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Does the Adoption of "Economic Value Added" Improve Corporate Performance?

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DOES THE ADOPTION OF "ECONOMIC VALUE ADDED" IMPROVE CORPORATE PERFORMANCE?

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Abstract:

Determining how to properly measure corporate performance is one of the most important problems in contemporary corporate finance. Without a sound mechanism to evaluate managerial performance, a corporation's management has no adequate standard to be judged by. This can destroy the firm's value very quickly through poor managerial decisions. For this reason, managers need to be evaluated and compensated based on a performance measure that truly demonstrates the changes in a company's value.

The interests of executives and shareholders do not always coincide, as can be seen through many of the current corporate scandals. Thus, it is almost universally argued that the best way to align these interests is through incentive-based managerial compensation. As a result, the corporate world is constantly searching for the best financial performance measure to use for managerial compensation; the better a measure explains the changes in a corporation's value, the more beneficial it is in assessing managerial performance. Some typical methods to used to compensate and evaluate management include plans based on accounting performance or stock options / ownership. Recently, a new method has become a popular method to better align these interests - Economic Value Added (EVA).

This paper focuses on the improvements in firms that adopt EVA for managerial evaluation and compensation. It compares the performance changes in firms that adopt EVA and matching firms (based on industry, asset size, and profitability) that do not adopt EVA. The time period of this study spans from 1985-1997.

The results of this study show what types of companies would likely improve corporate performance through the adoption of EVA, and in addition, firms that could benefit from adopting EVA will choose to do so.

After the adoption of EVA, numerous studies claim the adopting firms experience significant improvement in operating performance and stock performance. Accordingly, I observed the changes in both the operating performance (measured by returns on assets) and the stock performance (measured by abnormal stock returns, based on a portfolio of similar firms) of adopting and non-adopting firms.

The results of this study provide strong evidence that firms which adopt Economic Value Added tend to experience significant improvement in important performance metrics, specifically changes in returns on assets and abnormal stock returns. Adopting firms increased (from one year prior to adoption to three years after adoption) their annual return on assets by 2.68%, while non-adopters' annual return on assets declined by 0.58%. Even more convincingly, a large disparity exists in the stock performance of the adopting firms and non-adopting firms. Contrary to the results of certain previous studies, I found in the three years following EVA adoption, adopting firms outperformed the rest of the market by 25.66%, while the non-adopting firms under-performed the rest of the market by -21.10%. All of the results fisted in this paragraph are significant at the 5% level.

These findings are consistent with prior research arguing that firms which adopt Economic Value Added tend to experience significant improvement in important performance metrics, specifically changes in returns on assets and abnormal stock returns. In summary, EVA can be a great way to create value for shareholders.

1. Introduction:

One of the most important problems of contemporary corporate finance is how to properly measure corporate performance. Without a sound mechanism to evaluate managerial performance, a corporation's management has no adequate standard to be judged by. This can destroy the firm's value very quickly through poor managerial decisions. For this reason, managers need to be evaluated and compensated based on a performance measure that truly demonstrates the changes in a company's value.

In order to maintain a successful business, it is vital for a company to compensate its executives based on the company's performance. These incentives give management the prerogative

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to do their best to improve the company's, performance; otherwise executives might not put a faithful effort into their jobs. What is in the best interest of a company's shareholders and what is in the best interest of the company's managers may be entirely different things. This conflict of interest is commonly referred to as the "agency problem." Due to this problem, it is critical to give management the incentive to improve a company's performance. According to Garvey and Milbourn (2001), "There is near unanimity in the belief that performance-based compensation is a critically important corporate governance mechanism." Hence, management compensation plans are in place to help coalesce shareholders' and manager's interests.

While the top executives of a large corporation typically receive actual salaries in upper six-to seven-figure range, a significant portion of their overall compensation comes in the form of bonuses. Traditional management compensation plans most frequently occur in two ways, providing bonuses based on accounting figures and/or issuing stock options. Accounting-based compensation will commonly reward management for increasing figures like the firm's earnings or sales. Stock options can give the holder the right to buy stock at a certain price within a certain timeframe. Thus, logic behind this sort of plan dictates that executives will want to do as much as possible to improve the company's stock price, in order to maximize their salaries (the more they raise the stock price, the more money they make).

However, as Jensen and Murphy (1990) argue, the overall compensation for a firm's executives does not adequately reflect the performance of the firm. Their study claims that a corporate leader has little incentive to improve the corporation's performance. According to their research, there is a very minimal, if any, correlation between executive compensation and corporate performance'.

If this is truly the case, then why are the performance measures used to compensate corporate managers so crucial? Jensen and Murphy (1990) claim the most important aspect of executive compensation is not how much you pay them, but how. According to the findings of Wallace (1997), firms that adopted a residual income measure for managerial compensation improved their residual income, essentially supporting the adage 'you get what you measure and reward.' Thus, if a corporation utilizes the best (i.e. most valued by investors) performance measure to evaluate and compensate its management, it will likely improve its performance in that metric. But does the maximization of certain accounting or stock variables actually lead to value creation and if so, which ones? This is the ultimate question in assessing methods of measuring corporate performance.

Biddle, Bowen, and Wallace (1997) argue that firms with managerial compensation plans based on earnings outperform other types of plans. Others, such as Jensen and Murphy (1990) claim compensation plans that utilize stock options or ownership are the most effective method. Yet another group of individuals

feel Economic Value Added (EVA) is the best way to solve this problem.

This paper focuses on the performance changes in firms that adopt a new performance measure (for managerial evaluation and compensation) that has recently become quite popular, EVA. It compares the performance changes in firms that adopt EVA and matching firms (based on industry, asset size, and profitability) that do not adopt EVA. The time period of this study spans from 1985-1997.

This research shows what types of companies would likely improve corporate performance through the adoption of EVA, and in addition, firms that could benefit from adopting EVA will likely choose to do so.

Most importantly, this paper also provides evidence that firms which adopt Economic Value Added tend to experience significant improvement in important performance metrics, specifically changes in returns on assets and abnormal stock returns. Adopting firms increased (from one year prior to adoption to three years after adoption) their annual return on assets by 2.68%, while non-adopters' annual return on assets declined by 0.58%. Even more convincingly, a large disparity exists in the stock performance of the adopting firms and non-adopting firms. Contrary to the results of certain previous studies, I found in the three years following EVA adoption, adopting firms outperformed the rest of the market by 25.66%, while the non-adopting firms underperformed the rest of the market by -21.10%.

Section 2 explains the concept of EVA, along with its alleged benefits and drawbacks. The hypotheses are listed in Section 3. The description of the sample and summary statistics of the sample are displayed in Section 4. Section 5 discusses the empirical results. The summary is located in Section 6.

2. What is EVA?

2.1 Concept of EVA:

Economic Value Added is a form of residual income; that is, it is the residue left over after all costs have been covered, according to Ehrbar and Stewart (1999). As such, it is a measure of how much value a company has created. What EVA does is require management to provide a return above what investors expect to receive. EVA and economic profit are relatively synonymous. Stem & Stewart trademark EVA, while economic profit is essentially the same thing, only it is used by Stem & Stewart's competitors like Boston Consulting Group or KPMG.

EVA takes into account the return stakeholders in a company expect. This is accounted for in a company's weighted average cost of capital (WACC).

$$WACC = R_E * (E / V) + R_D * (D / V) * (1 - T_C)$$

Where: R_E = cost of equity

R_D = cost of debt (%)

E = market value of equity

D = market value of debt

V=D+E

T_C = corporate tax rate

What WACC essentially does is it takes into consideration what every dollar of capital invested in the company is expected to return. After a company's WACC has been calculated, then EVA can be calculated using the following formula:

EVA = NOPLAT - (WACC * TC)

Where: NOPLAT = net operating profit less adjusted taxes

TC = total capital[2]

Through this computation, EVA is able to determine whether or not a company produced a return equal to, less than, or above the return its stakeholders expected. According some to Ehrbar and Stewart (1999), the foundation of EVA's capital charge (TC) dates all the way back to Adam Smith, in that a business has to produce a minimum, competitive return on all of the capital invested in it. The most unique aspect of EVA is in its accounting for the required return of both debt and stockholders. This is unquestionably one of its most valuable traits.

2.2 Benefits of EVA:

One of the more compelling arguments for EVA is in its effects on all levels of employees. When firms implement EVA, Stern & Stewart sends some of its professionals out to orchestrate the process. They have a procedure that allows them to slowly integrate EVA into the firm. As employees are taught the specifics about value creation, they become much more aware about the effects their decisions have on the company's value.

For managers in a firm that gives bonuses based on EVA results, there is no limit to how much they can earn. Proponents of EVA claim this encourages managers to increase their company's performance as much as possible. Additionally, managers are encouraged to set more ambitious goals for the company, since managers are compensated on EVA instead of meeting the goals they set for the company (which would likely be set too low by management, in order to ensure they get their bonuses).

Various studies have found EVA adopting companies outperform non-adopters in certain areas. One of the most often quoted is in the improvements to adopters' stock performances. For instance, Wallace (1997) states, "Finally, weak evidence suggests that market participants respond favorably to adoption of residual income-based compensation plans, as evidenced by increased stock returns." Many articles written by the developers

of EVA, Joel Stern and G. Bennett Stewart, argue that EVA is highly correlated to market value added (MVA)[3]. Basically, they argue that MVA is (and should be) the overall goal a successful company achieves when it produces positive EVA.

Perhaps the most beneficial aspect of EVA is its ability to judge performance at the divisional level. For multi-divisional companies, the inability to judge and reward divisional performance apart from company performance is one of the most prevailing criticisms of bonuses through stock options. Using stock options can cause one or more divisional managers to take credit for the other divisional managers' efforts. If a company's stock price goes up, but one division performs poorly, that divisional manger will still reap the rewards of the other divisions' performance.

EVA can prevent this from occurring. Each division has its own "hurdle" to clear. For instance, a firm could have two divisions, A (WACC=10%) and B (WACC=20%). If A had a 13% return (3% above required return) and B had a 16% return (4% below required return), then the managers of division A would receive bonuses, and division B's managers would not take credit for division A's efforts, even though B's return was higher than A's.

EVA has exacting demands for what type of return a company is providing for its shareholders. Its supporters feel EVA does a better job of incorporating the overall impact a company's projects make on its invested capital. In their opinions, management is encouraged to follow shareholders' interests more closely with EVA-based plans than in traditional forms of managerial evaluation and compensation.

2.3 Criticisms of EVA:

As stated earlier, not all companies use the same adjustments to EVA. In fact, the number and type of adjustments that are used can vary widely. In his survey, Weaver (2001) found that of the 36 potential adjustments observed, the average company uses roughly nineteen (with a minimum of seven and maximum of 34). This variability in the determinants of EVA fuels a lot of criticism from its opponents, in addition to an adverse reaction from people unfamiliar with the metric. AT&T adopted EVA, only to abandon it later for several reasons, one being the complexity of the metric, according to Ittner and Larcker (1998).

Some research has found that EVA has a lower correlation to stock performance than other performance metrics. In their paper (frequently cited and/or attacked), Biddle, Bowen, and Wallace (1997) compare operating cash flows (CFO), earnings before extraordinary items (EBEI), residual income (RI), and Economic Value Added (EVA). Their empirical "... results suggest that, in terms of relative information content, earnings significantly outperforms RI, RI significantly outperforms EVA (although the gap here is smaller), and all three outperform

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CFO." As they point out in the paper, these results almost mirror the results of Vuong (1989).

Other critics of EVA are quick to site that EVA is too present-minded. They feel it can encourage managers to liquidate their assets prematurely, in order for management to receive large benefits from selling parts of the company that may or may not be beneficial to liquidate[4].

As stated earlier, EVA is one method in place to align managerial decisions with shareholders' interests. In a 1994 roundtable discussion, Professor Jerold Zimmerman argues EVA has solved part of this problem. He contends that the creators of EVA have succeeded in putting the net present value (NPV) / discounted cash flow (DCF) method into a form which can be used by some corporations for performance measurement. However, he feels EVA does not work well in firms that are unwilling to decentralize. In other words, for EVA to be effective firms must be willing to "empower" operating managers; they must be comfortable with less of a "top-down" corporate structure.

Some argue that EVA isn't the factor behind improved company performance. Rather, as Wallace (1997) notes, "Firms that adopt new performance measures in their compensation plans may be changing other aspects of their environment. This is alleged to be the case with firms adopting EVA. In particular, firms that use the consulting firm Stem Stewart and Co. to help them implement an "EVA financial management system" often increase the intensity of their incentives along with increased education leading to employees having a greater awareness of the opportunity cost of capital and value creation. It is therefore possible that the observed effects attributed to the residual income measure are at least partially the result of environmental changes."

Another criticism of EVA stems from the fact that a lot of EVA adopters were performing poorly at the time of adoption. As a consequence, critics claim the change to EVA isn't the primary factor in improved performance as much as the fact that something, rather, anything needed to be done in order to change the company's performance. For instance, Hogan and Lewis (2001) feel "closer examination of the adopting firms indicates that they are relatively poor performers prior to adoption of these plans, however, and that the improved stock return and operating performance may not be unique to [EVA] adopters.5" They maintain adopters of EVA improve their operations and stock performance, but the improvements are roughly the same as comparable firms that do not adopt EVA.

More specifically, Hogan and Lewis (2001) found that adopters significantly improved their long-term operating performance, as measured by numerous accounting measures such as returns on assets from the year prior to adoption to four years after adoption. Although they found improvement in operating measures such as ROA, they did not find the improved

performance to be significantly different from non-adopters. In addition, Hogan and Lewis find no significant difference in the stock performance of adopters (18.6%, on an annualized basis) and non-adopters (23.4%) in the four years following adoption.

3. Hypotheses:

Clearly, a lot of studies have been conducted in determining the best method to alleviate the "agency problem" in corporate management. More specifically, researchers have been trying to solve what form of managerial compensation produces superior results in companies' financial performances.

The purpose of this paper is to determine whether or not EVA adoption improves companies' financial performances. As Wallace (1997) found, the performance measures managers are compensated on will improve. As a result, the more important a performance measure is to an investor, the more beneficial it will be in judging managerial performance.

As many papers such as Hogan and Lewis (2001) suggest, the performance measures investors arguably care the most about - returns on assets and stock returns - should be the most relevant measures on which to base corporate performance. In the end it comes down to whether or not an investor makes adequate money on his or her investment.

This paper extends the work of Hogan and Lewis (2001), although it approaches the data in a slightly different manner. While their results suggest no significant improvement due to EVA adoption, their performance metrics may not reflect the true value creation of adopters.

The results of this study differ from Hogan and Lewis (2001) primarily due to the method of determining stock performance. This paper uses a more recent method of determining stock performance, designed by Lyon, Barber, and Tsai (1999). Rather than measuring stock performance based solely on a portfolio using the daily CRSP value-weighted NYSE-AMEXNASDAQ index, this paper uses a method which compares firms based on a portfolio that accounts for market value, book-to-market of equity, and prior-performance. Appendix C provides a description of the methodology behind this portfolio derivation.

A corporation will do what it feels is necessary in order to facilitate its primary function: to make money. As Wallace (1997) found, the performance measures managers are compensated on will improve. Thus, if a corporation can compensate managers on a performance measure that more closely approximates what shareholders deem to be important, it will likely do so, as one would expect these performance measures to then improve. Therefore, I argue:

H1: The companies that are expected to benefit the most from the adoption of EVA win, in fact, adopt EVA. In other words, companies are rational; they will attempt to operate in whatever manner proves to be the most profitable.

H2: Firms that adopt EVA should experience substantial improvements in accounting performance as measured by return on assets in addition to significant gains in their stock returns.

4. Description of Sample:

Appendix A contains the sample used in the following analysis. It is a combination of the samples from two papers: "Adopting residual income-based compensation plans: Do you get what you pay for?" by James Wallace (1997), and "The Long-Run Performance of Firms Adopting Compensation Plans Based on Economic Profits" by Chris Hogan and Craig Lewis (2001).

The sample includes fifty-seven firms that adopted compensation plans that use a residual income performance measure. The disclosure in each firms' proxy statements confirmed the adoption of an EPP as well as the specific year of adoption, which ranges from 1986 to 1994. After establishing a sample of adopters, matching firms are then included based on several factors. In Wallace's sample, firms that adopt EVA are matched with firms that utilize earnings-based compensation plans. Except for a handful of firms, matching firms have the same* four-digit SIC and comparable total asset size in the year before adoption. In the sample for Hogan and Lewis, a pool of matching firms in the same two-digit industry is made based on total asset size (between 25% and 200% of the corresponding adopters). Then, all of the non-adopters meeting this criterion are sorted based on which firm has the closest OIBD / Assets ratio, with the closest non-adopter selected as the matching company. If no firm meets this condition, then all of the non-adopters with assets of 90% to 110% of the adopter's total assets are ranked, and the firm with the closest OIBD/Assets is selected as the matching firm.

Many of the adopting firms (such as American Freightways Corporation and Quaker Oats Company) are included in both papers. If an adopting firm was included in both papers (albeit with a different matching firm), then the matching firm listed in Hogan and Lewis's paper is used, since it is a more current paper than Wallace's paper.

Summary statistics for the sample are displayed in Table 1. The sample period consists of data ranging from 1985 to 1997. Through the examination of the appropriate proxy statements, adopters are defined as firms that adopted EVA for managerial compensation. Non-adopters are the firms which have been paired up with the adopting firms, matched up based on the adopters' industry, total asset size, and profitability, as stated in the previous section.

All data was acquired through Compustat. It was collected for each firm in the sample from the year prior to adoption (year -1) to three years after adoption (year 3). The top and bottom outliers for both adopters and non-adopters in each category

were removed. ROA is defined as earnings before interest and taxes (EBIT) divided by total assets. Leverage is defined as total debt to total assets.[6]

5. Discussion of Empirical Data

5.1 Analysis for Probability of EVA Adoption:

Table 2 provides the probit analysis for the probability of EVA adoption. The dependent variable is a (0, 1) dummy variable f6r adopting EVA, where 1 denotes an adopting firm and 0 is a non-adopting firm. Appendix B explains the control variables' possible relationship with the probability of EVA adoption, as well as the predicted relationship to long-term performance. All of the accounting control variables are from the Compustat database.

Sales are found to be positively correlated to EVA adoption in all three models, two of which are statistically significant at the 10% level. This is consistent with claims that EVA is more beneficial for larger corporations, because they are subject to larger agency costs. Cash to Total Assets is very negatively correlated in all three models with the adoption of EVA, all at the 5% significance level. This is to be expected, as more established firms' managers are less likely to be pressured to change their operations. Dividend payout is also negatively correlated with EVA adoption in all three models (two at the 10% significance level); which is understandable, since less risky firms are argued to receive fewer benefits from adopting EVA.

More importantly, the two performance measures added in models 2 and 3 are positively correlated with EVA adoption. In model 2, the change in return on assets from year -I to year 3 is very influential to the probability of adopting EVA, significant at the 10% level. Model 3 includes three-year abnormal stock returns (defined in Appendix C) which is positively correlated with the probability of EVA adoption at the 1% level. These two results support hypothesis H I, that firms which are expected to benefit the most from EVA will adopt EVA.

5.2 Changes in Returns on Assets:

Table 3 lists the performance changes of adopters and non-adopters. Δ ROA (Absolute) is the difference between ROA in year 1 (or 3) and year -1. Δ ROA (Relative) is the relative change in ROA from year 1 (or 3) and year -1. Its formula is[7] :

$$\Delta ROA \text{ (Absolute)} = ROA_{YR\,1} \text{ (OR 3)} - ROA_{YR-1}$$

$$\Delta ROA \text{ (Relative)} = (ROA_{YR\,1\,(OR\,3)} - ROA_{YR-1}) / ROA_{YR-1}$$

The abnormal stock returns for one (and three) years are the abnormal returns from year 0 to year 1 (or 3).

Adopting firms dramatically improved their performance in all six categories. The medians for A ROA (Absolute) from year -I to year 3 and A ROA (Relative) from year -I to year I are significant from zero at the 5% level. The medians for the other

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two ROA changes are significant from zero at the 10% level. This evidence is consistent with Wallace (1997) in claiming the adoption of EVA improves firms' return on assets. This partially supports the research of Hogan and Lewis, as they found that adopters significantly improved their long-term operating performance, measured by numerous accounting measures such as returns on assets from the year prior to adoption to four years after adoption. Although they found improvement in operating measures such as returns on assets, they did not find the improved performance to be significantly different from non-adopters.

Contrary to the results of Hogan and Lewis (2001), the changes in ROA for the firms that adopted EVA significantly outperformed the changes in ROA for the firms that did not adopt EVA in every single category. Half of the medians for non-adopting firms are significant from the difference in the two samples at the 5% significance level. Of particular note, the absolute change in the return on assets of adopters (year -1, year 3) is 2.68%, while the absolute change in non-adopters' ROA is -0.58%. These medians are significant from each other at the 5% level. This analysis supports hypothesis H2, as it provides pretty conclusive evidence that the adoption of EVA can dramatically improve a company's return on its assets.

5.3 Changes in Abnormal Stock Returns:

The last two columns of Table 3 report the abnormal stock returns (defined in Appendix Q. Both the mean and median improvements over one and three years of EVA adopters considerably outperformed the market over both the one and three year time periods following adoption. Both the medians and even the means are significant from zero at the 5% level. This evidence supports Stem & Stewart's claims that adopting Economic Value Added can significantly increase a firms' MVA.

The differences in abnormal stock returns for adopters and non-adopters are also very significant. The median one-year and three-year abnormal stock returns for adopters (both significant at 5% level) are 8.62% and 25.66%, respectively. On the other hand, the non-adopters' abnormal stock returns (0.28% and -21.10%) were not as enviable. The three-year non-adopter abnormal return of -21.10% is statistically significant from the difference in the medians of the two sub-samples (adopters and non-adopters) at the 5% level. This provides strong evidence in support of H2, that the adoption of EVA can improve firms' stock performance.

5.4 Regression Analysis of Performance Changes in Samples:

Regression analysis of the performance changes in EVA adopters and non-adopters is provided in Table 4. The dependent variables in the four models are different performance measures: the absolute changes in return on assets from year -1 to year 1, relative changes in ROA from year -I to year 3, abnormal stock

returns over a one year period (year 0 to 1), and abnormal stock returns over a three-year period (year.0 to 3). Five independent variables are regressed against these dependent variables, which are explained in further detail in Appendix B.

Of all the results from the analysis, the most important is the strong correlation found between the adoption of EVA and three of the four different performance measures. EVA adoption is determined using a "dummy" variable, i.e. a (0,I) statistic, where I denotes the adoption of EVA in year zero and 0 implies a firm did not adopt EVA in year zero. EVA adoption is positively correlated with the absolute change in return on assets (year -1, year 3), significant at the 5% level. One year abnormal returns are also positively correlated with adoption (at the 10% level). Most noticeably, the coefficient for three year abnormal returns (0.4976) is significant at the 5% level. This result provides a very strong confirmation of hypotheses H 1 and H2.

These results are in stark contrast to those presented by Hogan and Lewis (2001), who find no significant difference in the annual stock performance of adopters (18.6%, on an annualized basis) and non-adopters (23.4%) in the four years following adoption. However, these differences are not that unexpected, as it should be mentioned that the results in this study utilize more recent methods for determining stock performance, designed by Lyon, Barber, and Tsai (1999).[8]

Again, both of the three year performance measures show EVA adoption to be positively correlated, significant at the 5% level, while adoption is positively correlated to the one year abnormal returns at the 10% level. The stronger correlation between adoption and three-year performance measures can be explained fairly simply. It takes time to implement EVA. The effects of adoption should be more pronounced at a three-year interval, as a longer time is provided for the adopting firm to adjust to its new financial management system.

6. Conclusion:

Determining the best way to measure corporate executive performance is a crucial problem for any firm. If managers can be properly evaluated, their compensation can be used to align managerial and shareholder interests, combating agency costs and helping maximize shareholder wealth.

This paper provides analysis as to why EVA is a proficient way to accomplish this. It contradicts the findings of Hogan and Lewis (2001), which establishes that even though adopters significantly improved their long-term operating performance (according to numerous accounting measures such as ROA and OIBD/Assets), their improved performance was not significantly different from non-adopters. In addition, Hogan and Lewis argue adopters' stock performances were not significantly different from non-adopters.

Meanwhile, this paper finds EVA adopters significantly outperform non-adopters in improvements to their operational

performance (as measured by returns on assets) and abnormal stock returns. For instance, adopters' median improvement in returns on assets from year -1 to year 3 is 2.68% (significant at the 5% level), whereas non-adopters' median change in returns on assets for the same period is -0.58% (also significant at the 5% level). Furthermore, adopters outperform the stock market (from year 0 to year 3) by a median of 25.66%, while non-adopters experience median abnormal returns of -21.10%. Both values are significant at the 5% level.

These results are consistent with prior research (O'Byrne, 1999, Stewart, 1994, Stem et al, 1995) arguing that firms which adopt Economic Value Added tend to experience significant improvement in important performance metrics, specifically changes in returns on assets and abnormal stock returns. In summary, EVA can be a great way to create value for shareholders.

Endnotes:

[1] Jensen and Murphy (1990) determine a wise decision from a CEO which increases a company's market value by $100 million will result in a two-year increase in a CEO's compensation of $6,700, while a decision (that is beneficial for executives, but not shareholders, such as the purchase of a new aircraft for the corporate fleet) which destroys $10 million in shareholder value will result in lowering a CEO's compensation by $25,900. Frankly, neither of these scenarios should matter much to someone who is likely making more than $20,000 per week. In their opinion, a large part of this problem is due to the intense public criticism of the seemingly excessive compensation of corporate managers. In order to appease public opinion, corporate boards are less apt to truly pay managers based on the firm's performance, which, by essentially compensating executives at a relatively stagnant amount, executives are given little incentive to improve the performance of the firm.

[2] TC is roughly the value of all of a company's assets. However, before EVA can be calculated, adjustments are usually made to both NOPLAT and TC. Examples of this include adding research and development expenditures to NOPLAT or adding back accumulated goodwill and operating leases to TC. Over one hundred adjustments to these figures can be used in calculating EVA. Interestingly enough, not all companies use the same adjustments, and most companies tend to use only up to 5-6 adjustments consistently (Garvey and Milbourn.(2001)).

[3] MVA is the defined as the difference between a company's current market capitalization and the economic book value of the capital it employs.

[4] While this is a valid criticism, this argument can be applicable to virtually any executive compensation scheme. Typically, different compensation plans have measures that attempt to account for this "time-horizon" agency problem. According to Stem et al (1995), EVA combats this through the use of its "bonus bank," which partially delays (and possibly negates) the payment of EVA-based bonuses, dependant on the company's future health.

[5] In their paper, Hogan and Lewis set out to determine the long-term effects of EVA adoption, particularly its effects on accounting operating performance (returns on assets (ROA), operating income before depreciation to total assets (OIBD/Assets), etc.) and stock returns.

[6] Definition for leverage in terms of Compustat variables is: Leverage = [(data9 + data34) / data6]

[7] ROA definition is EBIT / Total Assets. ROA definition in terms of Compustat variables is: ROA = [(data 13 – data 14) / data 6]

[8] Hogan and Lewis measure stock performance (for the four years after adoption) based on a portfolio using which uses the daily CRSP value-weighted NYSE-AMEX-NASDAQ index. This paper uses a method which measures stock performance (for the three years after adoption) based on a portfolio that accounts for the market value, book-to-market of equity, and prior-performance of firms.

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Faculty Comment:

Mr. Bell's mentor, Tomas Jandik, made the following comments about his student's work:

Matt's research topic was exceptionally relevant - both because of its importance for contemporary financial research and because it allowed Matt to acquire analytical skills and financial intuition very beneficial for his future business career. The project execution on Matt's part was flawless. Not only he was able to theoretically familiarize himself with the problem of optimal measurement of corporate performance, but he also undertook empirical data analysis of the long-term performance of firms adopting so called "performance compensation plans." He extended the work of several influential finance studies on this topic and, notably, found very contrasting results leading to different conclusions from previously published financial studies. As a result, Matt Bell's thesis is not just a simple literature review study. It is a quality empirical financial analytical project. In contrast to some previous financial studies, the results of Matt Bell's honors thesis suggest that companies adopting "Economic Value Added" methodology to compensate managers outperform their non-adopting peers in the long run.

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The problem that Matt studied is far from clear cut. In fact, the ability of Economic Value Added methodology to motivate managers to create value has been quite a controversial topic in contemporary corporate finance. Whereas many people agree that managers who are paid based on their firm's performance make better corporate decisions and create more wealth for their investors, experts differ in their opinions on how to properly measure the "true" corporate performance.

Recently, an increasing number of finance practitioners has been claiming that a newly developed method for measuring corporate performance called "Economic Value Added" (EVA) can do the best job at measuring true corporate performance. EVA uses sophisticated financial techniques to create unique profit targets—based on the nature of business and the amount of currently invested capital—for each of company's divisions. As a result, each divisional manager can be properly motivated to create value and thus, the proponents claim, EVA generates a superior performance-monitoring scheme compared to traditional stock and accounting profits based methods.

Matt Bell's research (based on sound financial methodologies) did uncover very interesting results that suggest Economic Value Added is indeed a superior method for motivating managers to create wealth. One can say that thanks to how controversial and unresolved EVA topics are, Matt Bell's honors thesis provides a true contribution to the contemporary finance research.

Appendix A. Sample

Adopters			Non-Adopters	
Name	CUSIP	Year of Adoption	Name	CUSIP
Georgia-Pacific Group	37329810	1986	Fort Howard Paper Company	34746110
Donaldson Co Inc	25765110	1987	AST Research Inc	00190710
CSX Corp.	12640810	1988	Santa Fe Pacific	80218310
Orange Co	68417710	1990	Riverbend International Corp	76857510
Briggs & Stratton	10904310	1991	Data General Corp	23768810
Crane Co.	22439910	1991	Capital Associates, Inc	13973020
Quaker Oats Co	74740210	1991	Deans Foods Co.	24236110
Brandon Systems Corp	10530310	1992	Rational Software Corp	75409P20
Cincinnati Milacron Inc	17217210	1992	Network Systems Corporation	64121710
Ball Corp	05849810	1992	Trimas Corporation	89621510
Cabot Oil & Gas Corp	12709710	1992	Unit Corporation	90921810
Vigoro Corp	92675410	1992	Mylan Laboratories	62853010
Applied Power	03822510	1993	Banctec Inc	05978410
Applied Bioscience Intl Inc	03791710	1993	Enron Corp	29356110
Wellman Inc	94970210	1993	Minerals Technologies Inc.	60315810
Scott Paper Co.	80987710	1993	Union Camp Corp	90553010
Harnischegger Industries Inc	41334510	1993	Tandem Computers Inc.	87537010
Allegheny Teledyne Inc / Teledyne	01741510	1993	Carpenter Technology Corp	14428510
W.W. Grainger, Inc.	38480210	1993	Waxman Ind	94412410
National Data Corp	63562110	1993	Olsten Corp	68138510
Primark Corp	74190310	1993	Ceridian Corp	15677T10
American Freightways Corp	02629V10	1993	Intrenet, Inc.	46119010
Comptronix Corporation	20476C10	1993	Supertex Inc	86853210
Duracell International, Inc.	26633010	1993	Sunbeam Oster Co Inc	86707110
R P Scherer Corp	80652810	1993	Calgon Carbon Corp	12960310
L.A. Gear Inc	50170810	1994	Vans, Inc.	92193010
Coca-Cola Co	19121610	1994	Kellogg Co.	48783610
Eastman Kodak Co	27746110	1994	Loral Corp	54385910
Johnson Worldwide Associates	47925410	1994	Oneida Ltd	68250510
Kinetic Concepts Inc	49460W10	1994	Chromcraft Revington, Inc.	17111710
Pepsico Inc	71344810	1994	Anheuser Busch Cos. Inc.	03522910
Autoclave Engineers, Inc.	90921C10	1994	Gelman Sciences	36851410
TransAmerica Corp.	89348510	1994	Loews Corp	54042410
Deere & Co	24419910	1994	Apple Computer Inc.	03783310
HJ Heinz Co	42307410	1994	Whitman Corp.	96647K10
Ashland Inc.	04420410	1994	Petro-Canada Inc.	71644E10
Varity Corporation	92224R60	1994	Goodrich B F	38238810
Furon Co	36110610	1994	Carlisle Plastics Inc	14252210
Tektronix Inc	87913110	1994	United States Surgical Corp	91270010
Incstar Corp	45337010	1994	Gamma Biologicals Inc	36465710
Jefferies Group, Inc.	46145F10	1994	Legg Mason Inc	52490110
American Precision Inds	02906910	1994	Howell Industries, Inc.	44307310
Manitowoc Co	56357110	1994	Telxon Crop	87970010

Appendix A. Sample (continued)

Adopters			Non-Adopters	
Name	CUSIP	Year of Adoption	Name	CUSIP
Equifax Inc	29442910	1994	Novell Inc	67000610
Merrill Lynch and Co., Inc.	59018810	1994	Salomon Inc	79549B10
Medtronic Inc	58505510	1994	Stryker Corp	86366710
Premark International Inc	74045910	1994	Pall Corp	69642930
Maritrans Inc	57036310	1994	Seacor Holdings (Seacor Smit)	81190410
Beckman Instruments, Inc.	07581110	1994	Perkin-Elmer	71404610
Tennant Co	88034510	1994	Kronos Inc	50105210
Intl Murex Tech Corp	46005H10	1994	Watson Pharmaceuticals, Inc.	94268310
Kaiser Aluminum Corp	48300710	1994	Maxxam Inc.	57791310
Revco D.S. Inc	76133910	1994	Longs Drug Store Corp	54316210
Eastman Chemical Company	27743210	1994	PPG Industries Inc	69350610
Merix Corp	59004910	1994	Koss Corp.	50069210
Matthews International Corp	57712810	1994	Synalloy Corp	87156510
Grancare Inc	38518910	1994	Humana Inc (Extendicare Inc)	30224T87

Appendix B. Control Variables Influencing the Probability of EVA Adoption and Long-Term Firm Performance

Size (Sales and Total Assets)	Positive: Larger firms are subject to higher agency costs, so they may benefit more from adopting EVA.	Larger firms are less likely to go bankrupt, they are more successful.
Free Cash Flows Total Assets	Negative: More successful firms are less prone to change their operations.	Positive: Market has already taken prior performance into account. Negative: If ex-post accounting performance is poor, then performance can likely go nowhere but up.
Market / Book (Assets)	Positive: Riskier companies are frequently considered to benefit more from EVA adoption.	Riskier companies are typically. expected to have more growth opportunities, in addition to being more profitable.
Leverage	Negative: Firms with more debt are monitored more closely than firms with less debt, due to banks' monitoring of their investments.	Indeterminate: Highly levered firms are usually less risky and more profitable, but are also subject to a higher probability of bankruptcy due to the large amounts of debt.
Cash / Total Assets	Negative: More established firms are less likely to be pressured to change.	-
Interest Coverage	Negative: Same reasoning as Leverage.	-
Price / Earnings	Positive: Same reasoning as Market to Book (Assets).	-

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Appendix B, Continued.

Dividend Payout	Negative: More mature firms that have less risk and fewer growth opportunities are more likely to pay dividends.	-
A ROA (Year -1, 3)	Positive: According to Wallace (1997), firms that adopt EVA are likely to improve ROA	-
3 Year Abnormal Stock Returns	Positive: EVA adopters have been argued to experience increased stock performance following adoption.	-

Appendix C. Abnormal Returns

Abnormal stock returns for each firm are calculated in the following manner, first utilized by Lyon, Barber, and Tsai (1999):

1) Fourteen size reference portfolios are generated by separating all firms listed on the New York Stock Exchange into deciles by market value at the time of adoption. The smallest size decile was then separated into quintiles (to account for the fact that Amex and NASDAQ firm are typically much smaller, overpopulating the lowest decile). Amex and NASDAQ stocks are then added into portfolios based on NYSE sizes.

2) Five book-to-market equity portfolios are also constructed. They are established by separating all firms into quintiles based on book-to-market in the year of adoption.

3) Three prior-performance reference portfolios are established by separating all firms into prior-performance terciles. Prior performance is measured as a twelve month buy-and hold strategy.

4) Each target firm is then matched to all firms that belong in, the same size, book-to-market, and prior-performance portfolios. The abnormal return for each target firm is then calculated as the difference between the buy-and-hold return of the company and the buy and-hold return of the portfolio. If either the target firm or any other firm in the portfolio delists, then proceeds from the investment are re-invested into an equally-weighted market CRSP return until the maturity of the investment.

5) Finally, the abnormal sample firm portfolio return is then' computed as the difference between average sample firm returns and average returns on matched portfolios.

Table 1: Sample Summary Statistics

The sample period consists of data ranging from 1985 to 1997. Adopters are defined as firms that adopted EVA, which was determined through the examination of appropriate proxy statements. Non-adopters are the firms which have been matched up to adopting firms, as stated previously in the paper. The following data was acquired through Compustat for the years prior to adoption (Year -1) to three years after adoption (Year 3) for both adopters and non-adopters. ROA is defined as EBIT divided by total assets. Leverage is defined as total debt to total assets.

Compustat Formulas for Variables: Total Assets = [data6] ROA = [(data13 - data14) / data6] Leverage [(data9 + data34) / data6] Market to Book (Assets) = [fdata25 * data199 + (data6 - data,60)) data6] Price to Earnings = [data199 / data58] Capital Expenditures (CAPEX) to Assets = [data30 / data6]

	Adopters			Non-Adopters		
	Mean	Median	STD	Mean	Median	STD
Total Assets	3357.6	630.2	6968.5	4847.9	652.9	23416.9
ROA (Year -1)	10.08%	9.73%	5.48%	10.62%	8.67%	6.72%
ROA (Year 0)	10.45%	10.59%	6.04%	10.73%	9.76%	6.19%
Leverage	693.2	117.3	1623.8	403.5	75.2	786.0
Market / Book (Assets)	1.601	1.536	0.601	1.657	1.420	0.655
Price / Earnings	14.379	15.450	14.858	14.783	17.250	15.156
CAPEX / Assets	0.060	0.063	0.028	0.056	0.047	0.033

Table 2: Analysis of EVA Adoption Probability

Table 2 examines factors that may influence a firm's decision to adopt EVA. The dependent variable is a (0, 1) statistic, where the variable is equal to I if a firm adopted an EVA metric, and the variable is equal to 0 if a firm did not adopt EVA. Free Cash Flows to Total Assets is defined as (Operating Income Before Depreciation - Interest Expense - Income Taxes - Preferred Dividends - Common Dividends) / Total Assets. A ROA (Year -1, 3) is the absolute difference between a firm's ROA in year 3 and year -1. Interest Coverage is (Interest Expense + Pretax Income) / Interest Expense. 3 Year Abnormal Stock Returns (as defined previously) is a measure of the firms' abnormal stock performance from year I to year 3. T-statistics are in parentheses.and * demonstrate variables' significance at 1%, 5%, and 10%, respectively.

Compustat Formulas for Variables: Free Cash Flows / Total Assets = [{ data13 - data15 - data16 -data19 - data21)j / data6] Interest Coverage = {(data15 - data70) / data51

	Model 1	Model 2	Model 3
Intercept	0.6499 (1.28)	0.6849 (1.18)	0.7051 (1.22)
Sales	0.0618* (1.72)	0.0430 (1.07)	0.0720* (1.84)
Free Cash Flows / Total Assets	-2.4030 (-0.73)	-5.3751 (-1.38)	-3.9909 (-1.16)
Market / Book (Assets)	0.1142 (0.50)	0.2305 (0.97)	0.2316 (0.91)
Leverage	-1.3563 (-1.49)	-1.1031 (-0.97)	-1.7794 (-1.55)
Cash / Total Assets	-3.4533** (-2.01)	-5.3102** (-2.49)	-5.3742** (-2.47)
Interest Coverage	-0.0223 (-1.60)	-0.0189 (-1.24)	-0.0181 (-1.11)
Price / Earnings	0.0120 (1.40)	0.0192 (1.58)	0.0087 (1.19)
Dividend Payout	-0.4897* (-1.65)	-0.8424* (-1.81)	-0.5412 (-1.20)
Δ ROA (Year -1, 3)	-	5.6379* (1.85)	-
3 Year Abnormal Stock Returns	-	-	0.5888*** (2.63)

Table 3: Performance Changes of Adopting and Non-Adopting Firms

A ROA (Absolute) is the difference in firms' ROA in year 1 (or 3) and year -1. A ROA (Relative) is the relative difference in firms' ROA in year 1 (or 3). Its formula is A ROA (Relative) = (ROAyR 1 (OR 3) ROAyR -1) / ROAyR -1. ***, **, and * denotes significance from zero at 1%, 5%, and 10%, respectively. ###, ##, and # denotes the statistical significance of the difference between subsamples of adopting and non-adopting firms on 1%, 5%, and 10%, respectively.

		Δ ROA (Absolute)		Δ ROA (Relative)		Abnormal Stock Returns	
		(-1,1)	(-1,3)	(-1,1)	(-1,3)	1 year	3 year
Adopters	Mean	0.84	1.71**	12.04	14.22	8.88**	30.51**
	Median	1.56*	2.68**	12.47**	19.50*	8.62**	25.66**
Non-Adopters	Mean	0.48	-1.35##	0.80	-16.30#	-2.66	-13.69##
	Median	0.99	-0.58##	3.66	-7.74##	0.28	-21.10##

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Table 4 Regression Analysis of Performance Changes in Adopting and Non-Adopting Firms

T-statistics are in parentheses. ***, **, and * denotes significance from zero at 1%, 5%, and 10%, respectively.

Dependent Variables	ROA - Absolute (-1,1)	ROA - Absolute (-1,3)	1 Year Abnormal Returns	3 Year Abnormal Returns
Intercept	0.0155 (0.84)	-0.0045 (-0.23)	-0.1446 (-1.39)	-0.2354 (-0.78)
Adoption (0,1)	**-0.0008 (-0.07)**	**0.0286** (2.41)**	**0.1275* (1.94)**	**0.4976** (2.60)**
Free Cash Flows / Total Assets (Year -1)	-0.2421* (-1.75)	-0.8177*** (-5.69)	0.1288 (0.20)	0.2669 (0.13)
Assets (in $thousands) (Year 0)	0.0012 (0.40)	-0.0026 (-0.89)	0.0099 (0.62)	-0.0110 (-0.24)
Leverage (in $thousands) (Year 0)	-0.0024 (-0.17)	0.0087 (0.60)	-0.0308 (-0.40)	0.0835 (0.37)
Market / Book (Assets) (Year 0)	0.0045 (0.41)	0.0377*** (3.44)	0.0628 (1.01)	-0.0022 (-0.01)
N	93	82	81	82
Adjusted R-Square	-0.0045	0.3479	0.01949	0.02619
F-Stat	0.9167	8.1095***	1.3181	1.4358