems” — that is, making sure that the agents (the board members) are acting in the best interests of the principals that employ them (shareholders). For instance, the New York Stock Exchange Corporate Accountability and Listing Standards Committee has recommended these changes to the exchange’s listing standards: that a majority of the directors on boards be independent, that boards convene regular sessions without management in attendance, and that audit committees have sole responsibility for hiring and firing independent auditors and for approving their nonaudit work.

Such recommendations, while useful, do not deal with the fact that directors, no matter how dedicated and diligent, cannot serve as adequate monitors of management without sufficient information and the means to analyze it. And given the size, complexity and global scope of many corporations, the task is daunting. Directors meet on average four to six times a year, rarely have a staff to help them, and because of their demanding “day jobs” have limited time available to devote to collecting and processing the independent information they need to reasonably fulfill their duty to shareholders.

Some critics have suggested that boards need to have a completely separate staff, but that approach would be extraordinarily expensive and might paralyze companies. A more limited approach is to focus on what type of information directors must have to discharge their duties effectively. It is here that finance theory comes into play.

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From a finance perspective, the fundamental duty of directors is to help management maximize shareholder value. To fulfill that duty, directors must understand how the company creates value, and the primary analytical tool required for such understanding is a detailed discounted-cash valuation model — one that includes explicit forecasts of all constituent items, including a breakdown of projected revenues and the expenses and capital expenditures required to achieve those revenues, for at least five years (10 if possible). It is not enough to provide just a few years of forecasts or valuations based on ratios such as price to earnings or price to revenues. The model should also be disaggregated sufficiently to make clear the contribution of key divisions, and new versions should be produced at least annually, preferably in electronic form, so that directors can both compare management projections with actual results and evaluate how projections evolve over time. Finally, the company should maintain a complete electronic history of the models considered by the board so that it can be made available to new directors.

In conjunction with observed financial results, review of the evolution through time of the valuation models provides directors with the critical information they need to discharge their duties to shareholders. By comparing operating results with prior forecasts, directors can see where management has failed to execute its plan and can then question executives meaningfully about shortfalls. By seeing how projections in the models are then revised, directors can understand managers' view of the long-term implications of current difficulties. By continuously monitoring the evolution of the model forecasts, directors can assess management performance and credibility. Finally, by juxtaposing a series of models based on cash flow with the history of financial statements based on Generally Accepted Accounting Principles (GAAP), directors can gain deeper insight into how accounting decisions have affected reported performance over time and how financial reporting is related to value-enhancing cash generation.

The historical record of discounted-cash-flow (DCF) models also provides directors with a track record of what they reviewed if a corporate crisis should ensue. For instance, if it comes to light that data presented in the models were misleading, the models, along with audited accounting data, would highlight when and how the problem began. In addition, the models could serve as a tool for assessing legal liability. By examining the history of models provided to directors, finance experts could determine whether the information was misleading or grossly incomplete. If it was, liability would lie with management. If it was not, directors would have to bear part of the responsibility.

This is not to suggest that DCF models provide a silver bullet that will forever safeguard investors from management chicanery — the models can be manipulated. Nor does it mean that a company with "good" governance will always refrain from making bad decisions. But a sequence of DCF models serves two important purposes. It forces management to translate its “vision” into specific numbers that show how shareholder value will be created, and it forces the board to continually monitor and evaluate those numbers in light of ongoing financial performance and stock market valuation.

**How DCF Models Can Help**

Models showing the discounted value of future cash flows can help directors in several specific ways, including the following:

- **DCF models give directors an analytical tool that translates the directive to maximize shareholder value into business plans that can be monitored.**

> What criteria can boards use to determine whether day-to-day management decisions are consistent with the objective of maximizing shareholder value? Examining the fluctuation of the company's stock price is one possibility, but it is highly flawed. Stock prices react to any and all information that affects the company, its industry or the economy generally, and it is virtually impossible to separate out the impact of specific management decisions on price changes. To further complicate matters, academic studies demonstrate that stock prices often move without being prompted by any apparent information. Further, the information that directors are considering may be confidential, so that it is not even available in the marketplace at the time a decision must be made. For all these reasons, stock prices are not the best guide, particularly in the short run, for assessing the impact of management decisions. Directors should not ignore the stock price, which provides an estimate of value independent of management, but they should supplement it with a measure of value more directly tied to management actions.

> Compared with stock prices, the values produced by discounted-cash-flow valuation models have several desirable attributes. First, construction of the models requires managers to turn their general strategic plans into explicit cash-flow forecasts. Second, the models then translate those forecasts into an estimate of value. By adjusting the model inputs, directors can discern the impact of any particular operating assumption on the calculated

A sequence of DCF models forces management to translate its “vision” into specific numbers that show how shareholder value will be created.
value of the firm. For example, directors might use the model to examine the extent to which expansion into international markets is likely to increase value. They are then able to focus on the most important questions relating to shareholder value and how well management deals with those questions. Finally, the figures used in the models are free from all the "noise" that affects stock prices; other than the discount rate, they depend only on management forecasts of future performance.

This last attribute is also a potential weakness of the models. Management can, by choosing assumptions cleverly, make its plans appear likely to create more shareholder value than conservative (and prudent) estimates would warrant. That’s why directors must analyze a history of the models. If value is being created by the clever use of optimistic assumptions, rather than by rational business plans that can reasonably be expected to be fulfilled, it will become apparent over time.

A detailed DCF model clearly delineates the level of operating performance that is required to achieve certain valuation targets. Because the actual wealth that shareholders can consume is determined by the share price, directors need some notion of a reasonable trading range for the stock. Management often provides guidance on this question. When Enron was trading at $70 a share, Jeff Skilling was telling the board that the stock was undervalued. A more reasonable price, he claimed, was on the order of $120. Under such circumstances, Enron’s board could have used DCF models to understand the relationship between Enron’s business plan and Skilling’s valuation conclusions.

Comparing the DCF model numbers to stock prices can be revealing. For instance, a model applied to AOL in 1999 indicates that the company would have had to deliver a return on equity of 40% for the next 20 years simply to justify its market valuation at the time.\textsuperscript{4} Given the need to achieve such remarkable results, it becomes clear why AOL felt that it could best protect shareholder value by using its stock to buy Time Warner, a cash-producing asset.

Discounted-cash-flow models can also help directors unravel some of the mysteries associated with variations in a company’s stock price. Boards must be able to judge whether a company’s stock price has fallen because the market rose to unrealistic heights or because management failed to deliver the reasonable operating performance that it promised. DCF models allow directors to draw that distinction by continually comparing model values with market prices over time.

Discounted-cash-flow valuation models highlight the difference between accounting accruals and cash flows.

Another advantage of DCF models is that they are based on forecasts of future cash flow to investors, not accounting earnings. Consequently, juxtaposing a history of the models with financial statements from the same period will highlight the ways in which accrual accounting has driven a wedge between earnings and cash flow. This will help directors see through some potentially controversial accounting issues, such as the capitalization of expenses that occurred at WorldCom (operating expenses were depreciated, making revenues appear higher but having no impact on cash-flow figures), and how they play out over time. For example, it would be evident that capitalizing expenses inflates current earnings at the expense of future earnings but has no impact on cash flow in any period.\textsuperscript{5}

Of course, there are accounting tricks that DCF models will not detect, such as the realization of false revenues. Enron, for instance, allegedly inflated revenues by engaging in manipulated sales for fiber-optic bandwidth at inflated prices, which then allowed the company to mark its entire fiber-optic capacity to market and report the entire increased valuation as revenue. Because revenues are a fundamental input to discounted-cash-flow models, if the revenues are wrong, the models will be misleading. Directors need to understand not only the benefits provided by discounted-cash-flow models but also how they can be manipulated to cast a company in a more flattering light.

The use of DCF valuation models should not be confused with the duties of a board’s audit committee. An audit committee is charged with approving the presentation of current financial results. While the validity of current financial information is critical, a company’s value depends on future cash flow. Accurate financial data are important to investors and shareholders primarily because they serve as the foundation for forecasts of future cash flow.

Discounted-cash-flow models require directors to distinguish permanent from temporary events.

It is not uncommon for managers to attribute bad financial performance to one-time events such as restructuring charges or merger costs. But the U.S. Securities and Exchange Commission has criticized some companies for releasing measures of pro forma earnings that are potentially misleading because they exclude so many “one-time” charges. Lynn Turner, former chief accountant at the SEC, has gone so far as to criticize pro forma statements as EBS (everything but the bad stuff) accounting. Because they contain projections up to 10 years in the future, discounted-cash-flow models require management to project exactly how cash flow will evolve over time. This includes showing explicitly when all so-called one-time charges will be paid. The models also show whether management anticipates any new one-time charges. Thus if alleged one-time charges are actually expected to reoccur, management can avoid facing up to the fact only by excluding them from the DCF model. Such exclusion, however, will become apparent over time when a sequence of models is compared with actual financial performance.
Similarly, DCF models help elucidate the relationship between current financial performance, expectations of future performance and the company's stock price. Because value in DCF models depends on long-term future cash flow, truly temporary events that last only a year or two will have little impact. If management claims that poor current performance is temporary, it should have little impact on future expectations and, therefore, little impact on the price of the stock. If a stock price falls sharply despite management's assurance that problems are temporary, directors should take note. In such cases, the market does not believe what management is saying, and directors should take another look as well.

Discounted-cash-flow valuation models require management to explicitly account for the resources that are required to achieve future growth forecasts.

One of the drawbacks of DCF models is that they are highly sensitive to long-term growth forecasts. By increasing the forecast rate of growth in cash flow, management (or outside analysts) can apparently create value out of thin air. For instance, in 1999 it was possible to rationalize a $50 billion market value for Amazon.com by projecting that it would grow to the size of Wal-Mart. Fortunately, an offsetting benefit is that the models require management to project how such growth is going to occur. In particular, rapid growth requires significant increases in cash outlays for physical capital and labor; discounted-cash-flow models require that those expenditures be enumerated. They also explicitly take account of the cost of capital. As advocates of economic value added (EVA) stress, a company can grow without creating value if its investments fail to earn the cost of capital. A complete DCF model reveals whether such growth is occurring.

To engage in that kind of analysis, however, directors must delve into the details of the model. It is not enough to recognize that the DCF value produced by the model is consistent with management pronouncements: Directors need to understand the operating projections that underlie the model valuations.

It should be noted that a majority of the value of major U.S. corporations is derived from growth options — projects or lines of business the company either has yet to undertake or else are in an early stage of development. Even at well-established companies like General Electric, growth options account for more than 50% of total shareholder value. For smaller or more rapidly growing companies, growth options account for more than 75% of the market capitalization. In these circumstances, directors cannot rely solely on historical financial reports; they need to understand how management plans to exploit its growth options and create value and how those efforts have evolved over time in light of ongoing operating results. That requires a history of discounted-cash-flow valuation models.

Finally, discounted-cash-flow models provide an added tool for setting executive compensation.

Many companies have attempted to provide incentives for senior executives by tying compensation to stock prices. One problem with this approach is that the huge noise in stock prices often results in compensating management for luck. Because DCF models can help distinguish random movements in stock prices from those associated with improved management performance, they can be a useful tool in setting management compensation. Managers should be rewarded for making value-enhancing decisions, not for unexplainable volatility in the stock price.

The risk, again, is that unlike prices set by the market, values computed from DCF models can be manipulated by management. To an extent, examining the details of the models and studying how the models evolve over time can minimize that risk, and a history of missed projections is an obvious red flag. Nonetheless, the models are still potentially subject to clever manipulations. Furthermore, only management typically has the detailed information necessary to develop a complete discounted-cash-flow model. For these reasons, DCF models should be used with caution as one of many tools in setting executive compensation.

Applying DCF Analysis to Intel

The case of Intel provides a striking example of how discounted-cash-flow models can help directors discharge their duties. Consider that in August of 2000, Intel traded as high as $74.88 per share. During the next month, the stock began to weaken, closing at $61.48 on September 21. After the close of the market that day, Intel issued a press release that warned of weaker sales in the third quarter, particularly in Europe. In response, the stock plunged almost 30%. By September 26, the price had dropped to $43.21 — more than 42% below its peak a month earlier.

Using highly aggregated data based on information that was publicly available at the time, I created a discounted-cash-flow model for Intel as of September 2000. Although Intel directors would have had access to much more complete models that made use of detailed internal information, the model based on public records is a useful tool for understanding movements in the company's stock price and assessing management performance.
The model would have showed directors that even the price of $43 per share would have required extraordinary growth in revenue and earnings to be justified. By the fall of 2000, Intel’s sales were running at an annual rate of more than $30 billion. But to justify a stock price of $43, sales would have had to more than triple in just eight years to more than $100 billion. In turn, sales needed to justify the peak stock price of $75 were truly stratospheric. Based on that analysis, the directors would have realized that the peak price was almost certainly unsustainable.

Rather than stabilizing at $43, Intel’s stock price plummeted another 70% in the following two years. In the fall of 2002, Intel traded as low as $13 — down more than 82% from its high and translating to a loss of shareholder wealth in excess of $400 billion (the largest loss in shareholder wealth ever experienced by any company, even after adjustment for inflation, and more than five times the loss in value associated with the collapse of Enron). Such a dramatic evaporation of shareholder wealth raises an obvious question about management’s role in the decline. At minimum, directors would have to investigate the extent to which management missteps were responsible for the huge loss. Proper application of the DCF model is critical to this investigation. When analyzed in conjunction with news that affected the marketplace while Intel’s stock was falling, it reveals that there was no management problem.

The story has two components. The first is market overvaluation, which was certainly in play at the $75 price all the way down to $43. To the extent that investors accepted the dramatic growth assumptions implicit in such high valuations, they were acting on their own. The company never released information to suggest that such a high rate of growth could be maintained for close to 10 years. Intel’s management could hardly be held responsible for the market’s “irrational exuberance.”

Furthermore, Intel’s accounting and communications were remarkably transparent. By reading the company’s press releases and financial reports, investors could learn the three salient facts related to valuation in the fall of 2000. First, the company’s revenues and earnings were still closely tied to the personal computer market. Approximately 85% of the revenues for fiscal 2000 were from the sale of chips for PCs. Intel’s primary objective was to maintain its dominant position in the PC chip market by continually improving its product line. Second, the company explained that to maintain growth rates even close to historical averages, it would have to diversify its product line significantly. By the fall of 2000, efforts were under way to push Intel products into numerous new industries, particularly telecommunications. Finally, the company stated that to achieve the first two objectives, it would have to invest heavily, spending billions on R&D and the construction of state-of-the-art fabrication plants.

The story’s second component was the collapse in technical spending that began in 2000 and included an unexpected drop in
PC sales. After two decades of rapid growth, sales of PCs leveled off in 2001 and actually fell in 2002. These developments came as a shock to industry experts and stock market analysts. The impact on Intel was devastating. Revenue and earnings, both of which had been projected to continue to grow in the fall of 2000, fell sharply. Earnings for fiscal 2002 were 71% lower than they were for fiscal 2000. Not surprisingly, estimates for long-term future revenue and earnings growth have also been revised downward sharply; the projections available as of fall 2002 are consistent with a stock price in the range of $13 to $19, depending on exactly whose projections are used. And Intel was, in fact, trading in this range at the time.

Despite the unprecedented loss in shareholder wealth, the Intel story does not indicate a problem with management. Other than somehow anticipating the collapse of IT spending, there was nothing it could do but react to the problem with appropriate cutbacks and reassessments — which is precisely what it did, while continuing to invest significantly in new fabrication plants and chip technologies. Although one may argue with the details of management's reaction to the massive IT recession, it is not possible to argue with their actions on the whole in guiding the company. The striking fact is that by careful application of DCF analysis, directors could have comfortably concluded that the greatest loss in shareholder wealth ever recorded did not require particular action on their part.

Requirements for Directors

Unlike attorneys, doctors, stockbrokers and others, directors do not have to have any specialized training or meet a set of professional requirements. But specific jobs require specific skills, and directors must be able to assess whether management is doing all it can to increase shareholder value. Given the immense responsibilities of boards of major public corporations, it is not unreasonable to require a minimum level of understanding of valuation analysis on the part of the majority of any given board.

This does not mean that every director must be a financial professional. The financial knowledge necessary to understand how value is created could be conveyed in a relatively short course that focused on finance and accounting. It would be easy for any of the leading U.S. business schools to design such a course for future directors and teach it on a regular basis.8

No matter how independent or well-intentioned directors are, they will have great difficulty discharging their duties to shareholders of large, complex corporations without adequate information and the ability to analyze it. The combination of a sequence of DCF valuation models and the historical record of observed financial performance provides directors with the key information they need. By examining these figures over time, boards will be able to question corporate managers meaningfully and understand whether their performance has been effective or weak, honest or deceptive.

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1. It would be extraordinarily costly to duplicate management efforts, even partially, and the massive bill would have to be paid by shareholders. It is far from obvious that it is in shareholder interest to pay for such duplication. In addition, the dual management structure could be paralyzing. Companies with joint CEOs are often characterized by infighting and conflict rather than effective management. Institutionalizing such an arrangement could well be a disaster. Moreover, this drastic step would penalize well-functioning companies and their shareholders in order to prevent malfeasance at a few. Overall, the cost-benefit trade-off associated with developing independent board "managers" would be decidedly unfavorable, assuming that it is feasible in the first place.

2. Some critics have argued that the excessive focus on shareholder value, rather than being a solution, was one of the causes of board failure. When examined more closely, however, these criticisms are targeted at the emphasis on short-term financial performance or attempts to push the stock price above levels consistent with the company's fundamental value. DCF models overcome both problems by focusing both management and directors on the steps that need to be taken to maximize the ability of the business to produce long-term cash flow. If the company delivers on the business plan at the foundation of its DCF model, the stock price will come to reflect its fundamental value.


5. This ignores the impact of taxes. Depending on the tax rate, expensing rather than amortizing costs will increase current cash flow despite the fact that it decreases earnings, because it reduces current taxes.


8. It is important to stress that providing the sequence of detailed models is more important than the financial sophistication of the directors (the SEC's focus). Intelligent men and women, with sufficient willingness to do their homework, can come to understand the operation of a DCF model. And even the most sophisticated financial analyst who does not have access to a sequence of detailed models can have a difficult time understanding the economic implications of short-run financial forecasts that fail to illuminate long-term business plans and make vague statements like "the company's performance was hurt by softness in the European market." It is interesting to speculate, for example, how Enron's board would have responded to a DCF model showing the sales and revenue targets that the company would have to hit to justify a stock price of $70, to say nothing of $120.